The RAF Safety Magazine

Issue 48

AirClues

Road Safety

I Learnt About Flying From That!

Normalisation of Deviance

Weather and Climate Change

ROYAL AIR FORCE Safety Centre

Contents

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Foreword

By Air Commodore Sam Sansome, Inspector of Safety (RAF)


Air Commodore Sam Sansome

Welcome to Air Clues 48 – another edition with a wide variety of articles that should mean there is something for everyone! From stalwarts like 'I learnt about flying from that' to an article on weight loss jabs it never ceases to amaze me how there seems to be a safety element to literally every subject. Whilst not a competition, we do of course welcome any articles – or indeed any suggestions for articles – on any subjects you think we have missed or may be interesting to our readership. So, if you have any ideas or feel you have an article in you then please contact us and we can help make it happen.

There is no doubt that the continuing war in Ukraine and heightened tensions and divisions globally has reconfirmed the need for the Royal Air Force – and those of our allies – to be ready to 'Fly and Fight'. This capability ultimately is the foundation of deterrence and ensures that the RAF and NATO are no paper tigers. The new Chief of the Air Staff, Air Chief Marshal Harv Smyth, talks of the need to 'put more A-I-R – Agile, Integrated and Ready – in Air'. It would be easy – lazy even – to think that this means we just need to take more risk and be a little less safe. This is fundamentally not true. It assumes that safety is what is holding us back from achieving our operational goals. It is of course quite the contrary. Safety is what underpins our warfighting capability. It is what ensures we are ready to fly and fight and it ensures that we maintain that capability during conflict. Maximum lethality for minimum personal cost.

To ensure that this is the case – to ensure that safety is not the excuse not to do things and that it doesn't restrict our capability – we need to be smart about safety. We need to understand our risks – be risk aware – and we need to ensure we are in a position to take appropriate and sensible risks from a position of understanding not of ignorance. We also need to make it easy for our people to 'do safety' and make it easier to 'do it' than not to. More than anything else, it is not the 'paperwork' that makes us safe, it is the thought that went into it that makes it effective. So, please, continue to exercise your grey cells and make safe decisions.

> "We need your 'I learned about flying/engineering / air traffic from that' articles. Please write to Wg Cdr Spry with your open and honest stories."

Safety Awards

Flight Lieutenant Kemp – RAF Coningsby – Green Endorsement

During an operational sortie, Flight Lieutenant Kemp experienced a developing in-flight emergency whilst flying his Typhoon aircraft. Transiting to theatre at FL270, he identified a significant fuel flow discrepancy between the aircraft's engines, accompanied by mismatched engine parameters including a significant temperature differential and divergent nozzle positions. Recognising the symptoms of an Incorrect engine response, Flight Lieutenant Kemp swiftly diagnosed the issue and executed the appropriate emergency procedures with precision. Despite the degraded performance of the right engine, he made the calculated decision to continue with air-to-air refuelling and then recovery back to base for further assessment, thereby ensuring safe recovery of the aircraft while maintaining safety as the highest priority. As the situation evolved, Flight Lieutenant Kemp conducted a thorough systems analysis and, in consultation with his flight lead, formulated a modified approach plan. With only 1,000kg of fuel remaining—equating to approximately ten minutes of flight time—he executed a stable visual straight-in approach, preserving the option to shut down the malfunctioning engine if required. His calm and decisive actions ensured a safe landing, with the anticipated [R ENG P] caption illuminating on touchdown. He streamed the brake chute effectively, assessed braking performance, and taxied the aircraft clear of the runway before shutting down safely.

RAF Waddington ATC – Team Commendation (Pictured Left to Right: Flying Officer Greaves, Group Captain Holland, Corporal Bowman, Warrant Officer Jenkins)

On 26 February 2025, the RAF Waddington Air Traffic Control Tower shift team was operating at a heightened tempo supporting a critical Tier Two exercise. Whilst controlling various visiting nation aircraft including 4 x Royal Saudi Air Force F-15s and 2 x Turkish Air Force F-16s taxiing for departure, Flying Officer Greaves, Flight Lieutenant Barton and Air Specialist (Class 1) Haley and Air Specialist (Class 1) Nicholson were conducting the Runway 20/A15 fence line visual checks, ahead of releasing the Exercise fast jets. Their collective vigilance identified a lone, unauthorised pedestrian walking across the airfield directly towards the centreline of the runway, which posed a significant risk to both the safety of the intruder and aircraft, and also jeopardised the successful prosecution of the exercise. The swift actions of the entire team, led by Warrant Officer Jenkins, resulted in the prompt dispatch of RAF Police and Corporal Bowman (in an ATC vehicle) to apprehend the individual. This ensured the personal safety of the intruder and minimised associated hazards from the airfield. Within minutes, the individual was safely removed from the runway.

Mr Adrian Dant – DIO Holbeach – Merit

On 16 April 2025, Mr Adrian Dant was one of four quadrant hut operators at DIO Holbeach. When aircraft utilise the Air Weapons Range, the specific target being used dictates which quadrant hut should be activated. Mr Dant's quadrant hut was not activated for two USAFE F-15E aircraft using the range for practice bombing profiles. During this activity he noticed that the F-15Es were rippling 2 heavy weight bombs on each pass. On one of the `Hot` passes he observed that only 1 practice bomb had been released hence a potential hung bomb. Immediately he transmitted this information via ground management radio and in turn, this was passed to the aircraft by the Air Weapons Range Controller. The F-15E did have a hung bomb which inadvertently did not get released due to a technical error.

Corporal Jones – RAF Northolt – Merit

On 14 May 2025, at No.1 AIDU RAF Northolt, during an inspection of the newly delivered printed edition of the En-Route Bulletin, Acting Corporal Jones discovered that a significant number of pages within the document were blank. Acting upon the discovery he instantly informed his line manager, and contributed to a wider investigation, which highlighted that the issue affected all copies of the document delivered to the Unit. Continued investigation led to the issue being pinpointed as an error by the print contractor. The missing pages contained amendments critical to flight safety for En-Route Charts covering the UK and Middle East.

Air Specialist (Class 1) Barrett – RAF Lossiemouth – Merit

On 20 May 25, Air Specialist (Class 1) Barrett was operating as the Truck Runway Caravan Controller at RAF Lossiemouth in support of fast jet departures. While visually scanning the runway environment, Air Specialist (Class 1) Barrett observed that the approach-end Rotary Hydraulic Arrestor Gear cable was unexpectedly raised as a Typhoon was preparing to depart. Recognising the significant risk this posed—namely the potential for the aircraft's tailhook to unintentionally engage the cable during the high-speed rollout - he immediately contacted the tower controller to postpone the launch. Thanks to his rapid intervention, the pilot made the appropriate adjustments to his departure and took off safely beyond the raised cable. The cable configuration was then corrected before any further departures.

Sergeant Wood – RAF Lossiemouth – Distinction

On 12 December 2024, Sergeant Wood was tasked by the Rectification Controller to conduct ejection seat independent inspections on 3 Typhoon aircraft following removal and refitment of their Personal Survival Packs (PSPs) to enable loose article searches. The aircraft were located on the II(AC) Sqn flight line and, with the rapidly dropping light levels due to the time of year, Sergeant Wood requested that the aircraft be moved into a Hardened Aircraft Shelter (HAS) to provide the necessary lighting for this important check of life saving equipment. The close proximity to the pilot walk time for the planned night wave meant that towing the 3 aircraft to the HAS would likely result in, at the very least a sortie delay, or worse, a cancellation. Several individuals voiced their concern to Sergeant Wood, but, to his credit, he stuck to his principles and requested that the moves take place.

Corporal Simpson – RAF Lossiemouth – Distinction

Deploying on IX(B) Squadron's first Typhoon deployment to RAF Akrotiri, Corporal Simpson displayed the highest levels of professionalism by intervening with two air safety critical occurrences. On the first occasion he highlighted an incorrectly fitted hook uplock safety device. Without this hook uplock safety device being fitted correctly, there was risk that the hook could have caused serious injury to anyone unfortunate enough to be beneath it if the release mechanism were accidentally initiated. His timely and thorough reporting enabled the Senior Non-Commissioned Officers to investigate and highlight the issue through a Defence Aviation Safety Occurrence Report (DASOR) while avoiding the immediate risk of injury to personnel working on the aircraft. On a second occasion, whilst conducting routine maintenance on another aircraft, it became apparent to Corporal Simpson that a weapon station had become uncharacteristically loose. This was a remarkably unusual occurrence, out with the normal, and certainly unusual enough to warrant immediate further scrutiny. With the aircraft due to fly on the next operational sortie, he recognised the severity of the issue and promptly brought it to the attention of Weapons specialists and Rectification Control.

AirClues

Sergeant Mitchell – MOD Boscombe Down – Merit

On 8 May 2025, Sergeant Mitchell was the Approach Controller at MOD Boscombe Down and had only recently qualified for the position, holding the endorsement for less than a month. Due to glider activity in the area, an RJ100 aircraft had endured a complicated recovery to the airfield, electing to make an instrument recovery to the non-duty runway to break off and join downwind for Runway 05, the runway in use. The Supervisor went to the Visual Control Room to oversee this part of the procedure, leaving Sergeant Mitchell in charge of the Approach Control Room. Sergeant Mitchell observed a small radar contact which appeared to track close to the visual circuit and with utilisation of additional resources, he strongly believed it to be a glider. He was aware of the potential threat a glider in this position held to the RJ100 in the visual circuit. Without hesitation he passed this information to the Tower Controller, who acquired the glider visually through binoculars and reported it to the RJ100. Upon receiving this traffic update, the RJ100 pilot visually identified the glider and initiated a climb to ensure safe separation.

Air Specialist Class 1 (Technician) Webber – RAF Lossiemouth – Merit

On 3 February 2025, at Nellis AFB USA, during an after-flight servicing of a Typhoon aircraft, on a tight window between waves of flying and during the hours of darkness. Air Specialist Class 1 (Technician) Webber spotted a small carabiner that was part of a pilot's personal kit and which had fallen deep down into the cockpit next to the ejection seat. He immediately detailed the Engineering Requirement for follow on work. The loose article posed a hazard to the safety of the aircraft due to its ability to cause a control restriction should it migrate forward during flight. He spotted the article whilst on a night shift at a deployed and unfamiliar location in reduced lighting on the flight line.

Air Specialist Class 1 (Technician) Couvret – now Corporal Couvret – RAF Lossiemouth – Merit

On 24 April 2025, at RAF Lossiemouth, whilst assessing 1 Hangar for Foreign Object Debris, Air Specialist Class 1 (Technician) Couvret was intrigued by the presence of a seemingly normal bag of fasteners and panels from a Dual Mode Missile Eject Launcher on Aircraft racking. However, his interest was sparked by the fact that the specific aircraft, from which the fasteners and panels had originated, was allocated to the aircraft flying programme and about to go flying imminently. The aircraft on the line was reassessed for the presence and correct fitment of the fasteners and panels and was subsequently permitted to go flying. Air Specialist Class 1 (Technician) Couvret had correctly identified that the presence of these fasteners and panels within the maintenance environment presented a risk of a lack of configuration control to the aircraft and could have ended in an aircraft going flying with an incorrectly secured component.

Air Specialist Class 1 (Technician) Leat –
RAF Lossiemouth - Merit

On 23 October 2024, at RAF Akrotiri, Air Specialist Class 1(Technician) Leat was conducting a final inspection of a Typhoon aircraft prior to its taxi out on to an operational sortie. He discovered during the 'Panel and Leak Check' phase of the see-off that the Left-Hand Main Landing Gear Expandable Dynamic Fastener Pin was not installed to the Main Landing Gear Control Rod, and the Rod itself was hanging perpendicular to the ground from the airframe. Upon noticing that the Expandable Dynamic Fastener Pin appeared to be hanging in the airflow, he understood the potentially dangerous consequences that it may have if the aircraft were to get airborne.

AirClues

Road Safety

By Sgt Adam Wood, DSTpt TrgDel MTM

Image by Why Kei, Unsplash

Road Safety (RS) is a phrase often associated with some form of campaign conducted by MT departments to drive reductions in vehicle related accidents and promote transport safety to our people through educational means. The assumption that this is an MT responsibility could be no further from the truth. RS is integral to everything we do, and we all have a shared responsibility to ensure that our people remain safe while operating on the road, both on and off duty.

A Brief History of Road Safety

It can seem an obvious requirement in this day and age, but there was a time when you did not need a driving licence nor was there any laws regulating safe driving or any thought to RS. A time where it was basically a free for all, for vehicles to be driven like Lewis Hamilton at the British Grand Prix circuit. At the turn of the mid 1860s, the invention of the motor car really began. It would take over 40 years to enact some form of accountability, with the introduction to the Motor Car Act. The act was implemented in 1903 and is considered one of the early systems to managing RS. The act saw drivers having to register their vehicles and to hold drivers accountable for reckless driving with hefty penalties.

As vehicles evolved so did RS. From a mere 800 vehicles in 1900 to over a million in 1930 operating on the public highway, the Ministry of Transport with the authority of Parliament instituted what we are all familiar with in Defence, The Highway Code. Launched in 1931 it contained 18 pages, compared to the 189 pages it now possesses. In 1946, the Central Office of Information (COI) was established with the responsibility of running RS campaigns for the UK government. Over the next 50 years, RS became a national priority to reduce Road Traffic related accidents with key themes being targeted that are shown at Figure 1.

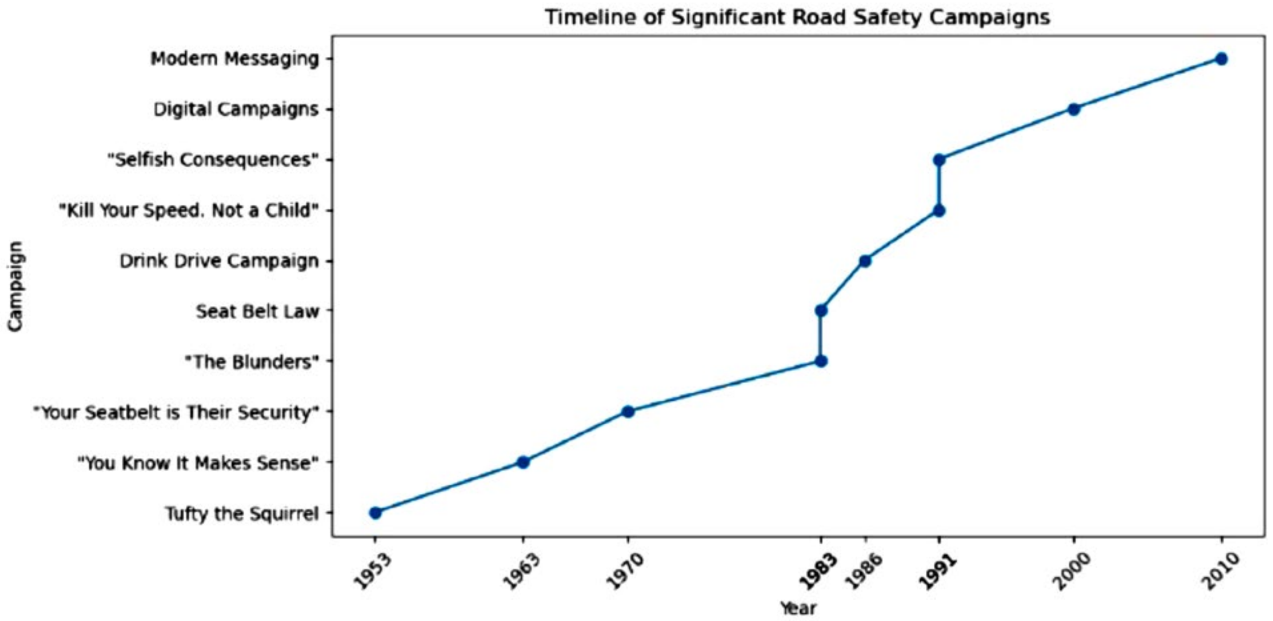

Fig. 1.

In the year 2000, the Government targeted a 40% reduction in people killed or seriously injured in road accidents to be achieved by 2010. In addition, the Ministry of Defence (MOD), implored each Service to begin running targeted RS campaigns alongside their unit initiatives to further achieve this objective. The first ever campaign within Defence was presented in 2006, 'Ride it Right', steered towards motorcyclists due to a rise in the number of off-duty motorcycle deaths. It is extremely unfortunate that statistically off-duty accidents have creeped up and later in this article, there will be a focus on raising awareness to this. In 2018, a review highlighted that vehicle related collisions are the second largest cause of non-operational fatalities and injuries in the MOD. To reduce this, a RS intervention programme was created, 'Survive the Drive'. The programme is still currently ongoing and is specifically aimed at Defence Personnel and civil servants to enable:

- Recognising that they are potentially at risk on the road.
- Understand the cumulative nature of the risks.
- Understand how to manage the risk for the safety of themselves, and of others.
- Understand that when driving, or indeed as a passenger in a vehicle, that small changes in behaviour can make a real difference.
- Positive behaviours can prevent a Road Traffic Collision (RTC) from taking place.
- Understand that the effects (ripple effect) of an RTC can be devastating and life changing, both to the individual and to their partners, families, friends and colleagues.
- Understand the potential consequence and impact of an RTC on their career.

This is a fantastic initiative that considers drink driving, distractions, speed, and fatigue with requests for events submitted via the Road Safety in Defence homepage. Please note bookings are currently paused but watch this space for updates. Alternatively, why not internally run a campaign focussed on these topics to underpin the importance of operating on the road, safely.

Why do we need Road Safety?

Figure. 2. MOD RS campaigns over the years focussing on specific trends that can be considered for future RS initiatives within your departments and unit.

RTCs attract human and financial cost, and ultimately impact operational output. The RAF RS strategy sets out about transforming cultural acceptance to RTCs across Whole Force (WF) to achieve zero tolerance and help eradicate reoccurrence. If we decide to act with the mindset of 'why bother' or not play our moral part in promoting and educating our people within our departments, Squadron, and as a unit collective, we will never achieve the RAFs strategy mission.

There has been an increase in off-duty related accidents with some resulting in injury whilst other cases unfortunately leading to fatality. Regardless, if our people are on or off-duty we need to ensure that we are getting the basics right. We need to foster a culture to keep our people better informed, more disciplined, and safer on the road. Sometimes the basics can be overlooked, assumed, or ignored that creates complacency leading to preventable accidents. What are the basics for our people when it comes to RS? There is no ultimate definition but applying RS to the question can generate a scrub of our safe systems that may produce those basics being revisited that creates new or valuable initiatives to implement.

- **Fatigue 'The Silent Killer'** – Ensuring our shifts and duty hours are complimented with sufficient rest. Equally, recommending additional / enforced rest following a duty if the intention is to get in their personal vehicles and drive home, irrespective of the time of day. Even more so following exercises when everyone arrives back at unit after excessive travel and get in their private vehicles to drive home. Ensuring everyone understands the signs and symptoms of fatigue and how to combat it. Understanding what a circadian rhythm is and how it can cause fatigue issues if manipulated. Researching, implementing, and promoting the Direction and Guidance (D&G) of AIRs fatigue management and unit / commander guidance on Road Transport fatigue.

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Year	Campaign	Description
2006	**Ride it Right**	Launched following a rise in off-duty motorcycle deaths.
2007	**'Grim Reaper' Video**	Shown to personnel returning from operational deployment.
2008	**'You're Tough but You're Not Invincible'**	highlighting increased accident likelihood.
2012	**Poster Campaign**	BFBS TV and radio commercials aimed at young soldiers from Afghanistan, emphasising road traffic accident risks.
2014	**'Hidden Dangers' Posters**	To prevent off-duty personnel from walking home after nights out, with taxi funds made available.
2015	**'Driver Distractions' Awareness Campaign**	Launched following a rise in off-duty motorcycle deaths.
2017	**'The Honest Truth' Campaign**	Shared real stories to promote safer driving.
2018	**'Survive the Drive' Campaign**	Focused on risky driving behaviours.
Ongoing	**Unit-Level Campaigns**	MOD pursues numerous unit-level campaigns recognised in the annual Defence Road Safety Awards.

Fig. 2.

- **Distractions** – Mobile phone and in vehicle technology paired with driving can be a deadly combination. MOD policy prohibits the use of mobile phones whilst driving on duty. When off duty we can make ourselves and others safe by putting it out of sight and/or turning it off. Hands free and handheld equipment increases injury or death up to four times as high. Let's encourage personnel to pre-plan journeys, set up GPS prior to commencing driving, highlight the do not disturb functions on phones that silences notifications and influence passengers to speak up when drivers risk safety. Arrange workshops to educate on the devastating consequences of using a phone when driving; fines, loss of concentration, driving bans, loss of life.

- **Drink driving** – Our social and official gatherings can be at the forefront of promoting reward for performance and advancing relationships. Whilst participation is well earned, if alcohol is present and consumed, we must remember and remind personnel of the detrimental effects alcohol can have. Even after going to bed following an alcohol consumed event and getting in a MOD or private vehicle can have destructive effects; impaired judgement, over the limit to operate vehicles, loss of concentration, fatigue, reduced driving ability. Can we change our functions to the weekend that allows for sufficient rest and deters people from jumping in their vehicles. If we have midweek get togethers, are we conducting fitness checks on one another and ensuring personnel / colleagues are fit for duty. Implore people to speak up and report in the workplace if someone has been out the following night and intends to operate a platform, both on and off-duty.

Any near miss or RTC serves as a reminder that we must do our utmost to uphold morality, keep safe the MODs most valuable asset, our people, and share that responsibility to protect them through campaigns. The graph at Figure 3 demonstrates why we need RS, showcasing the reduction of personnel at risk through initiatives and campaigns over the last 25 years.

Your contribution to RS

Every year units will hold a Road safety Committee (RSC) and set out a 12-month strategy to promote RS across their site. As workforces become more stretched so does the unit resource. The expectancy of relying on MT for RS needs converting. We all can do more, no matter how little you may think it is, it will make a significant difference. A poster campaign, driver safety briefs, rules of the road, workplace transport safely, highway code quiz – (knowledge is safety), suggestion boxes to generate ingenious ideas, the

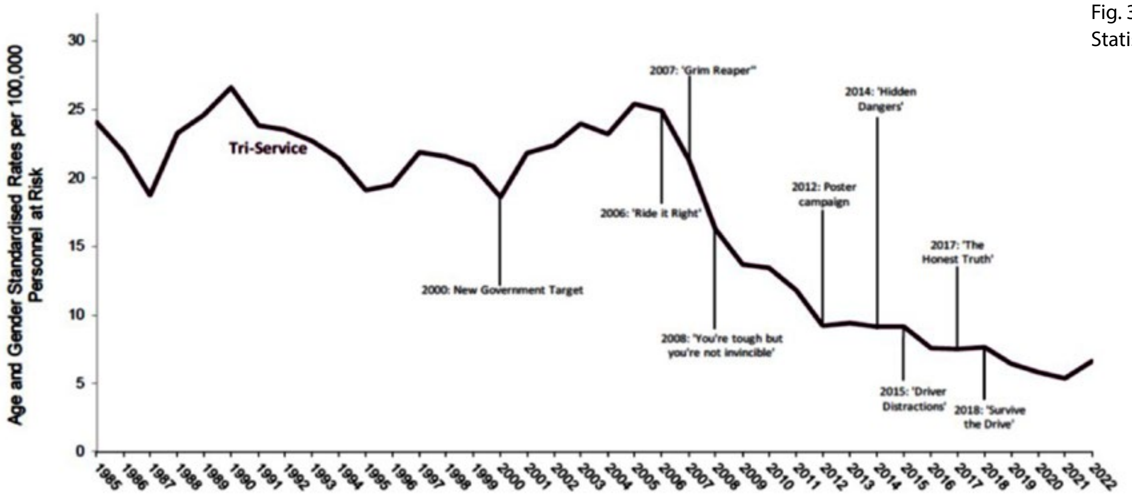


Fig. 3. Source: Defence Statistics Health

importance of wearing Hi-Viz, cycling safety, motorcycle safety, pedestrian safety, seasonal safety, vehicle safety, the list goes on. You can contribute to this or explore something more tailored to your team. If you are unsure on what to do, or need a marshaller to guide you, speak to your MT and they will endeavour to assist. We can all come together in doing our bit and accelerate RS awareness to our people.

Not only does this benefit everyone, but individuals, departments and units can all be recognised with a RS submission for the Annual Defence Road Safety Awards (DRSA). The DRSA was introduced in 1998 to raise the profile of RS within the Defence community. The DRSA recognises effective RS campaigns and initiatives through awarding the prestigious Rose Bowl trophy amongst other awards. Let us strive by example, identify, and implement measures to enhance RS across Defence. RS is not just a procedural obligation; it is a moral imperative that underpins the welfare and effectiveness of our people.

A Word on Winter Road Safety

As temperatures drop and road conditions worsen, winter driving demands extra caution and preparation. Whether you're commuting, on duty, or heading home for leave, it is essential YOU assess the risks associated with your journey. These tips can help keep you and others safe on the roads.

Before You Set Off

Check the weather forecast and ask yourself: Is this journey essential? Consider safety and personal items such as warm clothing, food, drink, torch, hi-viz vest, window scraper and/or de-icer. Ensure your mobile phone is charged.

Make sure your vehicle is winter ready. The 'FORCES' acronym can ensure your vehicle is prepared for wintry conditions.

F is for fuel – Ensure you have enough fuel for the journey. Vehicles use more fuel in start / stop conditions with can be regular in adverse weather conditions.
O is for oil – To avoid engine malfunction and possible breakdown, remember to check oil levels.
R is for rubber – Check all tyres have at least 3mm of tread and are inflated to the correct pressure. This is vital to maintain road grip in wet and icy conditions. Conduct a function check of wiper blades to ensure they are working effectively. Likewise, ensure the rubber on the blade has not deteriorated. If so, change them.
C is for coolant – Confirm it is at the correct level and contains the required amount of anti-freeze.
E is for electrics – Conduct a walk round of your vehicle to ensure all lights are working. Don't forget brake and fog lights.
S is for screen wash – Ensure this is topped up as it is effective even in cold temperatures. Remember colder temperatures demand a more concentrated solution.

Look up public transport updates and road safety alerts for accidents or closures. Always have a backup plan in case your usual route or travel mode isn't available.

Preparation is your best defence against winter hazards. Check the weather forecast, plan your route, and allow extra time for your journey. If conditions are severe, consider whether travel is essential.

Stay alert. Stay safe. Arrive alive.

For more reading and information on Road Safety please see www.deadlymates.com www.brake.org www.bikesafe.co.uk www.think.gov.uk www.roadsafe.com www.walkingforard.com www.youthforroadsafety.com
Defence Land Safety Regulator Movement and Transport Website
AP 8000, Part 5: General Leaflets – Leaflet 8009 - Fatigue Management
JSP 800 Vol 5, Road Transport, Part 2, Group 3, Guidance document 1 & 2 (Unit and Commanders Guide to Fatigue)
DAP 3150, Mechanical Transport Instructions (MTIs) Part 1, Instruction 3 – Road Safety
2024DIN06-027-Annual Defence Road Safety Awards 2025
UK Armed Forces – Death in Service 2023

Our Increasingly Extreme Weather

By the RAF Safety Centre

Enduring Weather: Aviation in a Changing Climate

As the global climate continues to warm, the skies are becoming not just more turbulent—but more extreme. Following the rising threat of clear-air turbulence discussed in the first instalment of this Enduring Weather series, we now shift our focus to the broader spectrum of extreme weather phenomena. These changes affect everyone—but for aviators, they bring an escalating set of operational challenges.

From violent convective storms to intensifying crosswinds and unpredictable icing, the aviation environment is rapidly evolving. These shifts demand heightened caution, adaptability, and deliberate planning from all aircrew—military and civilian alike. Recent analysis from the UK Met Office's Climate Change and Aviation Risk Outlook leads to one clear conclusion: aviation must urgently adapt to a harsher, more volatile atmosphere.

The New Weather Reality

The UK Met Office identifies a growing list of climate-driven risks: more frequent and severe turbulence, unpredictable wind patterns, and an increased incidence of convective storms. Rising surface temperatures will challenge aircraft performance—lengthening take-off distances, reducing payload capacity—and deteriorate infrastructure such as runways, navigation and control systems. NATO researchers also highlight the strain that erratic weather cycles place on operational readiness. Extended droughts, flash floods, and temperature extremes are already disrupting basing operations, logistics chains, and flight schedules.

Both the UK Met Office and NATO research make it clear that the new weather reality – marked by increasingly erratic, severe and unpredictable conditions – will demand that aircrew operate in an environment where heightened physical strain, cognitive workload, and constant adaption to atmospheric volatility become routine features of flight. Aircrew can stay ahead of extreme weather by spending a little longer planning for the unexpected. Planning alternates, building solid contingencies and making sure they are just that little bit better prepared for the unexpected.

The Escalating Weather Challenge

Climate change continues to intensify global weather systems. Warmer air holds more moisture, fuelling stronger thunderstorms, prolonged heatwaves, and heavier precipitation. These evolving conditions are no longer rare exceptions – they are fast becoming the norm.

Summer 2025 was the hottest on record in the UK, with four heatwaves in a single season. A summer like 2025 - which was expected once every 340 years in a natural climate – is now likely to occur once in every five years. (Met Office) highlighting how rapidly we (humans) are impacting the climate.

Aviation faces increasing operational risks from turbulent weather, volatile wind shear, and reduced predictability in flight planning. These conditions not only challenge pilot decision-making and aircraft performance but also increase the strain on operational planning, readiness, and safety margins.

These impacts are already being seen in real time:

- Severe Thunderstorms: Intensified convective activity is generating larger, more frequent storms capable of strong updrafts, downdrafts, lightning, large hail, and microbursts—all serious threats to aviation.
- Wind Shear and Crosswinds: Shifting wind patterns are increasing hazardous shear and gusty crosswinds, especially during take-off and landing.
- Icing Conditions: A warming atmosphere is elevating freezing altitudes, making traditional assumptions about icing conditions increasingly unreliable – especially during climb and descent.
- Flood and Drought Extremes: Rapidly shifting weather patterns are damaging airport infrastructure, disrupting operations, and undermining baseline environmental expectations.

What's Driving the Change?
The core driver of worsening aviation weather is the human caused climate change. The masses of gas (Carbon Dioxide, Methane, Nitrous Oxide to name a few) we put into the atmosphere and the resulting temperature increase. Rising global temperatures are altering atmospheric circulation patterns, increasing the energy and moisture available for severe weather. Simply put: more energy, more moisture – more unpredictable and extreme weather.

A lot of what governs our weather in the UK and Northern Europe is the Jet Stream and due to this increased temperature profile, the Jet streams have been seen to shift and become more erratic. The jet stream is driven largely by the temperature difference between the Artic and the Tropics, and due to the Artic warming, which is about four times faster than global averages (a process called Arctic amplification), that temperature contrast is weakening. A weaker contrast tends to slow the jet stream down and make it wavier, which cause weather systems to linger.

Sea surface temperatures are also warming, and seasonal patterns are becoming less predictable. This new atmospheric instability is fuelling stronger thunderstorms, heavier precipitation events, and prolonged wildfire seasons - all of which have direct consequences for aviation.

Looking Ahead: What to Expect
Extreme weather is expected to intensify in the coming years. Meteorological models project an increased frequency of high- impact events such as severe convective storms, tropical cyclones, and sudden atmospheric shifts. We can also expect

greater variability in flight conditions – more abrupt changes in cloud ceilings, pressure systems, and icing layers. These dynamics will make both long-range planning and in-flight decision making more complex and critical.

Significant projected impacts include:

- Increased clear-air turbulence and convective turbulence.
- Reduced visibility from wildfire smoke and fog.
- Rising frequency of rapid-onset storms.
- Compromised runway performance due to flooding and heat damage.

Impacts to RAF and Military Operations
Aircraft deployed to expeditionary airfield with limited infrastructure face significant weather vulnerability. Forward Operating Bases and Dispersed Operations Aircraft deployed to expeditionary airfields with limited infrastructure face significant weather vulnerability:

- Flash Flooding: Sudden downpours can render unpaved or poorly drained runways unusable, delay sorties, and damage Ground Servicing Equipment (GSE).
- Heat Damage: Sustained high temperatures can soften or buckle runway asphalt surfaces, increasing the risk of FOD (Foreign Object Damage). Aircraft performance also declines in "hot and high" conditions, lengthening take-off rolls and reducing payloads.
- Dust Storms and Sand Intrusion: These reduce visibility, delay operations, and increase engine and avionics risks.

Low-Level and Tactical Flight Operations
Flying at low altitude in difficult terrain is inherently dangerous—extreme weather only makes it worse:

- Convective Turbulence & Precipitation: Thunderstorms can destabilise aircraft, impair navigation, and reduce flight path accuracy. Heavy rain and hail may obscure terrain and sensor effectiveness.
- Pilot Workload and Disorientation: Adverse weather at low altitude increases cognitive load, raising risks of fatigue, spatial disorientation, or CFIT (Controlled Flight into Terrain).

Case Study: Dubai International Flood – April 2024
In April 2024, Dubai International Airport recorded its most intense rainfall in 75 years. Over 250 mm of rain fell in 24 hours—double the city's annual average—paralysing roads and flooding the airport. Meteorologists linked the event to a "cut-off" low-pressure system that drew in warm, moisture-rich air, triggering extreme precipitation. Taxiways were submerged, aircraft blocked, and operations stalled. Thousands of passengers were stranded, and the operational backlog took days to resolve – creating significant disruption and cost. While rain is not usually the primary threat to aviation, the sheer volume in this case overwhelmed infrastructure – highlighting the growing danger of uncharacteristic weather events.

What This Means for the RAF
These incidents show the vulnerability of even major hubs to increasingly erratic weather. Conventional planning based on historical norms is no longer sufficient.

Recent severe events across Europe - Spanish floods, Italian heatwaves and Portuguese wildfires – underscore the need for updated risk assumptions.

Aircrew Caution: What Needs to Change
1. Enhanced Meteorological Vigilance:

- Aircrew must recognise that historical weather trends may no longer apply.
- Planners must challenge weather assumptions, particularly when preparing for deployments in historically "stable" climates.

2. Met Office interactions:

- Units and operators should be encouraged to engage with your local Met forecasters to discuss how environmental changes will impact their platforms and sortie plans.
- Include up-to-date discussions on expected weather - even on routes previously considered low risk.
- Emphasise Crew Resource Management (CRM) for abnormal weather, ensuring all crew are prepared to respond quickly.

3. Self-induced pressure and resource:

- Encourage crews to use all available sources of weather data to build as much of a picture as possible. (Onboard RADAR, reports from other aircraft, updates from airfields, ground stations or ops).
- Pilots should be aware of self-induced pressures to launch in marginal conditions no matter the situation. Ask yourself would you launch if there weren't any external pressures (going out of currency, OCU is running behind, "I don't want to let the side down").
- Consider what mitigations you can put in place to manage the risks and discuss these with the authoriser.

Final Thoughts: From Caution to Culture
Caution can no longer be optional—it must become embedded in our operational culture. Aircrew must lead this shift in mindset: extreme weather is no longer a rare inconvenience; it is a routine hazard that demands constant respect. The environment is no longer passive – it is often a hostile variable in every mission plan. With improved planning, vigilance, and respect for natures volatility, we can reduce disruption, prevent emergencies, and widen our safety margins.

We can't wish the weather away—but we can outfly it, outthink it, and outlast it.

Further Reading

- UK Met Office: Climate Change and Aviation Risk Outlook.
- NATO Centre of Excellence: Operational Weather Resilience in the Age of Climate Change.
- RAF Air and Space Power Review: Environmental Threats to Future Air Superiority.

I Learnt About Flying From That

A Tale of Two Aircraft

By Flt Lt Josh Richardson, 27 Sqn RAF Odiham

It had all started on my first day of leave, I woke up to a phone call, and thirty-six hours later I was disembarking at an airport terminal, the sun setting on a foreign desert. Familiar faces greeted me, joking that I'd probably be on the next return flight. Two months later, I was still there, about to take off on a tasking mission we all called routine, in weather we were all accustomed to, wondering when we all would go home, unaware that my last flight in Theatre would unintentionally be the most serious.

As the Operation was in the process of drawing down, the tempo had slackened significantly. But a routine task had come up and we prepared accordingly. The met forecaster had been sent home the previous week, so we briefed the weather using a regional report. The forecast indicated 10km visibility, a 40% probability of haze and dust, and no significant cloud. Light levels were classified as red illumination, meaning ambient light was insufficient for our night vision devices (NVDs) to provide a clear picture. However, we knew the landing sites had cultural or external lighting that would offer enough illumination in the final stages of flight. None of this was unusual—it was nearly identical to the conditions we had flown in just two days earlier.

As we prepared to lift our two Chinooks, I noticed the visibility at the Main Operating Base (MOB) was worse than expected. We departed at low level, using ground features for reference, and assessed conditions to be within limits. A brief radio call between the formation confirmed that both crews were comfortable continuing. We climbed above the small-arms threat and proceeded on task. At altitude, we found ourselves surrounded by a dense haze of dust particles, creating a 'fishbowl' effect—clear views above and below but limited slant visibility ahead. However, we could still see the lights of towns and villages around us, and so had sufficient references to continue. I 'leapfrogged' the formation from light-to-light, ensuring we always had a ground marker to anchor around if needed, cognisant we would soon need to let-down to low

level. The weather improved over our tasking area, and once the mission was complete, we turned back to the MOB without concern. Having already confirmed there were sufficient ground features for navigation, I felt confident we could return the same way we had departed. Yet, as we travelled, I noticed it seemed even darker. There appeared to be fewer towns than I remembered. I reassured myself—we still had a light source ahead and on track—until it suddenly disappeared.

I had been concerned on our return journey, that as the weather was worse than forecast, we might struggle to recover to the MOB. I aimed to maintain ground references while my co-pilot and I discussed our options – as my 12 o'clock marker vanished. I was anxious that it had been suddenly obscured by a band of inclement weather, concealed in the vast void, that we were flying straight towards. With no visible horizon or references ahead, I looked left and clearly saw a large town, based off of my crew's discussion my decision was to maintain references, I would handrail that town and then see what my options were. I initiated a gentle left turn, mindful of the conditions and not wanting to force the second aircraft into an abrupt manoeuvre. To my surprise, our rear crewman soon reported that the second aircraft had climbed above us and was continuing on track. Initially I was confused – even frustrated. Why hadn't they followed my lead? No one in our crew had an answer. I broadcast on the air-to-air radio "Coming left for references." They replied with their position and that they had switched on their exterior lights. Looking over my right shoulder, I could see their aircraft. In red illume conditions, with such poor visibility, I knew how quickly that could change. I made a snap decision to rejoin formation and manoeuvred to join them.

I joined into the echelon left position. Now I experienced first-hand the difficulties which the 2nd aircraft had been suffering for some time. Though I could see them clearly, the low light levels made it nearly impossible to distinguish features on the aircraft frame. This was compounded by the lack of a discernible horizon, or any contrast within the NVD's field of view. It quickly became disorientating, I couldn't tell visually if I was above or below them, everything within my vision was a uniform green haze, punctuated only by the dark silhouette of a Chinook. I took the lead, now appreciative of how challenging it was to hold position and maintain a formation position was in these conditions. At the same time, the second aircraft transmitted over the air-to-air, suggesting that sustaining the formation was becoming too difficult. I agreed, and we split the formation. As we neared the MOB, both aircraft independently found reference points, descended to low level, and recovered visually.

During the debrief, I quickly realised how vastly different the second crew's experience had been. My turn had caused them to unintentionally go 'belly up' on our aircraft, with the forward crewman being the only crew member still visual and calling an emergency manoeuvre to avoid us. They were understandably shaken—even furious. Such a situation demonstrated to me as the formation lead, the importance of the debrief structure. We discussed what we had seen from my aircraft's perspective and allowed them to voice their own experiences. We reflected on the spatial disorientation, the assumptions and intentions from both crews, the lack of communication and the difficult in formation keeping. This structured discussion helped defuse tensions and establish a rough timeline of events, though it would take until the morning and perhaps even unto the subsequent investigation to ascertain a clearer picture.

What I would do differently: This experience underscored for me the importance of communicating rather than assuming mutual understanding in formation flying. In hindsight, a simple call before initiating my turn—something as straightforward as "coming left for references"—might have given the 2nd aircraft the clarity they needed to react sooner and more predictably. Likewise, I would encourage an open flow of communication both ways; had they informed us earlier of their difficulty holding position and that they had closed to 2 spans, I may have reconsidered the turn altogether or executed it differently. This event highlighted the value of realistic low-light, poor-reference training. I would seek out more exposure to these conditions in a controlled environment, ensuring that both I and any crew I fly with have a shared appreciation of how disorientating they can be. Above all, this incident reaffirmed to me that formation flying in degraded conditions demands constant coordination, proactive communication, and an acute awareness of how even small decisions can ripple across the flight.

The Normalisation of Deviance – *When Routine Becomes Dangerous*

By Wg Cdr Jim Lawson, SO1 Promotion, RAF Safety Centre

The term '*Normalisation of Deviance*' was coined by Diane Vaughan in her book, '*The Challenger Launch Decision*' where she described in detail how NASA didn't break any rules, but rather managed risks using engineering judgement to move from an original baseline focused on *'why should we launch?'* to one which was shaped around the concept of *'why shouldn't we launch?'* In 1986 the NASA Engineers famously warned about O-Ring failures at low temperatures. Due to pressure to launch, the warnings were overridden – because similar warnings hadn't led to failure before. Repeatedly accepting risk conditions '*because it worked last time*' led to catastrophe.

NORMALISATION OF DEVIANCE

"THE GRADUAL PROCESS BY WHICH THE UNACCEPTABLE BECOMES ACCEPTABLE"

What It Is Not

It is not a one-time mistake or error. Nor is it an isolated lapse in judgement, attention to detail or skill. It's about patterns. A single honest mistake such as a pilot missing a check or a technician using the wrong torque setting doesn't show a cultural trend.

It is not time-critical or emergency improvisation. So, for example, deviating from SOPs for a life-threatening condition, with the aim of saving lives or avoiding catastrophe. These actions are exceptional, reactive and situational, and not culturally absorbed.

It is not simple rule breaking. Why? Because with simple rule breaking the offender knows it's wrong and doesn't pretend it's acceptable. So, if you falsify maintenance documents or fly under a bridge, this is conscious misconduct, and not the cultural drift that represents normalisation of deviance. Rule breaking is not black and white. Rule breaking can develop into a cultural trend e.g. signing for work that you haven't personally done or, worse, not doing work you have signed for as having done. If this becomes an acceptable trend on the unit, then we have a deviance from proper procedure becoming normalised. Remember it's the gradual process by which the unacceptable becomes acceptable.

It is not the formal acceptance of risk. Risk is acknowledged, managed, and mitigated – not hidden, denied or brushed aside e.g. formal risk acceptance is launching a sortie in poor weather, after a risk assessment has been done. Again, this particular aspect is not black and white either – risk holders often complain about people taking risk that is not theirs to take. In the past an RAF unit on deployment developed a trend where, in the spirit of getting the job done quickly, they started carrying heavy aircraft parts to the aircraft on their shoulders instead of using the available lifting equipment. Eventually, in the case of a fast jet elevator, one was dropped and an injury occurred – the subsequent reporting action on the injury served the purpose of highlighting the trend to the Duty Holder, who would never have sanctioned this deviation if asked, even though it improved operational turnround efficiency.

Why It Happens

Time Pressure – In the case described above with the aircraft elevator, perceived time pressure can encourage shortcuts. You will no doubt recall the phrase widely promoted that juxtaposes 'getting the job done,' which we all aspire to do for our masters, versus the more appropriate term favoured by the risk holders of 'getting the job done – safely'.

Overconfidence from experience – this behavioural trait couples a lack of consequences with charisma and reverence. The famous story of a B-52 USAF pilot describes a man who was so revered in his circles that no one dared to challenge him. He regularly performed unauthorised aggressive manoeuvres during airshows. Supervisors did not have the courage to deal with it, even after many clues arose from his peers, who eventually refused to fly with him. Leadership inaction normalised risky behaviour until that fateful day in 1994 at Fairchild AFB which is widely available watch on social media.

Past Success – In the case of Challenger, NASA managed risks using engineering judgement to move from an original baseline focused on 'why should we launch?' to one which was shaped around the concept of 'why shouldn't we launch?' The NASA Engineers famously warned about O-Ring failures at low temperatures. Due to launch pressure, the warnings were overridden – because similar warnings hadn't led to failure before – a real cry wolf situation. It is an inherently human trait that if we get away with something over and over, we eventually develop a blissful ignorance of the hazard in the first place. When success is a powerful motivator in projects such as the US Space Programme, that human trait becomes infectious. Couple it with powerful peer and leader charisma, and threat of sanction for speaking up, and you have a formidable psychological hurdle for those who do recognise the risk to overcome.

Peer Normalisation – There was a historical case where electricians at Brize Norton had got into the habit of using cigarette lighters to put heat shrink tubing on cables at the rear of the Tristar – to the extent that even non-smoking electricians carried lighters. This was not only a direct fire risk but could easily have resulted in electrical faults on critical systems in the aircraft. The practice had come about because it was difficult to get power to the back of the aircraft – multiple extension leads, and a power set, had to be found for a job that took seconds in many cases. It was clear that as new electricians arrived on the squadron that they picked up this shortcut from their peers – who had, in turn, picked it up when they had arrived on the squadron. A combination of 'if you can't stop them, then join them' (peer normalisation) and 'past success' (as nothing had gone wrong and nobody had caught them doing it!) led to this becoming totally normalised. When the practice eventually came to light, the OC Eng was able to procure proper gas-powered shrink guns from civil aviation sources that they were able to clear for immediate use.

Normalisation of Deviance is Not Confined to Air Safety

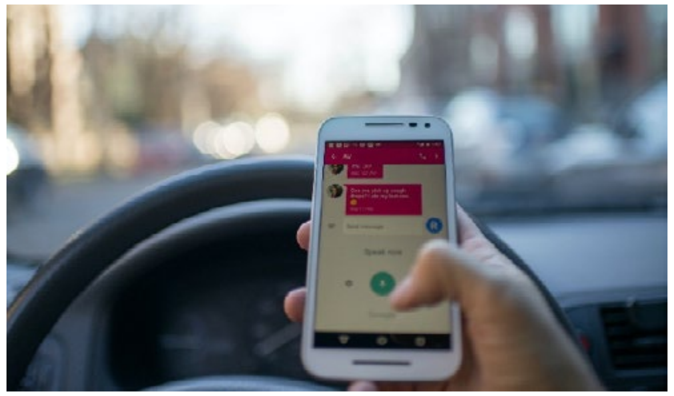


Image: Pexels.com credit Roman Pohorecki

Whilst we might all say we are not guilty of it in a flying environment, we can probably admit to it in routine life. How many times can you remember texting whilst driving? Do you think that an amber traffic light actually means 'go faster'? Do you use your swivel chair to reach the office clock to change the battery instead of finding a stepladder? And, we've all seen plenty of videos describing how not to employ a forklift. Enough already! Back to Air Safety……

Recognising the Signs

If you want to intervene in this hazard, you need to look for the signs, and get others to do so too.

- "We've always done it this way" – a very common reason for straying from the book procedures. Op Tempo can influence this.
- "It never caused a problem before" – related to the first bullet, and the main reason for the Challenger accident.
- Jokes about "getting away with it" – you might hear this in the bar over a casual drink, when people let their guard down.
- Unwritten procedures replacing formal ones – again, related to the bullets above. Audit staff should be especially vigilant for this.
- "I'm never flying with him again" – Said about the B-52 pilot; again, only likely to be heard by a supervisor in an informal environment.
- "We need to get the job done – it's Ops" This was the case with the 'elevator on the shoulders' incident. Very easy for supervisors to not see this.

Breaking the Cycle

If you can recognise Normalisation of Deviance in your unit, you have a great opportunity to nip it in the bud. But there are some leading factors you can employ where it is not obvious or hasn't happened yet. **Firstly, Reinforce Standards**: especially under pressure. **Praise adherence**: if your team is doing the job as prescribed, let them know. Pass out a few 'Well Done' awards. **Debrief near-misses**: get to the root of what happened and ensure the team learns from it in a non-punitive way. This neatly brings us onto: **Create space for honest reporting**, without fear of retribution. **Speak** to your people informally – get the war stories. And, very importantly, **Model** the behaviour you want to see – leaders go first. **Ask yourself**: What corners are people cutting because they think it's harmless? What have we gotten used to that would shock a new team member? If an accident happened today, what would the Inquiry uncover? When was the last time we reviewed a procedure? Are there any unwritten rules we have adopted? Are my people afraid to raise safety concerns? What do I do that might set the wrong example?

Tools to Tackle Normalisation of Deviance

Debriefing is one of the best tools, especially Immediate Post-Sortie Debriefing and hats-off debriefs ("Boss – that was a dangerous decision out there"). There's a great article in a past Issue of Air Clues by the (then) Chief of the Air Staff, Sir Stephen Hillier entitled ' A Short Bedtime Story on Leadership'. In the article, the Chief describes how, as a junior officer, flying with his Stn Cdr, he challenged a flying decision by the Stn Cdr; he thought that was an OJAR moment, but the Stn Cdr (eventually) praised him for it. It is a particularly good example of leadership because, by telling the story as the Chief, he was implying that this was behaviour he endorsed.

Discuss what was planned against what actually happened. Get to the root cause of why there was a difference. Encourage people to report dangerous outcomes. Have a Just Culture Framework in place.

A Short Bedtime Story on Leadership

Setting an example for others to follow

by Air Chief Marshal Sir Stephen Hillier

This is a story about supervision and leadership, and an experience that has stayed in mind and guided my approach to such things ever since. A story of honesty, integrity and lessons learnt, regardless of rank. For the reader today it might seem unremarkable. I sincerely hope so. But things were not always as they are today – it has taken effort to get where we are and we should not forget that it requires ongoing effort to keep us there.

Cultural Interventions – Use Campaigns and Stories to Shift Cultural Norms. One of the most popular and effective aspects of Air Clues magazine is the plethora of 'I Learnt About Flying from That' articles. These stories manifest from people who experienced a near-miss in the past, got away with it, and remained silent. However, their conscience dictated that they should share the lessons with others, hence writing into Air Clues to describe the experience. More often than not, to their great credit, these authors choose not to be anonymous. It is vitally important that they are not sanctioned for doing this, another part of our Just Culture. I should add however that, for some reason, the supply of such stories is somewhat thinning out, which might reflect a contemporary fear of retribution. Leadership please take note.

Actively analyse and discuss accidents, including civil aircraft accidents. The regular column by the UK Flight Safety Committee in Air Clues is included for this very reason, to give insights to commercial aviation risks that might translate to the military environment. Accident reports in the commercial world should be analysed for read across, not just with similar platforms. Many of the causal effects are Human Factors related.

Authority Gradients & CRM - Don't Be Surprised

By Wg Cdr Jim Lawson, RAF Safety Centre

One of the first things we do in the military is swear an oath of allegiance, or make a formal attestation of some kind. Words like 'promise' and 'obey' abound.

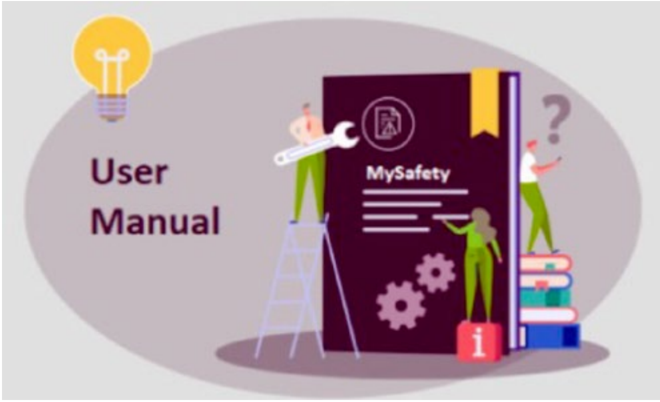
Promote Human Factors and Safety Culture Training and Crew Resource Management (CRM) training. It is vitally important to identify and mitigate cross-cockpit gradients. Air Clues is dotted with stories about how a confusing picture arose in the cockpit of who was actually in control of the aircraft and what decisions were being made.

MySafety

By RAF Safety Centre

MySafety is a web-based application to support the reporting and management of safety and environmental protection occurrences, investigations, recommendations, Learning from Experience and Lessons.

MySafety is accessible online via MODNET for occurrence reporting and management. Users can submit an initial summary of an occurrence to their Org/Unit by using any Personal Electronic Device (PED) connected to the internet via the MySafety Alert on the Defence Gateway. All MySafety Alerts must be validated by an Occurrence Manager to generate an Occurrence Report.



The system is used to report safety (JSP 375 Chapter 16) and environmental protection (JSP 418) occurrences relating to Defence personnel, visitors or contractors that are undertaking Defence activities (including official sport as set out in JSP 660), using Defence equipment or on the Defence estate.

The recording of Learning from Experience (LfE) events and subsequent lessons are detailed within the Organisation Learning Policy Statement and JSP 441 - Information, Knowledge, Digital and Data in Defence.

Safety occurrences include:	
An event that results in injury, ill health or death to a person(s) (accident).	
An event which causes loss or damage to property, plant or equipment, or harm to the environment (incident).	
An event that had the potential to cause injury, ill health or death to a person(s) or damage to property, plant or equipment, but no actual harm or damage occurred (near miss).	

Environmental protection occurrences include:	
Fuel spills	
Discharge to the environment	
Release of fluorinated greenhouse gases	

Strategic Command (Strat Com) Renamed the Cyber and Specialist Operations Command (CSOC)

By Cyber & Specialist Operations Command (CSOC)

The Ministry of Defence has reshaped the Cyber and Specialist Operations Command (CSOC) to enhance the UK's ability to help keep the United Kingdom secure at home and strong abroad.

In an era where the first blows of conflict are often struck in cyberspace, the Ministry of Defence has reshaped the Cyber and Specialist Operations Command (CSOC), following the announcement on 1 July, to help keep the United Kingdom secure at home and strong abroad. Building on the foundations of Strategic Command, CSOC unites Defence's cyber and specialist capabilities under a single command, ensuring the Armed Forces are ready to respond across all domains: land, sea, air, space, and cyberspace.

This change reflects the ambition of the 2025 Strategic Defence Review, which sets out a bold vision to make Britain safer, secure at home, and strong abroad. CSOC is at the heart of this vision, driving a landmark shift in deterrence and supporting the move of the Armed Forces towards warfighting readiness.

CSOC stands as the fourth Military Command alongside the Royal Navy, British Army and Royal Air Force - playing a core role in shaping and delivering Defence's Integrated Force.

> CSOC's mission is to generate and operate specialist capabilities, ready to fight across all domains, to make the United Kingdom secure at home and abroad.

CSOC provides vital and game-changing capabilities for Defence, in support of HMG's National Security Objectives. This includes commanding and conducting integrated operations 24/7 – for all of Defence and the UK Armed Forces - to protect the UK and support NATO, ensuring warfighting readiness - whilst keeping our forces healthy, fit to fight and ready to respond globally.

Cyberspace and the electromagnetic spectrum connect every aspect of modern life, but this connectivity also creates significant vulnerabilities. The frontline of conflict now

Cyberspace Communication Specialist

extends beyond traditional battlefields to the digital networks underpinning businesses, national infrastructure, and daily life. Recent conflicts have shown that disinformation campaigns and persistent cyberattacks are defining features of modern warfare. CSOC stands at the forefront of this fight. Every day, its cyber specialists defend the UK's critical networks, military assets, supply chains, and people.

CSOC brings together over 26,000 specialists across 130 global sites, uniting expertise across cyber operations, medical support, intelligence, special forces, education, and our Defence attachés overseas.

General Sir James Hockenhull, Commander CSOC, said:
"Across all we do—whether delivering specialist operations, combatting daily cyber threats, arming Defence with intelligence, uniting the Integrated Global Defence Network, or preparing the next generation of Defence leaders—CSOC is always on, acting with insight, speed, and impact.

We are across every UK operation, delivering specialist capabilities and always ready to respond, anywhere and anytime.

This reshaping ensures we are equipped to out-think, out-pace, and out-fight our adversaries, keeping the UK safe at home and strong abroad.

The conflict in Ukraine has underscored the needs to move to warfighting readiness, achieved through closer collaboration across Defence, wider Government, industry, and our international allies and partners. CSOC embeds frontline lessons, harnessing AI, data, drones and digital warfare to enhance the UK's operational advantage".

CSOC's close collaboration with UK industry is central to this effort. By uniting operational insight with technical ingenuity, CSOC is driving innovation in areas such as cybersecurity and digital warfare. These partnerships not only strengthen national security but also create high-skilled jobs and support the growth of UK businesses at the forefront of defence technology.

As one of four UK military commands, CSOC operates at the forefront of modern warfare. Whether delivering precision targeting, constantly combatting cyber and electromagnetic threats, or uniting Defence's Integrated Global Defence Network, CSOC ensures the UK is prepared to meet the challenges of modern warfare and protect our society, now and in the future.

Operation **CHESSMAN**

By Squadron Leader Joanna Magill, Defence Medical Services

Flt Lt Harrison

The RAF Medical Support Officer (Physiotherapy) Cadre have recently deployed on Operation CHESSMAN supporting Baltic Air Policing Operations in Poland from April to August. The physio provided interventions to 32% of the deployed personnel, including a range of occupations from Typhoon pilots to engineers, mission support staff and augmentees.

The main role of the physiotherapist is to act as a force enabler, delivering early intervention and injury mitigation services tailored to the physical requirements of those on operations. They assess, diagnose and deliver early interventions including physical rehabilitation to optimise recovery from injuries sustained whilst deployed, progress pre-deployment individual programmes and provide expert advice regarding the best place for injury management, sending individuals home for definitive care when required. The deployed physio on CHESSMAN, (Flt Lt Harrison), demonstrated key value. Not only did she keep all personnel in their deployed roles, including one acutely injured pilot on QRA, but she managed to have all her patients complete their treatment programmes in theatre so they came back to the UK fit and ready for the next tasking. She was only unable to help one particular patient that required our highly coveted AEROMED pathway and was returned to the UK for orthopaedic intervention.

A key part of the service provided by the RAF physiotherapist is their injury mitigation services. Their specialist qualifications, experience and training ensure they can provide a targeted aviation medicine service which supports pilots to reduce flight related musculoskeletal issues from escalating before they impede on their performance or even prevent them from flying. On Op CHESSMAN this was tailored around an increase in flying frequency, increase in night flying and associated increased usage of the Mk4 helmet and NVGs, a heavier combination of head worn equipment.

RAF Physio, Flt Lt Harrison, applying in-theatre treatment

These stressors are known as issues for Typhoon pilots, with a 2023 CAM study reporting the high prevalence of flight related neck pain experienced by Typhoon Force, with 86% of those surveyed (81 pilots, 68% of the Force) experiencing flight related neck pain within the last year, leading to difficulties ranging from inability to complete some flight related tasks, to being unable to fly as a result. The RAF Physiotherapist will provide direct access to their services often within the Typhoon Sqn buildings, targeted mobility sessions focusing on the neck, upper and lower back and hips and focused neck strength programmes alongside their conditioning programmes provided by the RAF Physical Training Instructors. The physiotherapist will focus on both education and relaxation throughout the sessions, giving an opportunity for respite during an often hectic schedule for all. These sessions are often enjoyed by all deployed personnel, with mobility 'pre-hab' sessions being a big hit with the engineers.

Physios mainly deploy within a team of primary care professionals, including a medic, general practitioner (GP) and sometimes a nurse or paramedic. On Op CHESSMAN, the physio deployed with a medic and Reservist GP. The combination of practitioners supporting deployed personnel is tailored to the activity and the requirement for an RAF Physiotherapist based on musculoskeletal risk, especially flight related injury risk, and the number of deployed supporting personnel. The RAF currently has 26 Physios and deploys on roughly 19 Ops and Exercises a year, with 7 held at various states of readiness from R2 to R5. Operation and Exercise cover ranges from Op SHADER to the Carrier Strike Group, SPRING HAWK and most Typhoon Exercises in between. A small number of them also hold secondary healthcare qualifications and have deployed on Op CATALYSE and RENOVATOR in Eastern Europe, maintaining their currency to support the RAF Role 1 Air Hospital Staging Unit contingency.

2023 RAF G Survey Results

By Sqn Ldr Michael-Luke Jones, Occupational Medicine Doctor at ROMD Brize Norton

High G Training Facility

During 2023, the Regional Occupational Medicine Department at RAF Brize Norton has led the delivery of an anonymous survey to all UK military pilots on their experience of G forces. This survey was carried out in collaboration with the RAF Centre of Aerospace Medicine (RAF CAM) and King's College London and asked pilots about their whole-career experience of G forces, training and mitigations.

What were we looking for?

The survey aimed to assess how many military pilots experience alterations of consciousness due to high G exposure during their career – events usually referred to as G-LOCs or A-LOCs. These safety-critical events are reported through normal military aviation safety reporting, but anonymous surveys have previously led to excellent levels of reporting and provide a 'snapshot' of where the main risk areas are.

RAF Aerospace Medicine specialists have been carrying out similar surveys since the late 1980s. The first anonymous survey was conducted as part of preparation for the introduction of faster and more agile aircraft, including the European Fighter Aircraft that subsequently became Eurofighter Typhoon. To some surprise, hundreds of episodes of G-related loss of consciousness (G-LOC) episodes were reported in this 1986 survey, with one responder reporting losing consciousness in flight around once per year!

Thanks to the aircrew who responded to the survey, the RAF realised that it didn't just need to think about the risks of G forces with future aircraft, but they needed to improve aircrew training and safety now. This and subsequent similar surveys have kept the military flying community informed of trends in G-induced incidents and supported the introduction and improvements to high G centrifuge training. They also provide historical data to allow comparisons to be made with the results of the current survey.

However, despite improvements in aircrew protection against G forces, pilots still don't have complete protection against G-induced alterations of consciousness. Unfortunately, we know that the worst-case scenario can still have predictable and tragic consequences, particularly in single pilot aircraft.

A consistent finding from previous surveys was that a surprisingly large proportion of all RAF aircrew had experienced at least one G-LOC or A-LOC during their career. The proportion of aircrew reporting at least one incident in previous surveys was around 20%. The most recent survey from 2012 broadened the definition which led to a reported prevalence of 37%. A large majority of the reported incidents had occurred during military flying training, rather than in operational fast jet flying as might initially be expected.

Following on from these findings, the 2023 survey aimed to assess if the rate of G-induced alterations of consciousness had fallen since 2012 following introduction of improved training and aircraft countermeasures. The survey also allowed us to assess whether the pattern of G-induced alterations of consciousness occurring most frequently during flying training had continued and the key risk factors associated with these incidents.

This updated survey also gave pilots an opportunity to give anonymous feedback on the relevance of RAF CAM's aviation medicine training and the Aircrew Conditioning Programme (ACP). Finally, pilots flying an aircraft capable of significant levels of G were asked some extra questions to gather their view of flight safety risks and mitigations. These included topical issues such as the effect of increasing simulation training.

What did the survey find?

The survey was open between February and July 2023 and received 403 responses. Following analysis of these responses, the key findings were:

- a smaller proportion of pilots reported experiencing G-induced alteration of consciousness incidents compared to the previous survey (22% vs 37%),
- a larger number of pilots reported multiple incidents during their career compared to findings of previous RAF and international surveys,
- a higher proportion of incidents involved front-line fast jet pilots compared to the previous survey (20% vs 10%),
- whilst pilots express a high degree of confidence in their anti-G straining manoeuvre (AGSM) training, an inadequate AGSM was reported in over half of recent training aircraft incidents,
- time away from the high G environment was reported as a risk factor in the majority of recent front-line fast jet incidents and ...
- current high G pilots across front-line and training aircraft reported that time away from the high G environment was the most important risk factor for high G incidents.

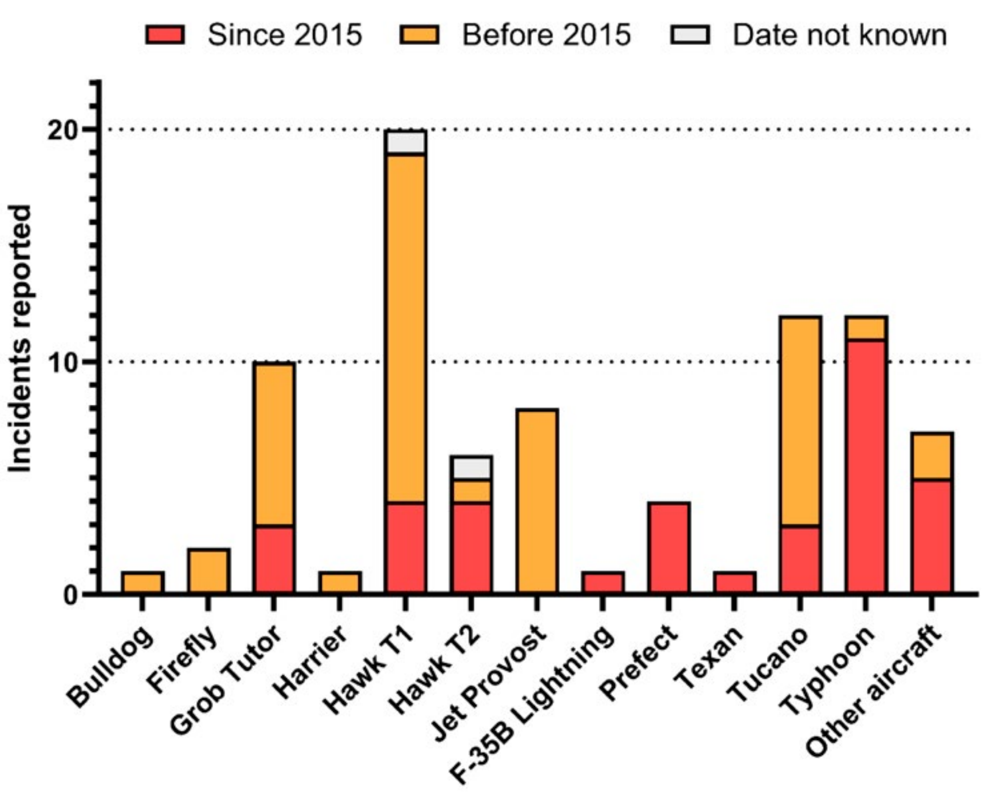


Chart showing G-induced incidents by aircraft type and time reported.

What does this mean for fast jet pilots?

Whilst previous RAF surveys have indicated that a large majority of G-induced incidents occur in flying training aircraft, this updated survey has started to challenge this narrative. When looking at incidents reported over the last eight years, the single largest number of incidents was reported in the Typhoon aircraft. The overall number of incidents reported are small, but this does highlight that the excellent G protection provided by modern fast jets still doesn't provide complete security against the effects of G.

The most common risk factor reported in these incidents was time away from the high G environment, which we know can reduce the body's natural response to G forces. This is known as the "G lay-off" effect and experimental studies have demonstrated that G tolerance reduces following time away from high G exposure. Anecdotally, this effect may take only one to two weeks to begin to develop. This suggests that some caution is appropriate when returning to maximum G exposure after a period away from flying or carrying out other 'low G' flying roles.

What does this mean for pilots involved in flying training?

One of the main changes in G risk mitigations since the previous RAF G-LOC survey was an increase in centrifuge training during military flying training. It was reassuring to see that pilots reported a high degree of confidence in carrying out an anti-G straining manoeuvre following this change. However, a significant number of incidents where pilots experienced a G-induced alteration of consciousness occurred due to failing to carry out an effective AGSM.

Failing to carry out an effective AGSM appeared to be a particularly prevalent factor in pilots involved in flying training, as this was reported in over half of recent training aircraft incidents. Several factors may be involved here, such as student pilots being distracted by concentrating on an unfamiliar flying manoeuvre or alternatively instructors being surprised by an unexpectedly high level of G during a student-flown manoeuvre. Whatever the cause, an AGSM can only protect you if you carry out the manoeuvre!

What does this mean for aviation medicine training?

Following introduction of RAF CAM's new High G centrifuge in 2018, it was reassuring that a majority of pilots stated that the new training model involving dynamic flight simulation was more helpful. As RAF CAM pioneered the routine use of flight simulation during centrifuge training, this result was reassuring. Updates have been made to training to adjust the maximum G levels experienced to make these more representative of aircraft G.

More mixed feedback was received from pilots on their experience and the relevance of the ACP. Some pilots expressed concerned about the relevance and delivery of the programme, whilst others felt that the programme was under-resourced or that they had limited available time to continue the recommended exercises. This feedback has been shared with the lead clinician for the ACP who will assess the scope for changes to the programme.

What happens next?

Results of the survey have now been analysed and distributed within RAF CAM and briefing notes have been circulated to Senior Operators within 1 Gp and 22 Gp. The results are being used by RAF CAM Aviation Medicine Training Wing to update relevant training packages.

The results will also be presented at an international conference and will be submitted for scientific publication. In addition, a repeat survey study focussing on fast jet pilots has been recommended in around three years to monitor the findings in operational fast jet aircraft. Engagement with research studies such as the G Survey and the upcoming QinetiQ-led MOD Disorientation Survey is important for us to understand and improve air safety and aircrew performance and I would like to thank all of the survey respondents who took time to contribute their experience to this project.

Royal Air Force Platforms

Combat Air

Control of the Air and global freedom of action through advanced multi-role platforms delivering precision Attack while contributing to ISTAR.

Typhoon FGR4 137 aircraft, 30 'Tranche 1' aircraft (OSD 2025)

RAF Lossiemouth	1(Fighter) Squadron II (Army Co-operation) Squadron 6 Squadron IX (Bomber) Squadron
RAF Coningsby	3 (Fighter) Squadron XI (Fighter) Squadron 29 Squadron (Operational Conversion Unit) 41 Squadron (Test & Evaluation Squadron) 12 Squadron (Joint UK/Qatar Squadron)

Lightning F-35B 34 aircraft, increasing to 48 by late-2025. Growth of up to 74 deliveries.

RAF Marham	617 Squadron 809 Naval Air Sqn 207 Squadron (Operational Conversion Unit)
Edwards AF Base (USA)	17 Squadron (Test & Evaluation Squadron)

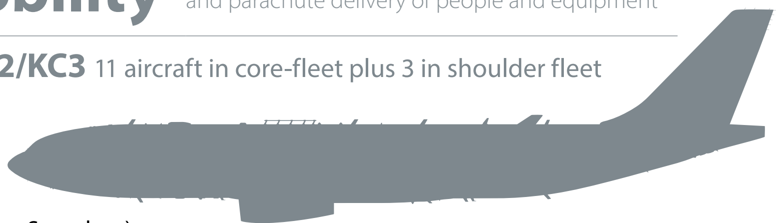
StormShroud 20+ aircraft entering service by 2025

RAF Waddington — 216 Squadron

Air Mobility

Strategic and tactical air transport, air-to-air refuelling and parachute delivery of people and equipment

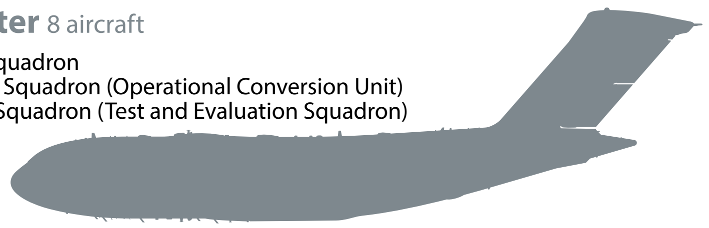
Voyager KC2/KC3 11 aircraft in core-fleet plus 3 in shoulder fleet



RAF Brize Norton

10 Squadron
101 Squadron
206 Squadron
(Test and Evaluation Squadron)

C-17A Globemaster 8 aircraft



RAF Brize Norton — 99 Squadron; XXIV Squadron (Operational Conversion Unit); 206 Squadron (Test and Evaluation Squadron)

Atlas C1 22 aircraft delivered

RAF Brize Norton — 30 Squadron; LXX Squadron; XXIV Squadron (Operational Conversion Unit); 206 Squadron (Test & Evaluation Squadron)

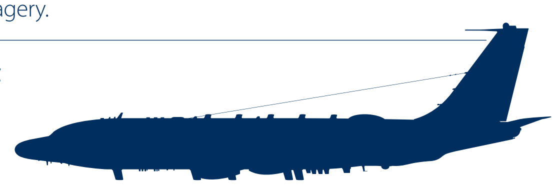
Envoy IV CC Mk 1 2 aircraft delivered

RAF Northolt — 32 (The Royal) Squadron; 206 Squadron (Test & Evaluation Squadron)

Intelligence, Surveillance, Target Acquisition & Reconnaissance (ISTAR)

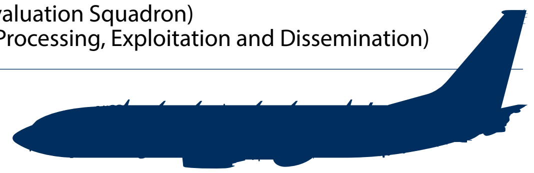
Strategic and tactical situational awareness and understanding through the collection, processing and exploitation of information – from electronic transmissions and by collecting traditional, thermal and radar imagery.

RC-135W Rivet Joint 3 aircraft



RAF Waddington — 51 Squadron; 54 Squadron (Operational Conversion Unit); 56 Squadron (Test & Evaluation Squadron); 1 ISR Wg (Intelligence Processing, Exploitation and Dissemination)

Poseidon MRA1 9 aircraft



RAF Lossiemouth — CXX Squadron; 201 Squadron; 42 Squadron (Operational Conversion Unit); 56 Squadron (Test & Evaluation Squadron); 1 ISR Wg (Intelligence Processing, Exploitation and Dissemination)

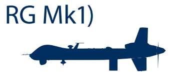
Wedgetail AEW Mk1 3 aircraft with Initial Operating Capability in 2026

RAF Lossiemouth — 8 Squadron; 42 Squadron (Operational Conversion Unit)

Shadow R1 5 aircraft, transitioning to Shadow R2 and increasing fleet size to 8 aircraft

RAF Waddington — 14 Squadron; 54 Squadron (Operational Conversion Unit); 56 Squadron (Test & Evaluation Squadron); 1 ISR Wg (Intelligence Processing, Exploitation and Dissemination)

MQ-9A Reaper 8 aircraft (OSD Sep 2025, transitioning to Protector RG Mk1)



RAF Waddington — XIII Squadron; 56 Squadron (Test & Evaluation Squadron); 1 ISR Wg (Intelligence Processing, Exploitation and Dissemination)

Protector RG Mk1 16 aircraft entering service by 2025

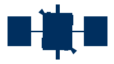
RAF Waddington — XIII Squadron; 31 Squadron; 54 Squadron (Operational Conversion Unit); 56 Squadron (Test & Evaluation Squadron); 1 ISR Wg (Intelligence Processing, Exploitation and Dissemination)

UK Space Command

SSPAR (Solid State Phased Array Radar) 1 Ballistic Missile Defence (BMD) and Space Domain Awareness radar

RAF Fylingdales — UK Space Command

TYCHE (ISTAR Operational Capability Demonstrator) 1 Electro-optical satellite

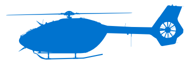


UK Space Command

Training

Training of pilots and weapons system operators. Provision of air experience flying for air cadets and members of the University Air Squadrons.

Jupiter HT1 7 aircraft



RAF Valley	202 Squadron
RAF Shawbury	60 Squadron

Juno HT1 29 aircraft

RAF Valley	202 Squadron
RAF Shawbury	60 Squadron Central Flying School (Helicopter) Squadron 660 Squadron AAC 705 Squadron NAS 670 Squadron AAC

Hawk T2 28 aircraft

RAF Valley — IV (Army Co-operation) Squadron; XXV (Fighter) Squadron

Phenom T1 5 aircraft

RAF Cranwell — 45 Squadron

Texan T1 14 aircraft

RAF Valley — 72 (Fighter) Squadron

Prefect T1 23 aircraft

RAF Cranwell	LVII Squadron
RAF Barkston Heath	LVII Squadron

Tutor T1 91 aircraft

RAF Wittering	115 Squadron 16 Squadron
Various	Fifteen University Air Squadrons Thirteen Air Experience Flights

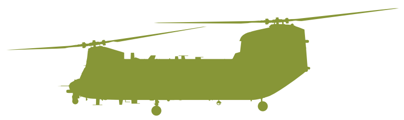
Viking T1 52 aircraft (plus 29 stored aircraft in the sustainment fleet)

RAF Syerston	RAF Central Gliding School & 644 Volunteer Gliding Squadron
Various	611, 615, 621, 622, 626, 632, 637, 644, 645, 661 Volunteer Gliding Squadrons

Support Helicopters

Tactical mobility of people and equipment, casualty evacuation, and Defence Engagement.

Chinook HC 5/6/6A 54 aircraft



RAF Odiham	7 Squadron 18 (Bomber) Squadron 27 Squadron
RAF Benson	28 Squadron (Operational Conversion Unit)
RAF Akrotiri	84 Squadron (Emergency Response Capability)

Defence Engagement

Hawk T1/A 17 aircraft

RAF Waddington — Red Arrows

Lancaster, Spitfire, Hurricane, Dakota, Chipmunk

RAF Coningsby — Battle of Britain Memorial Flight

Key: Combat Air Force · Air Mobility Force · ISTAR Force · 22 Group · Joint Aviation Command · 1 Group

Information correct as at 07 May 2025

AirClues

Insights from the UK Flight Safety Committee

Time for a Rethink: Why Aircraft External Lighting and 'See and Avoid' Clearances at Night Need a Review

By Rob Holliday, CEO UKFSC

Aviation is built on layers of safety, redundancy, technology, and human vigilance. Yet, two recent catastrophic events, one in the United States, one in Japan, have exposed a critical vulnerability. The reliance on the human eye and aircraft external lighting through the use of "see and avoid" clearances or as a defence against a loss of separation at night. Both incidents, one a midair collision involving a military helicopter and a regional jet in Washington, DC, and the other the tragic Haneda Airport runway collision where an A350 landed on top of a stationary aircraft at night, demand a fundamental review of how we illuminate aircraft and manage visual separation in darkness.

The Washington DC Accident: When "See and Avoid" Fails at Night

On January 29, 2025, at Washington National Airport, US Army helicopter PAT25 (a Sikorsky UH-60L) was given a clearance to proceed visually in complex, night-time airspace. The transcript reveals the following exchange:

20:46:01.6 TWR-A PAT two five traffic just south of Wilson Bridge is a C-R-J at one thousand two hundred feet for runway three three.

20:46:07.9 RDO-1 PAT two five has the traffic in sight request visual separation.

20:46:10.5 TWR-A separation approved.

Image by Bornil Amin, Unsplash

Later

20:47:39.1 TWR-A PAT two five you have the C-R-J in sight? [sounds of rapid beeping consistent with conflict alert audible in background while tower is transmitting]

20:47:41.9 TWR-A PAT [transmission interrupted by 0.8 second mic key from PAT-25] C-R-J.

20:47:44.1 RDO-1 PAT two five has uh— aircraft in sight request visual separation.

Moments later, the helicopter and a regional jet (PSA Airlines flight 5342) collided. The helicopter crew, operating under a clearance to "maintain visual separation," failed to see and avoid the other aircraft.

This is not an isolated case. The "see and avoid" principle, used for decades, is fundamentally compromised at night. Human vision is poorly adapted to detecting small, moving lights against a cluttered, illuminated background.

The Washington DC accident is an example of how the system can break down when technology and procedures do not compensate for the evolution of the environment and human limitations.

The Haneda A350 Runway Collision: A Tragedy in the Dark

On January 2, 2024, at Tokyo Haneda Airport, an Airbus A350 landed on top of a stationary Bombardier DHC-8 on the runway at night. The Japanese accident investigation report details the sequence:

The DHC-8 (JA722A) was cleared to taxi and hold at a designated point on Runway 34R:

"JA722A, Tokyo TWR, good evening. No.1, taxi to holding point C5." Tower to DHC-8, 17:45:14

The A350 (JA13XJ) was cleared to land on the same runway, with the DHC-8 still present and not visible to the landing crew until the last moments.

The report's analysis is that the A350 crew and air traffic controllers did not see the DHC-8 on the runway, despite all required external lights being illuminated on the aircraft. The DHC-8's anti-collision lights, navigation lights, and landing lights were all on, yet the A350's pilots were unable to visually acquire the aircraft, albeit they were not expecting it to be there, until impact was inevitable. The accident occurred after sunset, in conditions of good visibility but with the runway and airport environment brightly lit, a classic scenario where current aircraft lighting is simply inadequate.

It will be interesting to see if the final accident report recommends PAPIS that flash, whenever there is an aircraft on the runway to warn approaching aircraft.

A Ground Collision at Night

On 11 December 2024, a Cessna 560 business jet was taxiing at Hartsfield-Jackson Atlanta International Airport when it was struck by a ground vehicle crossing a non-licensed vehicle roadway (NLVR). The vehicle collided with the aircraft's nose, causing substantial damage. The driver later stated that it was dark and raining, and they did not see the aircraft until after the collision, only noticing its illuminated wingtip lights when they looked back. They admitted to complacency and poor lookout but also noted the difficulty of seeing in the conditions.

The NTSB's conclusion? The probable cause was the vehicle driver's inadequate visual lookout. The report did not examine whether the aircraft's external lighting was sufficient for visibility in the prevailing conditions, whether the lighting configuration met operational needs for detection by ground vehicles, whether the design or intensity of the lights contributed to the driver's failure to see the aircraft. The aircraft was operating at night, in rain, in a complex airport environment. Yet the investigation did not consider whether the aircraft was visible enough to prevent the collision or the human element of the driver's eyes adaptation to the conditions. The NTSB did not travel to the scene, and the case was classified as a low-priority Class 4 investigation.

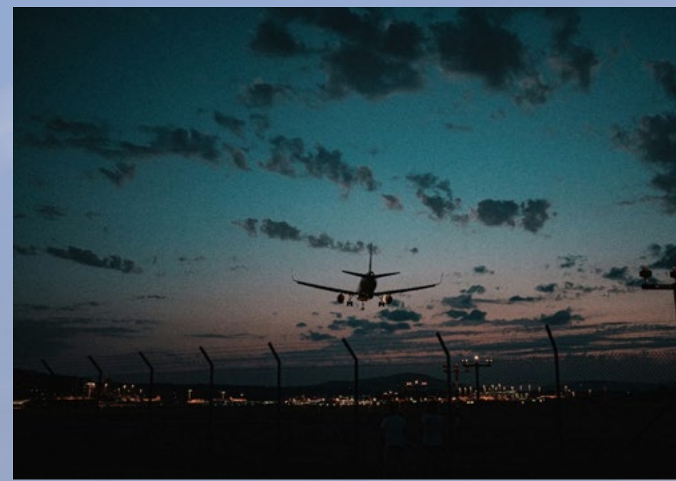


Image By Claudio Schwarz, Unsplash

Aircraft External Lights

Modern cars are equipped with LED arrays, adaptive headlights, and dynamic lighting signatures that make them visible in all conditions. There are 41 external lights on the A350, but legacy aircraft, by contrast, still rely on basic incandescent or LED position lights, anti-collision beacons, and landing lights. Technologies that have changed little since the mid-20th century. The standards for aircraft lighting focus on minimum intensity and colour, not on actual detectability in real-world conditions.

The Haneda report notes that the DHC-8's external lights were operating as designed, yet the aircraft was not seen by the A350 crew until the final seconds. Similarly, in the DCA incident, the helicopter crew struggled to visually acquire other traffic, even when actively searching. Both cases highlight the disconnect between legacy procedures and operational reality. Aircraft lighting is an unchallenged, accepted 'norm' that has drifted in effectiveness as the environment has become more polluted with artificial light combined with a doubling of commercial air traffic in the last twenty years. Creating a scenario that increasingly challenges the human eye to see and positively identify other aircraft.

The Evolution of Aircraft Lights

The 1920s –1950s saw the introduction of standardised position lights (red on left wing, green on right, white on tail) and landing lights for runway visibility. In the 1960s to the1980s, improved halogen lighting and strobe systems for anti-collision purposes were introduced. More recently from the 1990s to the present day there has been a shift to LED technology, offering lower power consumption, longer lifespan and brighter and more reliable illumination. Modern aircraft lighting now include taxi lights, runway turnoff lights, logo lights, wing inspection lights and anti-collision strobes.

Human Vision and Light Pollution

At night, the human eye relies on rod cells, which are sensitive to low light but poor at detecting colour and detail. The ability to spot another aircraft's lights is further degraded by light pollution from airport infrastructure, city lights, and reflections from wet surfaces. Academic studies confirm that contrast sensitivity and depth perception are dramatically reduced at night, especially when artificial lighting creates glare or background clutter.

The challenge of visually detecting other aircraft at night is not just a matter of human physiology, it is increasingly a function of the environment in which airports operate. Over the past 20 to 30 years, light pollution in and around major urban areas has increased dramatically. According to a 2021 Forbes article, global light pollution has increased by at least 49% in the last 25 years, with some regions experiencing up to a 400% increase due to the widespread adoption of LED lighting. This growth is especially pronounced around major airports, which are often located near or within expanding urban areas.

Over 80% of the world's population now lives under light-polluted skies, making it nearly impossible to see stars, and, by extension, small aircraft lights, in many cities. Zenith radiance (the brightness of the night sky overhead) in urban areas is now up to 40 times greater than in unpolluted rural skies. The actual increase in light pollution may be underestimated by satellite data, as many sensors do not fully capture the blue-rich light emitted by modern LEDs, which is disruptive to human night vision.

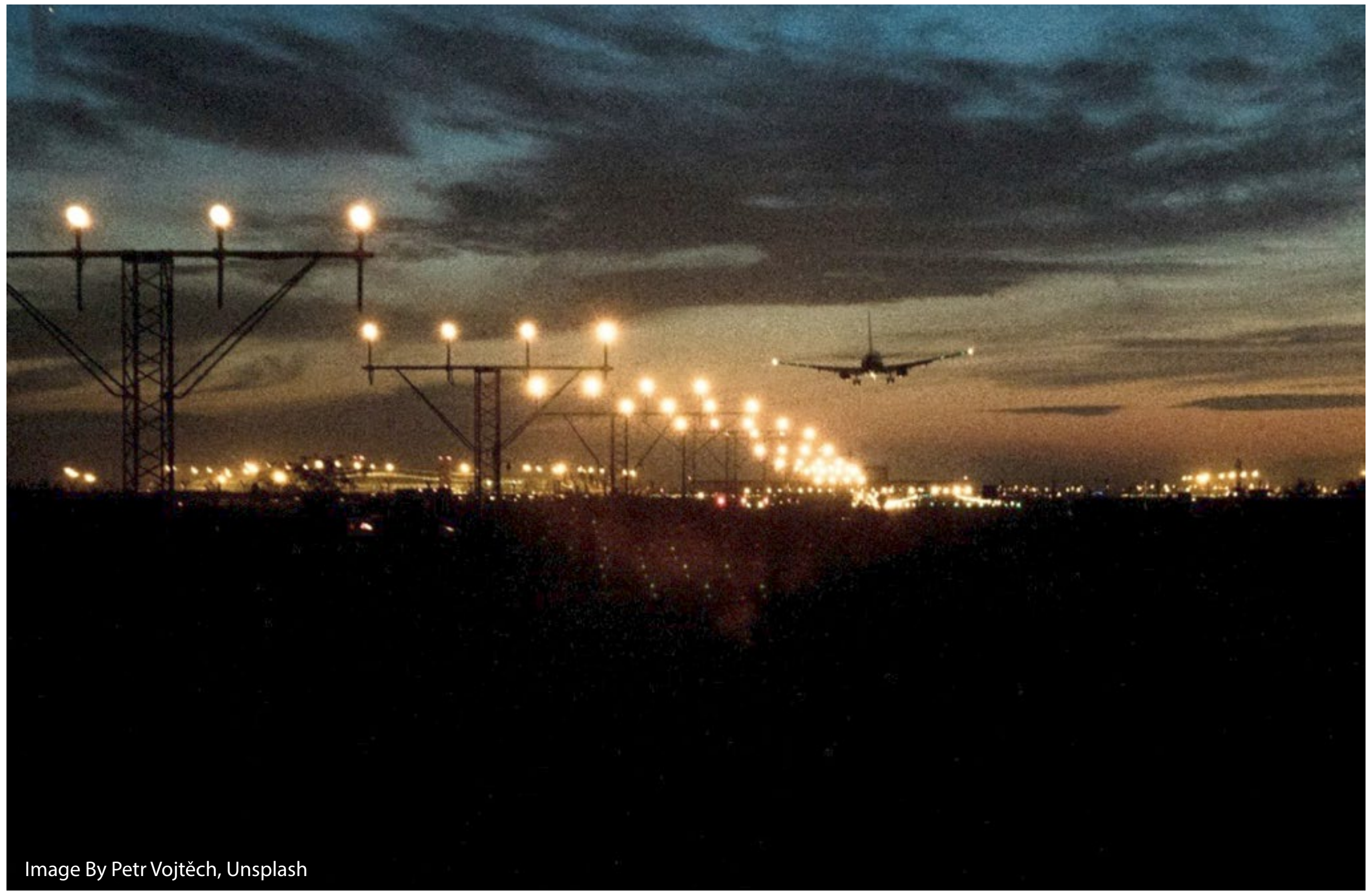


Image By Petr Vojtěch, Unsplash

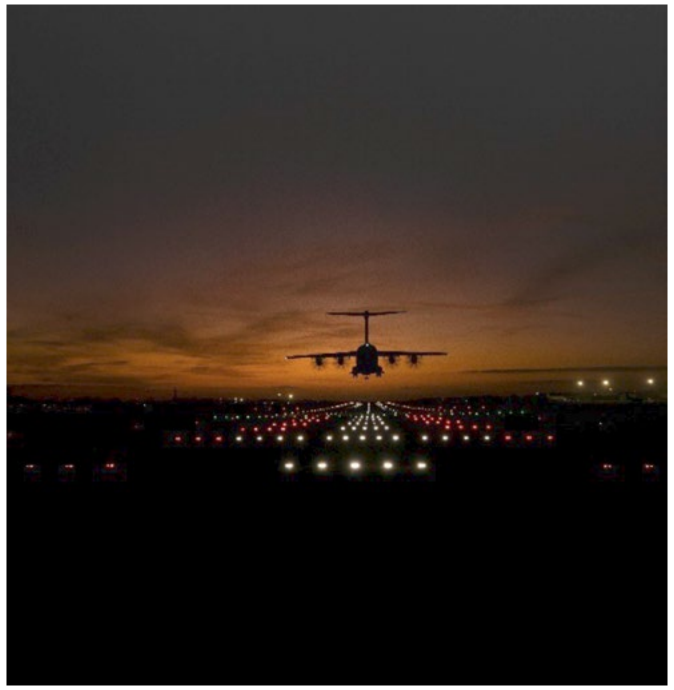


Image by Royal Oxford, Unsplash

Light pollution washes out the contrast between aircraft lights and the background, making it much harder for pilots to visually acquire other aircraft, especially when those aircraft are on the ground or in the airport environment. Exposure to bright lights, whether from airport infrastructure or city lights, prevents pilots' eyes from fully adapting to darkness, further reducing their ability to spot other aircraft. The proliferation of illuminated signage, buildings, and ground vehicles at airports creates a visually complex environment, where the relatively dim and static lights of an aircraft can easily be lost.

Research published in Nature Reviews Earth and Environment confirms that light pollution reduces contrast sensitivity and depth perception, both of which are critical for pilots attempting to visually separate from other traffic at night. Studies on human night vision show that rod cells, responsible for low-light vision, are easily overwhelmed by artificial lighting, and that even brief exposure to bright lights can delay full dark adaptation by up to 30 minutes.

As light pollution continues to grow, the effectiveness of traditional aircraft lighting and the very concept of "see and avoid" at night, will only decline further. The night sky is no longer dark, and the visual cues pilots once relied on are being drowned out by the glow of modern cities and airports. This points to a fundamental rethink of how we illuminate aircraft and manage visual separation at night.

Are See and Avoid Clearances at Night a Dangerous Anachronism?

The practice of issuing "maintain visual separation" clearances at night is increasingly indefensible. Both the Washington DC and Haneda cases show that even highly trained crews, operating modern aircraft with all lights illuminated, can fail to see and avoid other aircraft. The reliance on visual acquisition as a primary safety barrier is a relic of a bygone era. The transcript is revealing. Despite repeated requests and acknowledgements of visual separation, the helicopter crew was unable to maintain safe distance from other aircraft. The system failed not because of individual error, but because the procedure itself is flawed in darkness.

In the year 2000 around 17.5 million flights were recorded worldwide. In 2023 the number was approximately 38.9 million commercial flights globally. This reflects a more than twofold increase in annual commercial flights over two decades. In crowded airspace against a backdrop of increasing artificial light pollution, is it reasonable to expect the human eye to pick out a specific aircraft and avoid it?

Conclusion

The Washington DC and the Haneda A350 runway collision are not isolated events. They are symptoms of a systemic failure to adapt to the realities of night-time aviation. As air traffic grows, airports become ever more complex and artificial light pollution increases, it shifts the effectiveness of historic lighting and the human eye. Is it time for review? To examine current lighting standards, the effectiveness of human vision at night in today's evolving environment, whether see and avoid at night is an effective defence and closely examine of our procedures for aircraft separation in visual conditions at night.

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AirClues

Stay in Control:
Safety Starts at the Ignition

By RAF Safety Centre

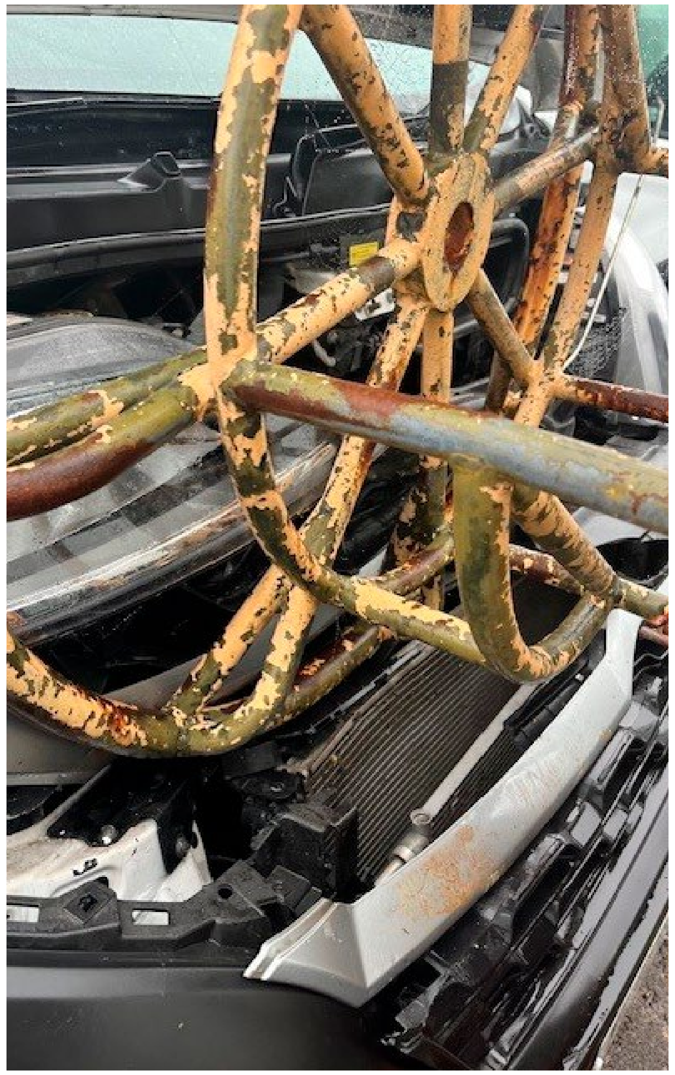
We would like to take this opportunity to remind all personnel to prioritise safety at all times and ensure Service vehicles are always started from the driver's seat and in accordance with orders and the UK Highway Code. There is a risk that the vehicle may have been left in gear, which could cause it to lurch forward unexpectedly when started, posing a safety hazard to both the operator and those nearby, so it is essential that the driver is in full control of the vehicle. Turning the ignition when not in full control of the vehicle – being sat in the driver's seat – has a serious and considerable potential to cause damage or injury.

This article aims to inform all users of Mechanical Transport (leased, owned, hired and sponsored), of their responsibility to ensure they adhere to standing orders for vehicle operation (including start-up or activation of the vehicle electrical system).

Following a recent safety occurrence, Babcock Safety Alert 2025-002 was issued regarding vehicles without Clutch Safety Interlocks. It is important to note that not all Service vehicles provided under the Phoenix II contract, or Green Fleet vehicles, are equipped with this safety feature.

Under European Community Whole Vehicle Type Approval (ECWVTA) regulations, new vehicles must be fitted with a Clutch Safety Interlock, which prevents the engine from starting unless the clutch is fully depressed. Recent safety occurrences involved vehicles built prior to this regulation that did not have this feature fitted and the engine was turned over whilst in-gear.

When performing any operation to start a vehicle with a keyed ignition, be that to activate the electrical system or to turn the engine over, all personnel are to be seated in the driver's seat and in full control of the vehicle. Noting that a number of Service vehicles do not have a Clutch Safety Interlock, there is a significant risk that these vehicles may lurch forward unexpectedly, creating a serious safety hazard.



To ensure everyone's safety please make sure to

- Always be seated in the driver's seat when starting a vehicle.
- Never attempt to start the vehicle while standing outside, regardless of how convenient it may seem.
- Adhere to the UK Highway Code guidance on starting a vehicle.

Case study

A Service vehicle recently sustained damage owing to it lurching forward and hitting a static object. This occurred when an SP was completing a vehicle before use check. The SP had opened the bonnet and then proceeded to turn on the ignition whilst standing outside of the vehicle, not realising the vehicle was left in gear it jerked forward, colliding with a fire hose reel mounted on a steel pole, causing serious damage to the front of the vehicle, bonnet and engine block.

All MTOs are to ensure the following instructions are recorded in MT Orders as well as inclusion in any vehicle conversion training:

In accordance with the UK Highway Code, the following safety precautions are to be carried out prior to starting any vehicle:

- You are **fully seated in the driver's seat**, with full control of the vehicle.
- The **handbrake is applied**.
- The **gear is in neutral** (or 'P' for automatics).
- All **mirrors are properly adjusted**.
- Your **seatbelt is fastened**.
- All **doors are securely closed**.

In addition to these Highway Code precautions, a visual check of the steering wheel position to ensure it has been centralised is considered safe practice.

- The practice of attempting to operate the vehicle ignition system from any position other than from in the drivers' seat is unsafe and thus prohibited for all personnel operating Service vehicles.

Never attempt to start the vehicle while standing outside, regardless of how convenient it may seem.

Glider vs Military

From Sailplane & Gliding Magazine Aug/Sep 2025

Image by Konrad Wojciechowski, Unsplash

Spry's Comment:

This is an article published by the glider community for the glider community about the conflict with military flying. It should give you an idea about how glider pilots act and think, and perhaps understand their shortcomings with respect to their knowledge about military flying.

Glider pilot behaviour in and around a MATZ is a topic that often provokes strong opinions. Experts from gliding and military aviation explain how to make wise choices. In each of the past three years there have been close to, or more than, 40 Airprox involving gliders. Here's just one possible scenario…

Picture the scene, you're comp flying a high-performance glider through a MATZ (Military Air Traffic Zone) of a busy airbase in East Anglia. What you don't know is that two fast jets are also nearby descending towards the centre line of the runway to land. Air Traffic Control (ATC) wasn't aware of you, so neither were the other pilots. Thankfully the jets spotted you and altered course. They passed within 100 feet and that's OK, right? I'd have to argue no, not really. At their speed, that distance is barely the blink of an eye, given their ability to cover a mile in roughly 10 seconds.

Glider pilot behaviour in and around a MATZ is a topic that often provokes strong opinions. Many believe that it's flat-out common sense to engage with ATC to ensure safe passage through a potentially hazardous area. Others take the view that because this isn't a legal requirement, there's no need. I can see both sides and I understand not all glider pilots feel comfortable dealing with military air traffic controllers.

Personal feelings aside, Airprox and near misses happen. Frequently. And the chances are in glider vs military aircraft, the glider isn't going to win. I've been engaging with experts from across the fields of gliding and military aviation in a bid to shed light on engagement and deconfliction from their point of view, and to offer some ways forward to make wise choices when gliding near and within a MATZ.

What is a MATZ and what do I do with it?

The BGA's joint Airprox Board Rep, Andrew Watson, explains:

UK military aerodromes are surrounded by both an Aerodrome Traffic Zone (ATZ) and a larger MATZ.

While there are restrictions on flight within the smaller ATZ, the surrounding MATZ is not controlled airspace for civilian aircraft, and you do not need permission to fly within it. However, some MATZs see high volumes of military aircraft, including jets, travelling at 300kts or more. While both military and glider pilots flying within a MATZ are bound by the usual rule to "See and Avoid" each other, it would be wise to use all the tools at our disposal to keep everyone safe.

A MATZ is usually a cylinder 10NM in diameter, with 4NM wide stubs aligned with the main runway extending a further 5NM from the military aerodrome. The cylindrical part of the MATZ extends from the surface to 3,000ft above airfield level (AAL), while the stubs usually extend from 1,000ft to 3,000ft AAL. If several military airfields are close together, such as Lakenheath and Mildenhall, or Cranwell, Coningsby and Waddington, their so-called Combined MATZ or CMATZ has a more complex shape, but usually with a series of cylinders centred on each airfield.

When making a cross-country flight that passes through or close to a MATZ, it would be wise to ensure that the MATZ controllers know that you're there, so that they can divert military aircraft around you.

Gliders made of fibreglass display only intermittently on controllers' radar screens, so if your glider is one of the 5% or so that are fitted with a transponder, you are strongly advised to switch it on when within 10 minutes' flying time of the MATZ boundary. A transponding glider displays as a solid "blip" with an altitude label on ATC radar screens, whereas those without an operating transponder display intermittently at best (and sometimes not at all), and with no altitude.

A reliable display of a glider's position and altitude allows ATC to route military traffic under, over, or around us. In addition, the automated Traffic Alert and Collision Avoidance System (TCAS) carried by larger military aircraft steers them safely away from transponding gliders. For both these reasons, please switch on your transponder (if fitted) in the vicinity of any MATZ. However, Low-Power ADSB Transceivers (LPATs) such as SkyEcho 2 do not interoperate with TCAS or display on many ATC radar screens. While some military controllers use "FLARM Radar" to get a general idea of how many gliders are in their area, this again does not work with TCAS, and controllers aren't allowed to use this "unassured data" for collision avoidance.

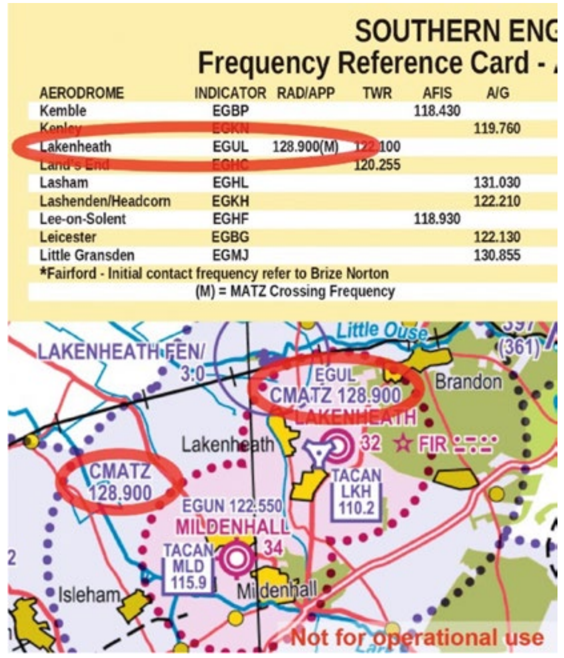
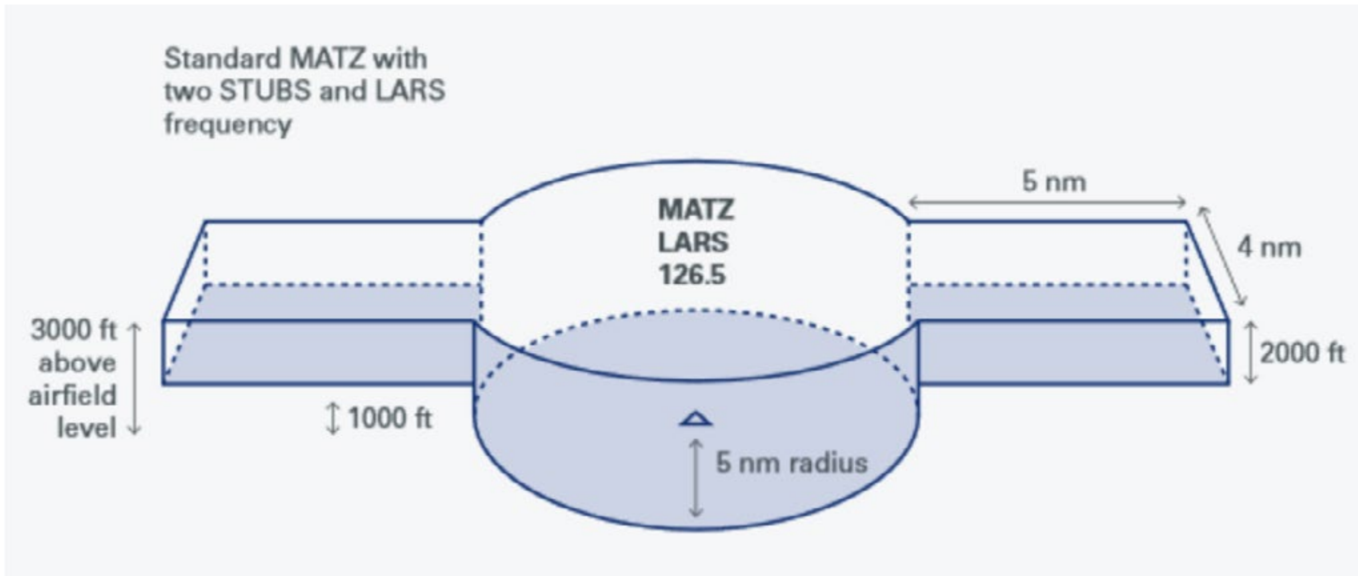


Fig 1



Whether your glider is equipped with a transponder or not, if cockpit workload permits, it's good airmanship to contact MATZ controllers by radio if you're on a cross-country task and within about 10 minutes' flying time of the MATZ boundary. To do so, call on the "MATZ Crossing" radio channel that you'll find on the standard CAA 1:500,000 VFR chart. As an example, the lower panel in figure 1 shows where the channel for the RAF Mildenhall / Lakenheath CMATZ (about 30NM south-west of Norwich) appears on the chart. You can also find it on the CAA "Frequency Reference Card" downloadable from the AIS website (go to https://nats-uk.ead-it.com/cms-nats/opencms/en/home/ then click on the "Charts" button, then "VFR Charts", then "VFR Chart resources", then "Frequency Reference Cards"). These cards show several channels for each military aerodrome; you want the one labelled "(M)". Where there are several aerodromes within a CMATZ, you may have to search through all of them to find the crossing channel, as in the excerpt from the card shown in the upper panel in Figure 1.

Tune your radio to the crossing channel and listen for a few seconds before transmitting to make sure you aren't interrupting other transmissions. However, many military aerodromes use multiple channels, including UHF channels that your radio cannot receive, so it may nevertheless take a few seconds for a busy controller to reply to you, and you also cannot judge how many aircraft are flying in and around the MATZ just by the amount of radio traffic on the crossing channel.

It's best to ask the controller for a Basic Service, as shown in Figure 2. Using the "Glider" prefix before your "G" registration tells the controller that your flight path may deviate around

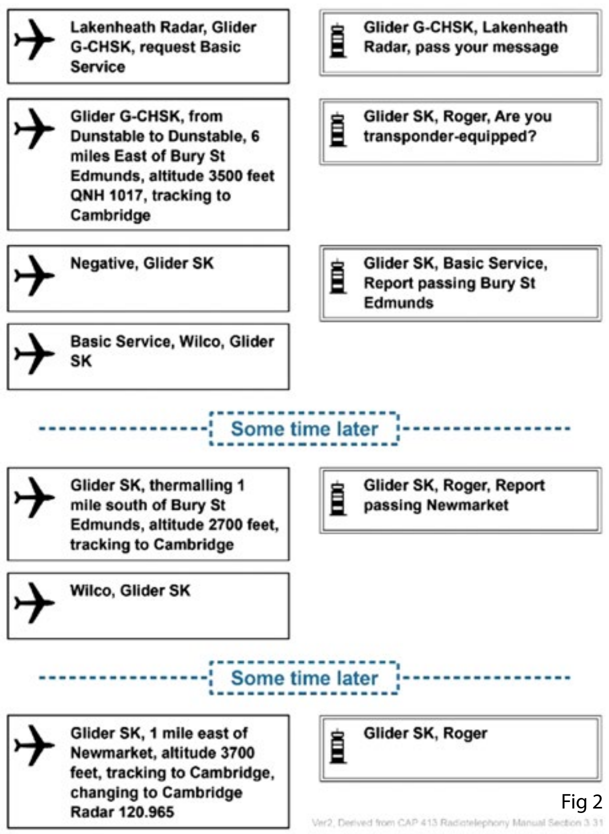


Fig 2

Ver2, Derived from CAP 413 Radiotelephony Manual Section 3.31

a straight-line route to take advantage of lift and avoid sink, and that your altitude may vary significantly. The controller will probably ask if you have a transponder. If you don't, reply "Negative", as in this example.

Once you've established contact and got a Basic Service, you have a framework for occasionally telling the controller where and how high you are, which greatly helps them route aircraft over, under, or around you. When asked, you simply provide your position relative to a prominent ground feature like a town, along with your altitude. If your workload is high, you can delay answering by telling the controller to "Stand By". However, it's important that you explicitly tell the controller that you're "leaving the frequency" or "changing to" another channel before retuning or turning off your radio; if the controller later cannot contact you, they may assume the worst and launch a search-and-rescue operation.

All MATZ controllers are more than happy to talk to us, even if our radio technique is rusty, but if you'd like to practise, the BGA provides free online self-study materials; search for "BGA FRTOL Course". Live online training with experienced R/T coaches is also available every winter.

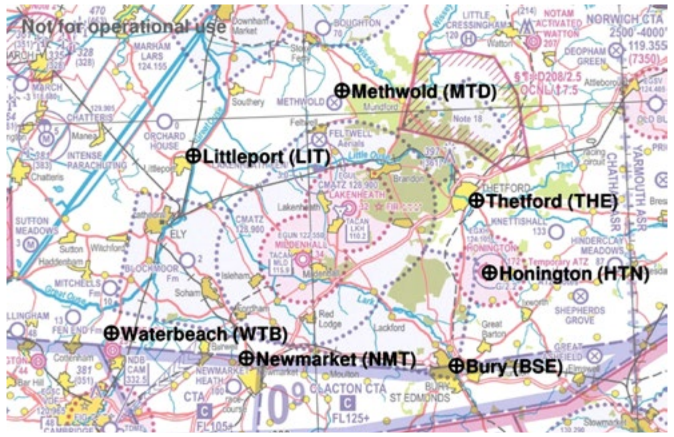


Fig 3

Special Consideration

The RAF Lakenheath / RAF Mildenhall CMATZ in the centre of East Anglia is particularly busy. These two aerodromes record around 61,000 aircraft movements annually, including fast jets (F-15s and F-35s) transiting to and from the CMATZ at up to 400kts. However, the Lakenheath controllers are typically Americans with limited knowledge of local geography, which can make it difficult to communicate your position. To address this, we've agreed a list of seven "Gliding Visual Reference Points" around the Lakenheath CMATZ that controllers have programmed into their radar displays – see Figure 3. Each is a standard BGA turning point near a prominent ground feature. If you give the controller your height and position relative to one of them, they should quickly be able to work out where you are, even if you don't show on their radar. You don't need to be directly over the reporting point to refer to it; it's better to give a rough estimate of your bearing and distance from a few miles away rather than to wait until you can give a precise location when overhead. You may also be able to use your GPS flight computer to give a distance and bearing from the relevant BGA turn point.

An Army Air Corps View *by Jim Trayhurn (former AAC Major) and now a Qualified Helicopter Instructor with Boeing Defence UK:*
The Army Air Corps Centre at Middle Wallop is tasked with training Apache helicopter pilots how to fly the aircraft and then fight with it. Both courses last around eight months, with the trainees then moving to the frontline units at Wattisham in Suffolk.

The latest version of the Apache has a full Instrument Flight Rules (IFR) capability. To qualify an Apache pilot with a full procedural Instrument Rating, they must fly a number of different types of approaches. This means the sorties are reliant on different locations to achieve the training objectives. The natural options are RAF Odiham, Brize Norton, Benson and RNAS Yeovilton.

The Apache is the aircraft that likely carries the highest risk of mid-air collision in the Army fleet. Apart from its Fire Control Radar (FCR), which is not designed to detect gliders, the aircraft has no onboard systems to prevent a mid-air collision (MAC) and so relies heavily on the robustness of the radar service from ATC, along with lookout, to mitigate for a MAC event.

Modern ATC radars typically filter out clutter by supressing returns with a ground speed of 40kts or less, so a thermalling glider may not even show on ATC equipment. This makes it even more important to carry a transponder or communicate via radio.

The Apache community is doing its part to mitigate for this issue. Plans are maturing to introduce an enhanced electronic conspicuity capability, ADS-B and possibly in future, SkyEcho on our tablets.

The main risk increase for an Apache vs glider MAC comes when crews are conducting IFR training. Odiham is a perfect example of the constraints of mixing military IFR traffic with soaring gliders, airborne from Lasham. The IFR procedures for Runway 27 at Odiham see instrument holding patterns at 3,000ft, located west of the airfield due to Farnborough's airspace. This means that gliders routing north/northwest from Lasham away from Farnborough and London's airspace will head straight through the IFR route. What they are doing isn't incorrect – it's Class G airspace – but it highlights the issues of gliders sharing the airspace with military IFR traffic. So, what are the best ways to deconflict from our perspective? Communication is the first thing. Middle Wallop will call Lasham on the day to get an idea of their flying activity if IFR traffic is planning to go to Odiham. On the same subject, whilst the gliders are operating in Class G airspace and may not even be in the MATZ it would be good airmanship to speak to Odiham and inform them of your position and planned route – especially if you spot military traffic.
With our skies becoming ever busier, consideration in sharing the privilege of flying is so important.

An RAF Invitation *by Sqn Ldr Pete Geddes, RAF Flight Safety*
Engagement between airspace users is an important aspect that's easily overlooked. The RAF Safety Centre oversees the policy on hosting Regional Airspace Users' Working Groups (RAUWG). These are held every six months at a variety of RAF sites and aim to reduce the risk of MAC between common users of airspace. The RAF Safety Centre typically sends a representative and the networking opportunities can lead to meaningful change.

Area	Hosting Unit
Oxfordshire (Location varies)	RAF Brize Norton
London (Location varies)	RAF Northolt
Central Southern England	MOD Boscombe Down
Lincolnshire	RAFC Cranwell
North England	RAF Leeming
Scotland	RAF Lossiemouth
East Anglia	RAF Marham
Wales and West Midlands (alternate) Regional Airspace Working Groups	RAF Shawbury and RAF Valley

Regional Airspace Working Groups

One successful example of engagement followed a visit to Black Mountains Gliding Club by the RAF Safety Centre. An Airprox hotspot close to their club in the UK Low Flying System was reviewed as it became obvious that existing regulation could be improved. Face-to-face discussion and mutual understanding of both aircraft operators' needs were generated. This work fed a proposal to the military regulators, and it's likely low flying military aircraft will call the club on their local frequency and approach the area in a direction more suited to avoiding MAC; similar to the principle of gliders calling ATC when close to a MATZ. It's not always the case that gliders should call the military. Sometimes it's the military that should call the gliders. The table above right highlights where your local RAUWG will take place. If unable to find a contact online, send an email to Air-SafetyCtre-RAUWG@mod.gov.uk. Why not invite a military representative to your club so they can see things from your perspective?

Conclusion

To sum up, it's simple to sit back and remind the authors of this article that you are not required by law to communicate with controllers when in or near a MATZ. I'd like to gently remind you that you aren't legally required to clean your teeth. The lack of law doesn't mean either endeavour is anything less than an extremely good idea. And in the case of communicating when operating near or within a MATZ, that extremely good idea might well save lives, including yours. Original article published in 'SAILPLANE & GLIDING AUG/SEPT 2025'.

Doc's Corner: Weight Loss Drugs- A Big Issue

By Wg Cdr Robert Gifford, Sgt Lorna MacDonald & Sqn Ldr Nicky Jecks

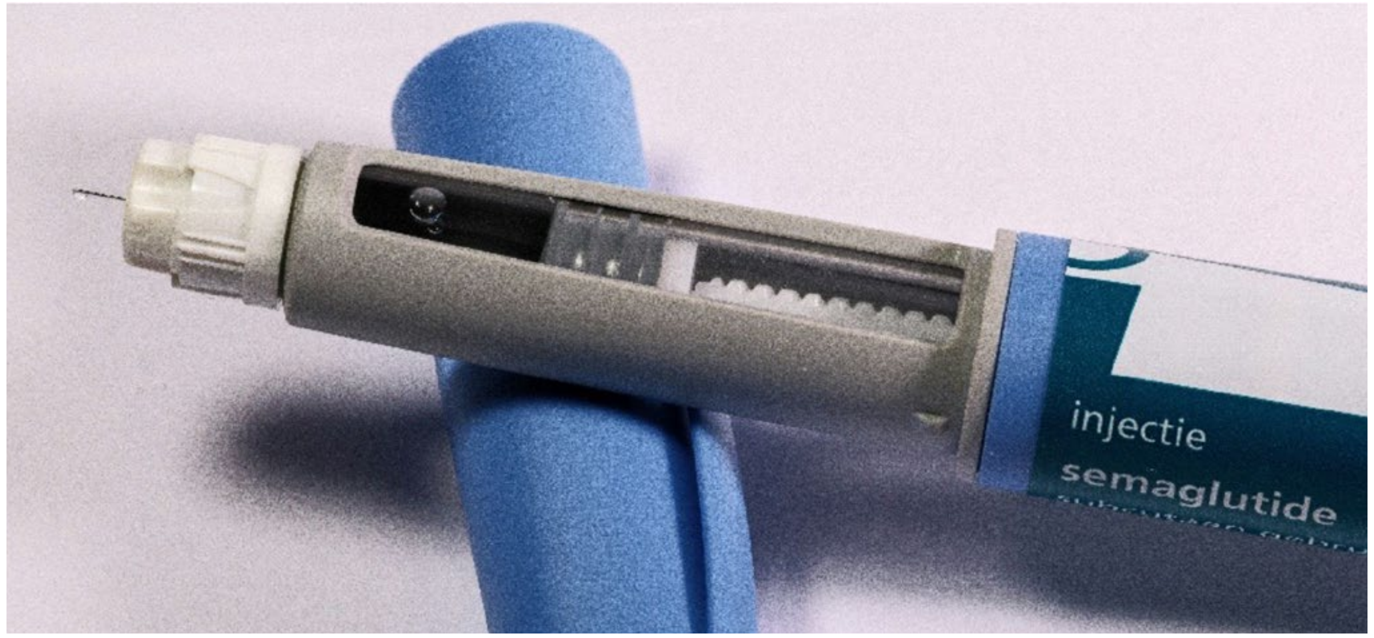


Image by Haberdoedas, Unsplash

Obesity is common among Service Personnel. As well as reducing fitness for operations, obesity causes serious health problems including diabetes, arthritis, heart disease, liver disease, sleep disorders, asthma and cancer.

Much research has been done to understand the most effective way to manage obesity. Unfortunately, just dieting and doing more exercise rarely achieves this in the long-term. While improving diet and exercise are vitally important, the body goes into 'survival mode' to fight against weight loss. This means that over 3 – 5 years weight is nearly always regained. Surgery to change the upper intestine can achieve impressive weight loss which is maintained for years. However, such operations carry significant risks, with potentially incapacitating side effects later in life. Recently, a class of medications called GLP-1 agonists have shown similar effectiveness to bariatric surgery, without as many risks. However, they are expensive and may cause side effects. They are becoming increasingly available to Service Personnel. This article explores the risks, benefits, and implications of using these medications in the military.

GLP-1 analogues for weight loss and obesity-related comorbidity

The current GLP-1 analogues used for obesity are Semaglutide (Ozempic, Wegovy) and Tirzepatide (Mounjaro). Both are given as a once weekly injection, with doses gradually increasing over 4-5 months. A tablet version of Semaglutide is likely to be marketed for obesity in 2026. Around 30% more weight loss is expected with Tirzepatide, but it is more expensive. Both medications have shown reversal of obesity-related medical problems.

Who gets them?

Obese or overweight adults with a Body Mass Index (BMI) over 30 kg/m^2 or 27–30 kg/m^2 plus one obesity-related medical condition (from a defined list) are eligible for GLP1 agonists on cost effectiveness grounds. This includes some 26 million adults in the UK. Therefore, the government has laid out a roadmap to provide these medications to those eligible over a 10 year period. Growing demand has led many (including Service Personnel) to seek treatment from private providers. DMS is now instigating its own specialist prescribing programme (STRIDE - the Services meTabolic pRogramme to Improve Deployability and hEalth), from late 2025.

The opportunity

Many patients taking GLP1 agonists feel able to exercise more and report significant improvements in general wellbeing. They also show marked improvements in medical problems caused by obesity and addictions, e.g. to nicotine or alcohol. People with type 2 diabetes have been using the GLP1 agonist class of medications safely for over two decades, so their long-term benefits do appear to outweigh the risks.

The threat

The vast majority of those using GLP1 agonists experience side effects at some point: nausea, vomiting, diarrhoea or constipation. This is important for medical grading - even mild symptoms may have an impact on safety-critical roles such as flying and controlling aircraft. After months of treatment, deficiencies in important nutrients can occur if a healthy diet is not followed. GLP1 agonists also cause loss of muscle mass. While this doesn't seem to mean reduced strength (because much more fat mass is lost), it's not known if this could reduce combat effectiveness. Much more rarely there have been reports of abdominal pain while taking them, caused by gallstones or pancreatitis. These conditions would necessitate a prolonged period of downgrade and non-deployability. These risks are greatly increased where the drugs are obtained privately and no further support is provided.

Unfortunately, when the medicines are stopped, the weight is regained - on average 75% of what was lost is regained after 1 year. There is a move towards recommending that these medications are continued indefinitely. Again, the risk of weight yo-yoing is far greater when they are obtained privately without additional support, and financial constraints increase the likelihood of them being stopped early. Storage requirements (28°C, or below 30°C for up to 30 days) complicate supply to overseas locations and may necessitate treatment pauses during deployments.

Image by Diana Polekhina, Unsplash

Guidance on accessing online pharmacies and appropriate registration can be found at the following websites:
https://assets.pharmacyregulation.org/files/2024-11/how-to-keep-safe-when-getting-medicines-or-treatment-online.pdf
https://www.pharmacyregulation.org/registers

Conclusion

All the current indicators suggest these medications are here to stay and become the 'new norm'. As with any treatment, risks and benefits must be assessed individually. A deep understanding of the individual's occupation is paramount. Service personnel must inform their Medical Officer before using privately sourced medical treatments so a full assessment of the risks may be taken, both to safeguard the individual and to inform the occupational and operational impacts. Currently, weight loss drugs are not approved for use in military aircrew or controllers, though policy is under review.

Authors

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Sgt Lorna MacDonald, Medical Nurse
Sqn Ldr Nicky Jecks, GP

Image by Adobe Stock

Whilst you are still airborne, It's **NEVER Too Late …** to execute a **Go-Around, Missed Approach** or **Baulked (Rejected) Landing**

By Nigel Williams, Lextel Aviation

Image: Pixabay; Pexels.com

Please note that the author offers up this article as seen from primarily a civil operational view. Clearly, military operations and tactical situations and tasking may well require the 'normal' procedures and limitations to be substituted with more specific handling requirements and techniques. At all times the approved AFM/FCOM/Military Operating Manual will be the final arbiter where a disagreement exists. The author's intention is purely to open a discussion about Missed approach and Go-around procedures and the embedded 'Gotchas' associated therein. With thanks to BAE Systems for allowing the use of some of their topics from JetSets safety magazine, Airbus Safety First magazine, Skybrary, and the Flight Safety Foundation.

The Potential Problem

In 30 years of training in medium to large aircraft and simulators, one of the exercises that seemed to need regular and often remedial practice is the Missed Approach, Go-around, Baulked landing, or even Overshoot (if you are old like me!). I always thought that may be my own attempts and methods to teach these manoeuvres were at fault. Thankfully many of my elders and betters assured me that it was not me, but that the exercises were indeed difficult to teach to both ab initio and recurrent pilots and ensure that a satisfactory standard was achieved and maintained.

It's straight forward enough to brief the manoeuvre sitting with a coffee in a simulator pre-brief and discuss all the relevant handling and flight control expectations, along with the required decision - making markers. We can discuss and study the TAP chart and note all the relevant procedural limitations and restrictions that may be required for a particular Missed approach. In addition to the basic Missed approach routing, there could be speed restrictions, limiting bank angles, altitude restrictions and even a 'must meet' minimum climb gradient.

But even with the best approach briefing, once we make the decision to miss the approach for whatever reason, the requirements and pressure to fly the aircraft, whilst accurately following the charted procedure (or ATC instruction), meeting any other published restrictions and communicating with ATC, can suddenly give rise to an extremely high workload environment - very different from the calm and measured atmosphere (well ideally!) in the simulator or of course ultimately in flight.

See the TAP chart at Figure 1 for the RNP E for RW 15 at Salzburg. It encompasses many of the requirements mentioned above. And, of course, in winter we may be faced with an approach to minimums, holding due to low approach rates, and ground delays due snow clearance and aircraft de-icing- lots of extraneous operational 'noise'.

Need I say more? Some or all these factors may have to be taken into account along with the possibility of having to perform a Missed approach or Go-around.

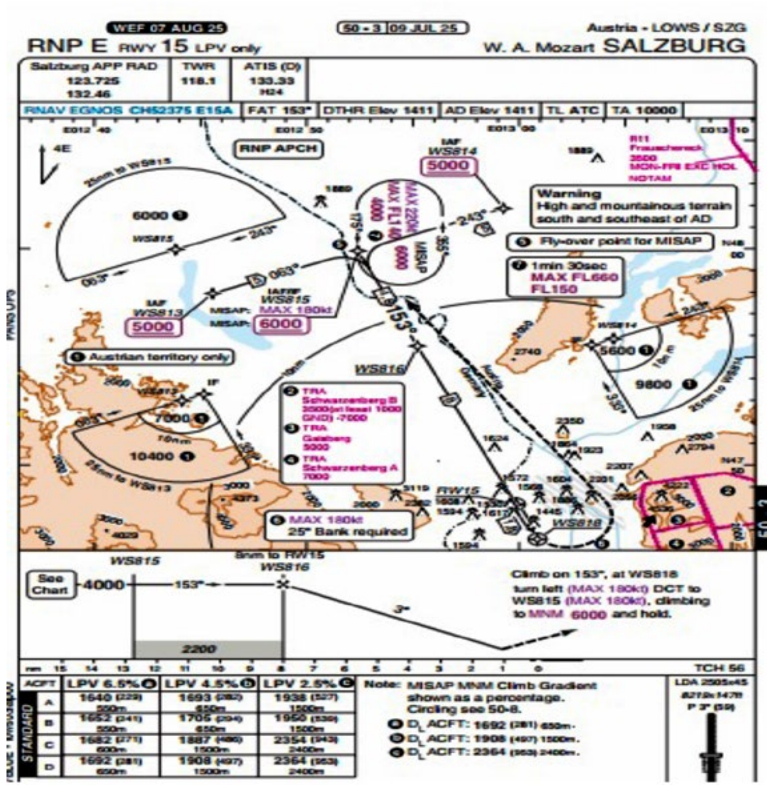


Fig 1. Not for Navigational Use

> "The old adage **AVIATE NAVIGATE COMMUNICATE** has never been so pertinent!"

- **Early missed approach left turn**
- **Minimum bank 25°**
- **Maximum speed 180kts**
- **Minimum missed approach climb gradient (on a different chart!)**
- **High terrain**

Blame Culture

For many years a blame culture existed in the civil world. A crew who elected to go around or miss the approach often had to provide some very good reasons as to why a Go-around was carried out. Usually a report had to be submitted, and a black mark attached to personal files! Thankfully those days have gone and in the last 20 years or so this blame culture has given way to requirements for much improved approach to briefings, crew coordination, CRM, and an understanding of the numerous problems that can overwhelm even the best trained crew when workload becomes excessive.

A 'busy' approach at peak time, ATC requesting "Maintain high speed to 4 miles" in bad weather, and at the end of a multi sector flying day with operational requests to make up time! I'm sure most of us have all been there, civilian or military, at some time.

One of the most important recent changes for crews is a change in culture – we are now actively encouraged to be 'Go-around minded'. Go-arounds should be regarded as a normal manoeuvre, not one that is only practiced every 6 months in the simulator, with an engine shut down, and invariably a Go-around from DA/MDA. We are now expected to carry out thorough briefings, ideally in plenty of time, and often as an interactive exercise. The Missed approach profile should be thoroughly briefed with both pilots understanding their respective duties such as maintaining situational awareness, cross monitoring, and call outs whether as PF or PNF.

Stabilised Approaches

The civilian world now places great emphasis on stabilised approaches, often with an SOP "Stable" / "Unstable" call out at either the Instrument or Visual stabilisation gate (typically 1,000ft / 500ft)

(Just as an aside, an "UNSTABLE" call at the agreed stabilisation gate should trigger a Go-around call)

A little further on I have included a list of typical stabilised approach values because they are so important. Sometimes just a single excursion from a stabilised criteria can lead to a potentially less than safe arrival. Documentary evidence shows that continuing an unstable approach can markedly increase the Landing Distance required and, not unusually, result in a runway excursion. In some cases, the safety factors applied to LDRs can be completely eroded.

This is what can happen if you continue an unstable approach:

> "On 12 March 2022, an ATR76-600 captain made an unstable approach to Jabalpur, India, leading to a first bounce more than halfway along the runway and a final touchdown 400 metres from the runway end. The first officer took control but did not commence a go-around, and the aircraft overran the runway before stopping. The captain had just over four months command experience and had made six similar "high-severity long-flare" approaches in the previous five days. These had gone undetected because although such exceedances were supposedly being tracked by company flight data monitoring, this event was not being tracked."
>
> (Courtesy Skybrary)

Definitions and Considerations: Let's remind ourselves of the basic definitions of the Missed approach, Go-around and Baulked Landing manoeuvre – is there a difference?

Missed approach: The Missed approach procedure is constructed in such a way as to provide prescribed obstacle clearance and separation from other procedural traffic within a portion of that airspace. It specifically refers to the procedure to be followed when an instrument approach is discontinued. It includes two elements - a climb and a horizontal manoeuvre which may include a turn, a limiting speed, a bank angle limit, a level off, or simply a requirement to maintain the runway heading.

Go-around: The Go-around is essentially the action of rejecting the landing. It may be conducted due to any number of reasons, including weather deteriorating below minima, ATC instruction, blocked runway or unstable approach, system failure to name but a few. It can be flown manually or by the Autopilot, Autothrottle and FMS if the aircraft systems, and certification allow. A Go-around can be initiated at any point along the approach, possibly up to the point where the wheels touch the runway surface.

The 'Soft' Go-around: There are 2 sub-sets of a Go-around that are extremely important – the 'Soft' Go-around, and the Go-around from below 50ft – the Baulked Landing. Most of our Go-around training places the aircraft (often with an engine failed) at, or just before, the DA/MDA. In real life however the Go-around often takes place at a point that is at a much higher altitude and at an earlier point along the final approach. In this case the crew might not have the aircraft fully configured for landing and will have to choose a suitable flap setting that will provide a safe configuration. For a Go-around at DA/MDA, TOGA thrust will almost certainly be required, but for a Soft Go-around full thrust may not be appropriate as the aircraft will accelerate rapidly resulting in a high rate of climb and control difficulties leading to the inability to capture the first level-off, which may be the missed Approach Altitude. This could be true whether the aircraft is being flown using the automatics or manually. Additionally, a rapid acceleration may also result in a flap overspeed. Remember that the aircraft will probably be much lighter and 'lively' than it is with the 'training loads we often carry during simulator training.

If a Missed approach is initiated before the charted MAP on a non - precision approach, then it is vital that tracking must continue to the MAP before beginning any turns specified in the missed approach procedure. ATC may issue an overriding instruction. This will ensure safe terrain avoidance and a potential CFIT.

The Baulked (Rejected) landing: This manoeuvre is probably the most critical of all 3 types of Missed approach., and yet during initial or recurrent training the emphasis tends to favour the more 'normal' Go-around from DA/MDA, unless we are carrying out initial or recurrent training for Low Visibility Operations (LVP) Cat 2/3.

(Please be aware that the Manufacturer may publish special handling techniques and procedures for a Baulked landing in the AFM - these must be followed implicitly.)

This is a low energy Go-around initiated at a very low height above the runway. During the early phase of the Baulked landing, the aircraft may touch down. Typically, the following conditions could result in deciding to Go-around from a very low height

- Runway incursion
- Strong or gusty crosswind
- A strong tailwind
- Low Level Windshear
- Loss of visual references (e.g. shallow fog banks)
- Bounced landing

The problem here is the low energy state of the aircraft. Typically the configuration will be:

- Flaps and landing gear in the landing configuration
- Aircraft descending
- Idle thrust
- Airspeed decreasing possibly below VREF
- Aircraft height 50 feet or less above the runway

Why Go-around?
IATA published the results of a study of 5,000 go-around Air Safety Reports. This indicated that the main reasons for executing a Go-around were Air Traffic Control, weather (particularly with convective weather associated with degraded visibility, and unstable approaches.

Recommended Elements of a Stabilised Approach

All flights must be stabilised by 1,000 feet above airport elevation in instrument meteorological conditions (IMC) and by 500 feet above airport elevation in visual meteorological conditions (VMC). An approach is stabilised when all of the following criteria are met:

1. The aircraft is on the correct flight path;
2. Only small changes in heading / pitch are required to maintain the correct flight path;
3. The aircraft speed is not more than VRef +20 knots indicated airspeed and not less than VRef;
4. The aircraft is in the correct landing configuration;
5. Sink rate is no greater the 1,000 feet per minute; if an approach requires a sink rate greater than 1,000 feet per minute, a special briefing should be conducted;
6. Power setting is appropriate for the aircraft configuration and is not below the minimum power for approach as defined by the aircraft operating manual;
7. All briefings and checklists have been conducted;
8. Specific types of approaches are stabilised if they also fulfil the following: instrument landing system (ILS) approaches must be flown within one dot of the glideslope and localiser; a category II or category III ILS approach must be flown within the expanded localizer band; during a circling approach, wings should be level on final when the aircraft reaches 300 feet above airport elevation; and,
9. Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilised approach require a special briefing.

An approach that becomes unstabilised below 1,000 feet above airport elevation in IMC or below 500 feet above airport elevation in VMC requires an immediate go-around.

Source: Flight Safety Foundation Approach-and-landing Accident Reduction (ALAR) Task Force (v1.1 November 2000)

Continuing an unstable approach beyond the final stable approach gate (1,000ft above airport elevation IMC, 500ft in VMC) can result in a substantial increase in LDR, typically:

- A 10% increase in final approach speed will result in approx. **20%** increase in LDR
- A 5% increase in final approach speed will increase LDR by **10%** if a normal flare and touchdown can be achieved
- A 5% increase in final approach speed will increase LDR by **30%** if a long flare with delayed touchdown is used to dissipate the extra speed

Further investigation shows a great variety of reasons, for example lack of visual reference at low height, cross and/or tailwind outside limits, severe turbulence, wind shear, a deep or bounced landing, EGPWS warning, instrument failure (either aircraft or ground aid) and runway incursion.

Sadly between 30 and 40% of fatal accidents take place under these types of conditions. Just as importantly many accidents could have been avoided if a firm and unanimous decision to Go-around had been made in good time.

Thorough briefing is vital as early as possible. A short review of the procedure and possibly the Go-around actions are useful can be very useful. The time available to do this will reduce markedly as the final segments of the approach are crossed.

The Missed approach
The very nature of a Missed approach means that the manoeuvre will almost certainly be performed at a low altitude, low speed and light landing weight. A great many important actions need to be carried out and completed accurately and in a short time. The actual manoeuvre requires careful and firm handling to control the positive pitch changes caused by the engines 'spooling' up to TOGA thrust – this can take up to 6-8 seconds. In many aircraft with the engines located under wing, the thrust will add to the positive pitch input by the pilot. It is vital that we are all aware of the recommended Go-around pitch attitude and that we follow any FGS pitch bar targets. Pitch trim should only be adjusted carefully to avoid 'over trimming'

Remember that the increase in pitch, along with the acceleration as TOGA thrust is achieved, can cause a false climb illusion which can convince the pilot that the aircraft pitch attitude is greater than required. This could result in a negative pitch input taking the aeroplane to a dangerously low attitude. Depending on the aircraft type there may be a change in longitudinal trim as the flaps are retracted.

As the aircraft climbs away, don't forget the lateral as well as the vertical routing. Remember following the published Missed approach route is designed to ensure terrain / obstacle clearance in the vicinity. If a Missed approach is commenced before the Missed Approach point, the initial routing must continue to the Missed Approach Point before turning. ATC may, however, issue an alternative route.

There will possibly be external interruptions from ATC who may be passing the latest weather, a revised Missed approach routeing, a frequency change etc.

AVIATE NAVIGATE COMMUNICATE !

The Rejected or Baulked Landing

As mentioned, the Rejected Landing is a critical manoeuvre. The thrust will be at or close to idle, the speed will be close to, or even just below, VREF. The flaps will be set to the landing position and the landing gear down, and of course the aircraft will be very close to the ground (and obstacles).

The initial actions to initiate the Rejected landing are the same as those required to initiate a 'normal' Go-around.

MAINTAIN PITCH ATTITUDE AWARENESS THROUGHOUT THE INITIAL MANOEUVRES. ACCURATE CROSS COCKPIT MONITORING IS VITAL

- Call (by PF or PNF) "Go-around" and simultaneously…..
- Select TOGA or maximum thrust and simultaneously…..
- Rotate the aircraft positively but smoothly to the target pitch attitude (or follow the FGS).
  Maintain Pitch Attitude Awareness Throughout the Initial Manoeuvres. Accurate Cross Cockpit Monitoring is Vital.

Now consider the reasons why this is such a critical manoeuvre:

- The engines will take up to 6 to 8 seconds to spool up to TOGA thrust.
- The speed will be at or below VREF so the rotation to the recommended pitch angle may have to be delayed if the thrust and speed are not increasing immediately. Do not attempt a climb or flap retraction until the engines have spooled up and are producing thrust.
- Should the wheels touch the runway maintain the thrust setting and pitch attitude and allow the speed to increase towards VREF at which point a gentle increase then pitch angle smoothly so that the aircraft becomes airborne.
- Flap retraction should be delayed until the speed has increased to landing VREF+5kt or VREF +10kt.
- Do NOT be tempted to reverse your decision to Go-around and try and land in the remaining runway length. This could be a recipe for a loss of control or runway excursion. Additionally, once the wheels touch the runway and one of the retarding devices (e.g. lift spoilers, brakes, reverse thrust) become active, performance requirements for the LDR and LDA may be null and void and it will be impossible to calculate any V speeds.

Obstacle clearance following a Baulked Landing should be carefully considered. By its nature the Baulked Landing will be carried out at a height that is well below the Missed Approach Point Altitude and therefore possibly outside or below the Obstacle Clearance Surface and the obstacle free area offered by adherence to the Missed approach routing. This could be exacerbated by a minimum Missed Approach climb gradient requirement. In such a case it may be difficult to plan an 'escape route'. If an Emergency Flight Path (EFP) is published by a performance provider to cover the case of an engine failure on take-off from the landing runway, this may provide an obstacle free area within the climb out corridor. See Figure 2.

If we can take anything away from the above, we must make full use of the simulator and recurrent training to practice…

- Preflight briefings to ensure all the aspects of a complicated approach into a challenging airfield in limiting weather.
- Ensure that the crew fully understand and practice their monitoring and call out duties both as PF and PNF.
- To introduce and practice all forms of Missed approach, particularly the Baulked Landings and 'Soft' Go-arounds from altitudes well before and above the Missed Approach Point.
- If possible, develop recurrent LOFT exercises that encompass the above topics.

Please FLY SAFELY!

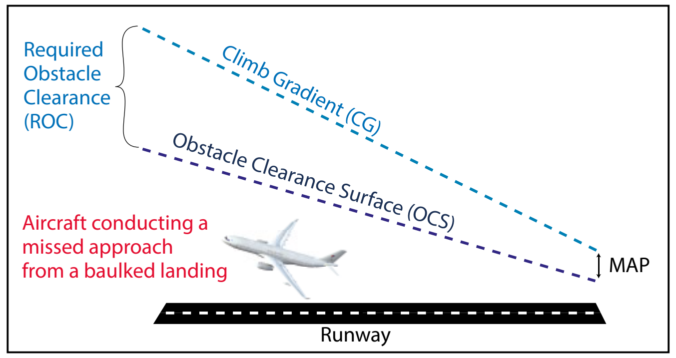
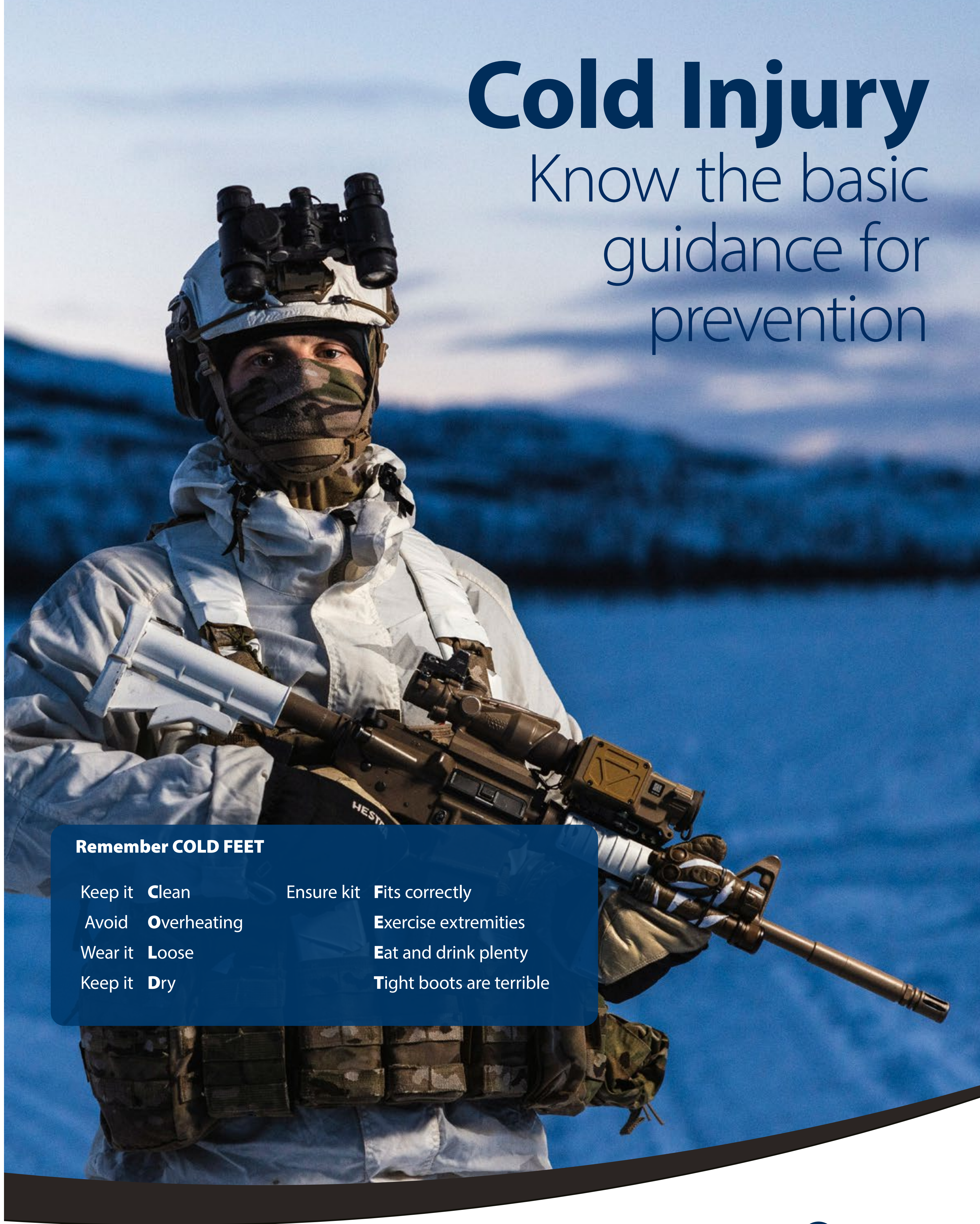


Fig 2.



ROYAL AIR FORCE Safety Centre

SC203
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AirClues

Coffin Corner

by **Flt Lt Jim West (Retd)**

Spry's Comment:

This article was first published in Issue 22 of Air Clues. However, it is not a subject that is discussed a great deal these days. With more modern aircraft this problem has been either designed out (think supercritical wing profile, automatic flight control systems), or by the limiting of cleared aircraft envelopes to reduce the likelihood of ending up in this situation. Nevertheless, our T&E colleagues commend it as a good refresher of aircraft design, handling and performance theory, and is still relevant in the case of system failures or aircraft mishandling. ■

Most aviators will have heard of this strange phenomenon, and probably guess that it's something to do with high level flight, which is true, but I'm going to spend a bit of time explaining in layman's terms what *Coffin Corner* or 'Q' Corner, actually means.

I will try to do this by looking how various airspeeds relate to each other as well as to temperature. I will also try and present a graphical way of understanding coffin corner, presenting it in relation to a constant Indicated airspeed and a constant Mach number. After all, these are the two airspeeds that aviators will have readily available in their cockpit.

So what is Coffin Corner?
Coffin Corner occurs at an aircraft's absolute ceiling (not its service ceiling). Absolute ceiling is where the speeds at which Mach number buffet and prestall buffet are coincident.

Or, to put it another way, Coffin Corner is the point where, if you fly any slower the aircraft will stall, but fly any faster, or increase the load factor (i.e. pull 'G') then the aircraft will exceed its design limits and possibly overstress the aircraft due to high speed and Mach buffet. I don't know about you, but I think that sounds kinda weird…. we're talking about a situation where an increase in speed means parts of the aircraft will have reached supersonic speeds. For aircraft not designed for supersonic flight this can initially mean exceeding critical Mach number (airflow has achieved supersonic speed at some point on the aircraft), but could also lead to – if left unchecked – phenomenon such as Mach Tuck and, in extreme cases structural failure - wings falling off and death and stuff. But, it's also the height where flying any slower means stalling and falling out the sky.

Yep, that still sounds weird to me.
Rumour has it that the name 'Coffin Corner' comes from the USAF pilots in the 50's losing control at high speed causing a breakup and loss of aircraft and crew when trying to push the aircraft to greater heights and faster speeds. Exceed the corner and end up in a coffin! However, despite the dramatic name Coffin Corner is very rarely a problem as aircraft have lots of protection built into their systems and generally operate just below the altitude where Coffin Corner takes effect. Modern EFIS equipped aircraft will also have various moving indications on their primary flight display (PFD), to show them exactly where they are in relation to their stall and Mach limits, and modern flight management systems will plan a max altitude well below the corner to allow manoeuvring and a speed buffet. It can quickly become a problem however if another fault occurs, such as losing or receiving incorrect airspeed indications.

Service Ceiling – Aircraft will have a nominated service ceiling based on rate of climb of 500fpm for a jet aircraft or 100fpm for a prop aircraft with the margin to the low speed stall of 1.3g. On most charts this 1.3g limit takes into account any moderate turbulence or a stable turn of up to 40 degrees. The higher 'absolute ceiling' is where the aircraft cannot physically operate without exceeding some kind of design limit or stalling. ■

This is what happened to a Boeing 777-200, flying from Perth to Kuala Lumpur. When climbing through flight level 380, the crew received an incorrect LOW AIRSPEED advisory due to a faulty accelerometer; at the same time, the aircraft's slip/skid indication deflected to the full right position on the PFD. The airspeed display then indicated that the aircraft was approaching the over speed limit and the stall speed limit simultaneously. The aircraft (under control of the autopilot) pitched up and climbed to approximately FL410 and the indicated airspeed decreased from 270kts to 158kts. The stall warning and stick shaker devices also activated. The aircraft returned to Perth where an uneventful landing was completed. This was due to a single faulty accelerometer.

So why does this strange phenomenon occur?
Let's start by looking at the ITM graph, hopefully some of you will have seen this graph before.

This graph below show Indicated Air Speed, True Air Speed (TAS) and Mach number. Most aviators will start by flying at a constant IAS then revert to a constant Mach number above a certain altitude. This graph works well in that it tells you how other speeds will be affected when climbing or descending at a constant speed. Lost you?

Yep almost lost myself there, but let's give it a try.

The vertical axis represents altitude and the horizontal axis represents speed. In the first graph you can see that the Indicated Air Speed is the constant – it doesn't change with altitude.

What this means is that if you climb at a constant 80kts IAS (run your finger up the vertical line representing IAS) then TAS and Mach number increase (they slant to the right indicating an increase in airspeed).

In the second graph, if you descend at a constant True Air Speed (this time run your finger down the vertical line of the 2nd graph) the Mach number will decrease, but IAS will increase. Get it?

So next time your instructor asks how TAS is affected when climbing on your instruments (IAS) think about this graph to give the right answer.

Now Lets Talk About Stalling
In very basic terms an aircraft wing needs a certain amount of air flowing over its surface to achieve the lift required to overcome the weight of the aircraft and get airborne.

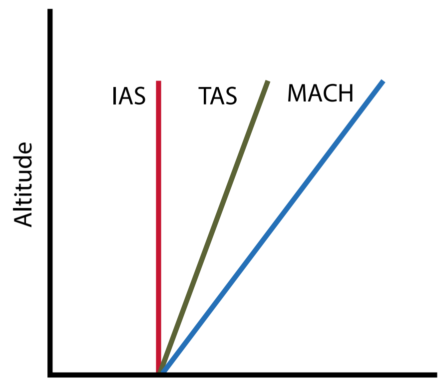
That's why when taking off the aircraft needs to reach a certain speed before it can take-off. The problem comes if we climb to higher levels - there are less air particles per area than at sea level due to a reduction in air density.

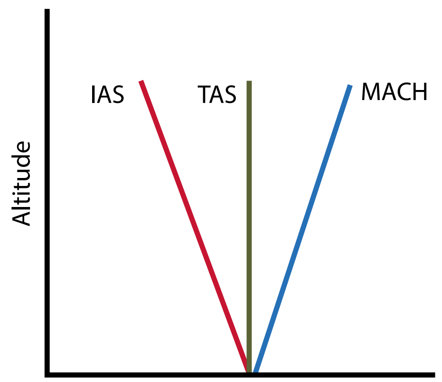
But an aircraft wing doesn't care about that, it still needs the same amount of air particles flowing over its surface to produce the lift required. So how are we going to produce the same amount of lift in this situation? Well one answer is to fly faster. For the purists amongst us, stalling is truly a product of angle of attack; for this exercise (and this exercise only) we will think about stalling as when the aircraft does not fly fast enough.

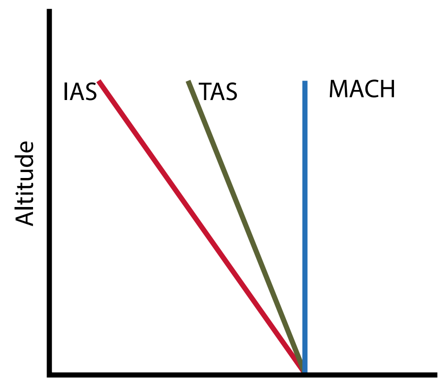
Let's Explain The Coffin
At high altitudes jets fly at a constant Mach number. This is because a pilot is mostly concerned with the speed at which Mach buffet occurs, think Chuck Yeager trying to break the sound barrier; in those old films there is always a moment just before the sonic boom where they are shaking around violently, this is because a shockwave forms and the airflow behind it breaks away causing MACH buffeting. And it is something that most modern aircraft want to avoid.

As we've stated, airline wings are generally not designed to cope well with Mach Buffet (though this is not as true as it once was – the Boeing 747 for instance has a highly swept wing and can fly at very high MACH numbers - up to M0.9). However if we wanted to fly much faster the design would be something more like a supersonic fighters wing – thin and swept - able to deal with the effects of supersonic speed.

Looking at the 3rd ITM graph below, if you climb at a constant Mach number, (put your finger on the M and work upwards,) your IAS will decrease….could it decrease so much that we reach our stalling speed (which as we've stated is always quoted as an IAS). Yes, of course it could – IF WE CLIMB TO A HIGH ENOUGH ALTITUDE…. So how are we going to prevent this? Easy, we start climbing at a constant IAS, not reducing our IAS any further towards stalling speed, (you can do this yourself - place your finger on the IAS of the 1st graph and track upwards. What happens to Mach number? – it increases).







See where I'm going with this? If not look at the graph below. The first two steps described have been pictorially represented and highlighted as step 1 and 2.

Stage 1: a climb at constant Mach causes a decrease of IAS,
Stage 2: A climb at a constant IAS means an increase in Mach number.

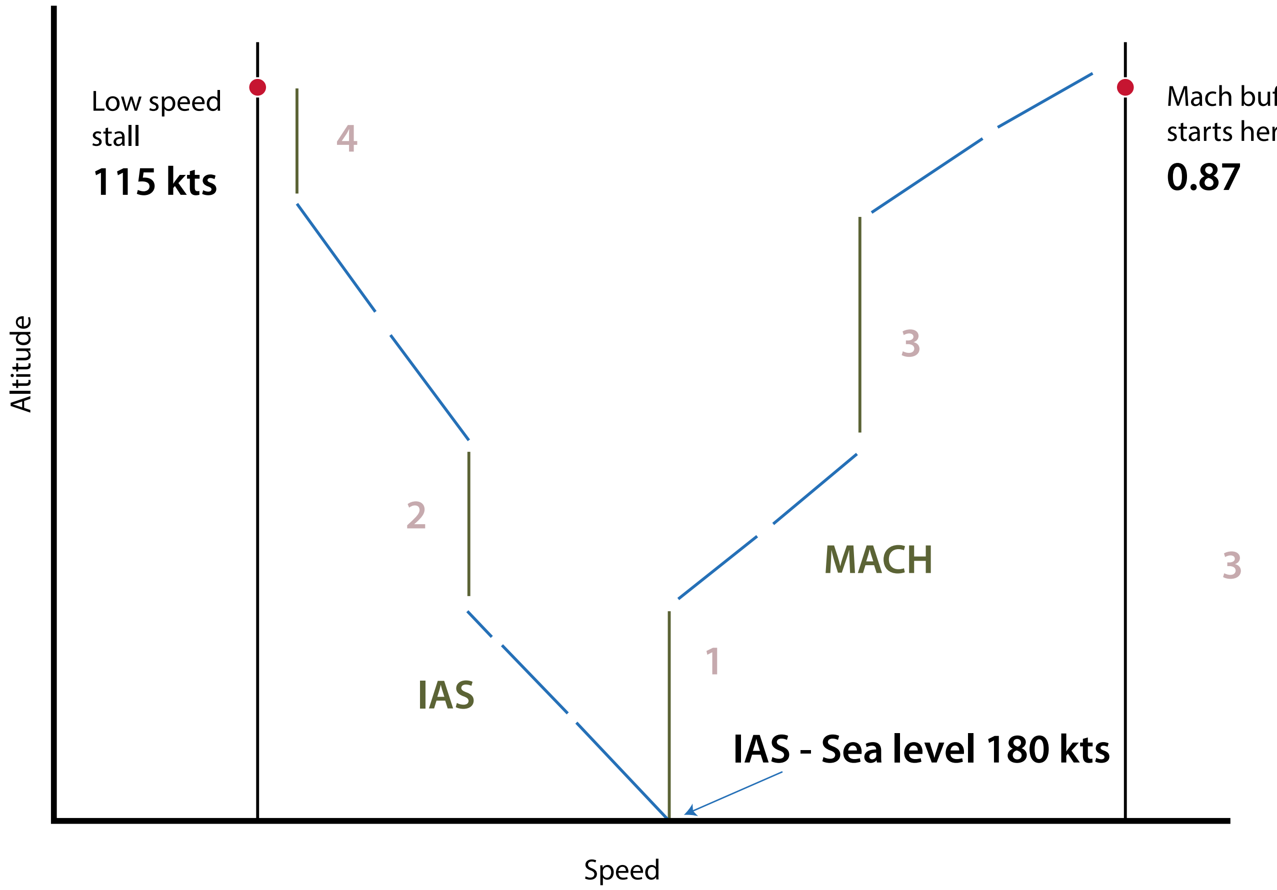
So you're now climbing at a constant IAS, the danger of stalling has been cured – good, problem fixed – let's keep climbing then; but now Mach number is increasing – oh no. Could we now get to a point where we reach our critical Mach number (you remember the problem with this, wings off, death and stuff) – yep you guessed it, of course we could. I know! Easy. Let's climb at a constant Mach number, which brings us to…

Stage 3: Here, once more stalling speed becomes a factor. But now we are that much closer to stall than in steps 1 and 2.

Clearly, this can't go on forever.
Climb high enough and you will eventually reach Stage 4. You may avoid stalling by increasing your IAS, but as we've just demonstrated there's a point where, if you decrease your speed any more, you will hit stalling speed, but at the same point you can't increase your speed because you will hit Mach buffet.

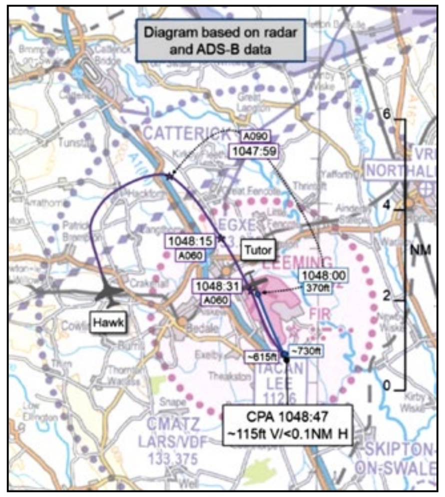
This obviously doesn't look like the buffet boundary charts taken from many aircrew manuals, nor does it demonstrate the coffin shape that gives this particular phenomenon its name. However, it's not supposed to. I just wanted to offer another way of thinking about Coffin Corner. Especially if you've failed, like I had for many years, to understand fully why this phenomenon occurs.

The U2 had it even worse; rumour has it they had only 5kts play between the stall and high speed MACH buffet. You had to be pretty careful flying one of those things.



Airprox Highlights

With Comments from Wg Cdr Spry



Tutor v Hawk
26 Mar 25
Airprox No. 2025041

The Tutor Pilot reported they were undertaking a standard departure - not above 500ft QFE - designed to give vertical separation on joining fast-jets. The fast-jet joiners are usually 'not below 1,000ft' if a Tutor is in the circuit or departing. The Hawk was at 500ft for a simulated 'no R/T' join and ATC had assigned the callsign 'no R/T aircraft'. They, therefore, were unaware of the type, and their mental model was that it was probably another Tutor, but they had a passing thought that a Hawk may also join 'no R/T' at 500ft. In either case, they extended upwind to give what they had thought would be space for the aircraft to turn into the circuit behind them. Having failed to acquire the aircraft, which was in their true 6 o'clock, they began their right turn, level at 500ft, but quickly became visual. They understood that the Hawk [pilot] had been visual with them throughout, and they rolled out as they observed the Hawk moving right to pass, then climbing to circuit height. They stated that vision in the Tutor's 6 o'clock position was limited by the canopy split and optical properties of the perspex, as well as physiology. The closure rate would have been 200-300kt, and would have increased if they had completed their departure turn. The [company named] Hawk aircraft were not displayed on the Tutor's ADS-B system, and in this case no TAS indication or alert appeared either. The TAS was selected 'on' in the after take-off checks, as per the Flight Reference Cards (FRC), but may not have had time to be fully operational. ATC later informed them that the Hawk had not been informed of them departing VFR, nor had the join been restricted in height.

The Hawk Pilot reported that, during an advanced flight training sortie, the aircraft was recovered for a simulated 'no R/T' join. They checked-in with ATC on the Approach frequency "simulating squawking 7600, for no R/T join". ATC transmitted blind with the airfield details. It was CAVOK so the aircraft was self-positioned visually. Approaching initials, they checked-in with Tower with their Hawk callsign, and they repeated the airfield details. At 1048 they were inside initials at 500ft as per the 'no R/T' procedure. Tower called "no R/T aircraft, I see you flashing your lights, join, one Tutor downwind". They were visual with the [uninvolved] Tutor downwind but also had TCAS contact with [the departing Tutor]. Approaching deadside at 1048:25, they were visual with the second Tutor maintaining runway heading, slightly below but climbing, still over the airfield. They remained deadside and overtook the departing Tutor on their right side. As they went past the departing Tutor it began a right turn, so they also turned right to remain clear. The Tutor pilot must have then seen them as it rolled out. At 1048:44 they overtook the Tutor, extended for 10sec, then turned downwind and climbed to circuit height. At 1049:05, the [pilot of the] departing Tutor called that they were changing to the Approach frequency. The pilot stated that there was no risk of collision as they were taking visual separation from the departing Tutor, and that any aircraft joining the circuit must avoid those already established, especially for a 'no R/T' join when lookout was paramount. Tower had neglected to inform them of the departing Tutor, which was still on their frequency. Both Tutors had been restricted to 500ft as there was a fastjet joining, but the SOP height for a 'no R/T' join is also 500ft. If they had known about the departing Tutor being restricted to 500ft, as soon as Tower had seen them flashing their lights, good airmanship would have been to climb to 1,000ft to join the circuit.

The Leeming Controller reported that, at approximately 1045, they were the ADC when the Approach controller (APP) warned in [Hawk c/s] for a 'no RT join'. At this time they had [an uninvolved Tutor] conducting circuits and [Tutor c/s] nearly ready to go at D1. When [the uninvolved c/s] had completed their 'touch and go', [the Tutor pilot] reported ready for departure. They then gave [the Tutor pilot] a clearance for take-off. [The Hawk pilot] then called up for a simulated 'no R/T' join. They then gave them the join but said, 'simulated no RT join approved' with the RW and QFE but no circuit state (1 in the circuit). They did not receive a read-back from this as they thought they were conducting the procedure. [The uninvolved Tutor pilot] then called downwind to practise flapless to land. They did not restrict [the uninvolved Tutor pilot] to 500ft at this point as they did not think the Hawk would interact with them; they were to land and conducting a practise flapless procedure. [The Hawk pilot] then went through initials flashing their nose light, where they responded with, 'I can see you flashing your white light, surface wind and Tutor downwind.' They then thought that [the Hawk] looked a bit lower than expected, not realising that the procedure was conducted at height 500ft. [The Hawk] extended upwind deadside to avoid [the Tutor] departing VFR west. [The Hawk] then turned downwind where they gave 'no RT aircraft turning downwind' and then a flashing white light when they were downwind. [The uninvolved Tutor pilot] was then given a clearance to land. When [the Hawk] turned final, they gave 'on receipt of a green light and with your gear down you are cleared to land'. This was whilst [the uninvolved Tutor] was still on the RW. They told the VCR ASOS to not give the green light until [the uninvolved Tutor] had vacated the RW. [The Hawk pilot] then stopped the procedure, called its gear down and requested a 'touch and go'. [The uninvolved Tutor] was then off the RW and a 'touch and go' was given with a green light from the VCR ASOS.

To read the full report, see Airprox No. 2025041 on the Airprox Board website.

Spry's Comment:

There was no risk of collision here as the Hawk pilot was visual with the Tutor throughout. That said, the Tutor pilot felt safety had been compromised and, in different circumstances, a collision risk could present itself. It serves as a timely reminder of some core regulation: Rules of the Air (RA 2307 for military pilots). It states that slower aircraft being overtaken have right of way and the overtaking aircraft should alter their course to the right. In the case of any ambiguity, a radio call stating your intent could clear-up any confusion.

AirClues

Hawk v C42
30 Jan 25
Airprox No. 2025009

The Hawk Pilot reported leading a 2-ship formation on a syllabus sortie. Following an exit from lowlevel via the A5 pass at Bethesda, they contacted Valley Approach. On climbing to height 2,000ft they were informed of non-cooperating traffic (non-squawking, non-talking) ivo Menai Straits.
At 1532:54, ATC informed them that the traffic was 'south west, no height information'; at this point, they were looking for, but not visual with, the traffic. Of note, RAF Valley Flying Order Book (FOB) recommends a climb to height 2,500ft over the Menai Straits following a low level exit, however, due to cloud, this was not possible. Furthermore, civilian traffic transiting the Menai Straits is encouraged to fly at 1,500ft. Turning on to a westerly heading to intercept a VFR straight-in approach (SIA) to runway 31RH, they elected to maintain height whilst looking for the traffic. At 1533:26, ATC informed them the traffic was 'south west, 4 miles, no height information'. They elected to track progress, slow from 300kts to 190kts and start a slow descent, ready to configure for the SIA. Whilst continually looking for the traffic, at 1534:07 ATC informed them 'traffic 12 o'clock, 2 miles, no height information, passing right-to-left'. At this point they elected to stop descent and, as none of the formation members were visual with the traffic, elected to start a gentle turn to the south, trying to create sight-line rate and minimise the height variable. Upon starting the gentle turn they became visual with the traffic at a range of about ½nm, which coincided with the pilot of the No.2 Hawk also becoming visual and, concurrently with them calling 'visual' intra-cockpit, called 'come left', at 1534:40.
They elected to pass above and in front of the aforementioned traffic, 116sec after first contacting ATC. The formation was positioned for a SIA and recovered with no further incident. Unfortunately, due to the [other pilot] neither talking, nor squawking, [their aircraft] did not show on TCAS and post mission analysis did not provide any additional detail.
The traffic was outside the HUD field of view and ATC could not provide any further information. Of note, crew recollection estimated a height separation of approximately 150ft and lateral separation of approximately 100ft. During the in-brief, ATC, who were aware of the incident, and the Executive Flying Supervisor were informed of the Airprox. Furthermore, ATC contacted Caernarfon Aerodrome and enquired as to who was operating the aircraft in question. Information received from Caernarfon indicated that the aircraft was not local to Caernarfon.

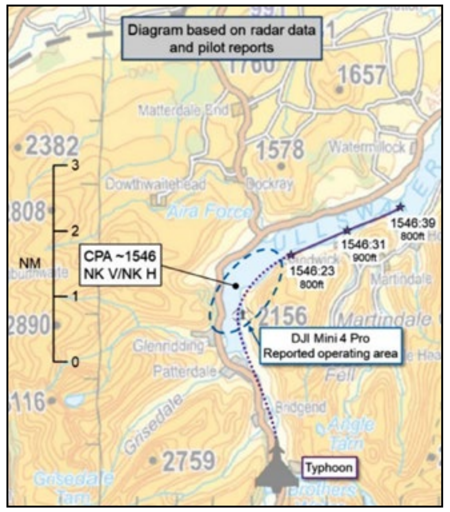
The C42 pilot could not be contacted.

The Valley Approach Controller reported they were screening a first tourist trainee. A pair of Hawks pulled out of the A5 pass and free-called Approach. Mona was active with circuit traffic. Caernarfon appeared to have circuit traffic. A slow moving [radar] contact in the vicinity of Y Felinheli was called to the formation on first contact. Airfield details were then passed.
Traffic was called again as the formation began to position for a visual recovery to Valley. The intentions of the formation were being communicated at that time. Traffic was then called a 3rd time as the conflicting traffic was now in the 12 o'clock position and approximately 2NM away, relative to the formation, with no height information available.
Shortly after, they heard on frequency "come left, left". They assumed at this point that the formation had become visual with the traffic and had to avoid. They did not interrogate the pilot at that time as they did not want to increase workload. Whilst this event was developing they, as the screen, asked the radar controller if they were speaking to [the pilot of] a non-transponder-equipped [aircraft] in the Menai strait, southwest bound. They were not. Furthermore, due to the position of the recovering formation and the other traffic [in the vicinity], they and the trainee discussed possible options as a deconfliction plan.
This could have been a "suggest heading (likely southwest) to avoid". This wasn't communicated as they felt that constant updates of the conflicting traffic were adequate, as they had no altitude reference from the non-squawking aircraft. They were conscious that the recovering formation was below the Safety Minimum Altitude Chart (SMAC) and a turn was not an ideal option as it may push them further into the high ground. If altitude data was available from the conflicting aircraft and a definite risk of collision was apparent, deconfliction advice would have been suggested.

For the full report see Airprox No. 2025009 on the Airprox Board website.

Spry's Comment:

Much like Airprox 2025041, this occurrence can be used to highlight the Rules of the Air. The Hawk pilot is correct in stating the Ikarus pilot could have called Valley to notify their presence, but there is no regulatory requirement to do so outside of the ATZ. The AIP entry for Caernarfon refers to coordination measures with Valley but is not legally binding. It's simply good airmanship to follow them. RA 2307 states that aircraft being overtaken have right of way. If aircraft are converging, pilots must give way to aircraft on their right unless in one of the less manoeuvrable categories such as airships. RA 2307 states singletons should give way formations. It shouldn't be assumed civilian pilots will be familiar with military regulation. A useful summary of Rules of the Air applicable to civilian aircraft is available in the CAA's Skyway Code. Finally the 'right-hand rule' ceased to be a rule in 2015. It's still considered good practice to keep line features on your left when following them, and this is referenced in both the civilian and military regs.



DJI Mini Pro 4 v Typhoon
13 Nov 24
Airprox No. 2024283

The DJI MINI 4 PRO Pilot reported they were flying the Mini 4 Pro (MTOW <250g) within VLOS over Ullswater, taking single images and shooting a panorama from various locations close to the launch site on the shore. Heights above the launch location varied from around 30ft to a maximum of around 300ft. As a (retired) Air Traffic Controller (Aerodrome / Approach Radar) they were very aware of the possibility of encountering low flying aircraft and had previously been monitoring the Low Level Common frequency whilst in their car over a period of a couple of hours but had only heard distant transmissions, none intelligible. However, at the time of the Airprox they were out of the car on the lake shoreline and not monitoring the radio. They had been flying for around 6min when they became aware of a sudden and loud jet aircraft noise coming from the south. They immediately considered following 'best practice' and reducing height, but knowing that low level jet aircraft fly down to 250ft AGL (or below) considered that descending might exacerbate the situation so concentrated on trying to acquire the other aircraft visually. When they did so, it was too late to try and assess the relative positions [as the Typhoon appeared from behind a shoreline tree from where they were flying]. Indeed, whilst searching for the jet they had temporarily lost sight of the drone. All of this occurred within seconds of first hearing the jet, so the opportunity of taking any meaningful avoiding action was effectively zero. Just prior to first hearing the jet they had taken a shot looking south, recorded by the drone as time 1445:50; there was no sign of the Typhoon on this shot. They then turned the drone onto approximately west and took another shot timed at 1446:05. After the Typhoon had passed they turned the drone to look north along the lake and immediately took another

shot, timed at 1446:41, the Typhoon could just be seen in the distance along the lake at what appears to be a similar height to the drone.

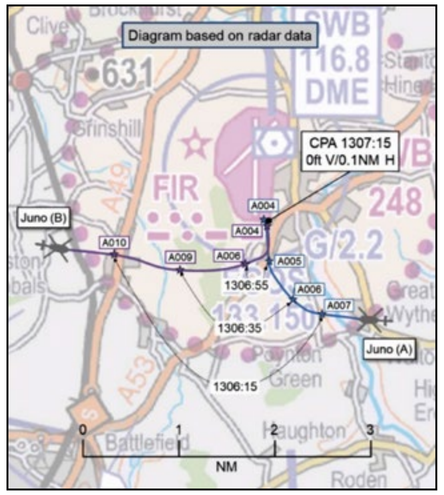
They would assess that the Typhoon passed at either the same height as they were flying or lower, but they did not have both in sight at the same time. [They opined that] lateral separation would have been impossible to assess anyway due to the disparate size of the two aircraft [and noted that the DJ Mini 4 Pro did not have conflict alert software]. However, the drone operator also reported that the Typhoon was 100m to the southeast on first sighting and co-altitude or below the drone.

The Typhoon Pilot reported that during a currency flight, they were conducting some low level flying in LFA 17, during which they unknowingly had an Airprox with a drone. The size and type of drone is unknown.

For the full report, see Airprox No. 2024283 on the Airprox Board website.

Spry's Comment:

At present, UK CAA regulations allow for the use of drones within 400ft from the closest point of the Earth's surface without the need to notify the activity. This creates a situation were low-flying aircraft and drones can use the same airspace with no awareness of each other's activity. The small size and slow speed of drones make them difficult to spot, especially against ground clutter. The drone operator is responsible for ensuring the airspace around their drone is clear, but the speeds and heights at which military aircraft operate gives the drone operator limited scope to react. It is worth considering where and when drone activity is more likely and identifying drone hotspots in your operating areas. In this case the Typhoon and the drone were both entitled to use the airspace, and it is fortunate that they didn't collide. ◻



Juno v Juno
31 Jan 25
Airprox No. 2025010

The Juno (A) Pilot reported they were the QHI teaching a basic rotary trainee Basic Transitions. They had just returned to Shawbury from Ternhill having joined through the southeast visual gate, High Ercall. On transit from the gate to the south of the airfield, in preparation to land at South Point, they saw two aircraft ahead of them which had joined ahead and were already on final and heard on the radio. They were visual with Juno(B) callsign aircraft joining through the south-western visual gate, Pym. Because of the amount of traffic and the experience of the trainee, they took control to conduct a gate approach. As they turned on to their final approach track at approximately 300ft and reducing speed to Vy, they called "final, visual with two ahead" and the western joining aircraft called Tower to request 30sec to cross the runway. They were still visual with the aircraft for a moment and then turned their attention to their approach, deeming their aircraft to have enough separation and ensuring that they landed to the right of the South Point area to allow room for the following aircraft. A few moments later, they heard the [pilot of the] other aircraft call 'short final' on the Tower frequency. They became visual with the other aircraft again when they conducted their lookout turn. On return from their second sortie they were notified by the 2 MAW Duty Authoriser that the [Juno(B)] callsign had not seen or heard their aircraft at all whilst joining or until the latter stages of [Juno(B)'s] approach. They were aware of the other aircraft all the way in to the field as they had heard [the pilot of] Juno(B)'s request to cross the runway call and were already visual. They were only made aware of the Airprox when they landed post a subsequent sortie as they had a rotors running refuel and crew change in-between.

The Juno (B) Pilot reported that they were a crew of 3 recovering to RAF Shawbury from Western following a 320 Confined Area sortie. The workload was low due to the relatively long transit back, with all checks and communications complete. They called for "30 seconds to cross RW36" and were given clearance. It was clear there were two other aircraft ahead in the vicinity of South Point, one was completing a running landing adjacent to South Point, the other was orientated north in the hover, holding short. They made a "long final, South Point" call. Seeing the two Juno aircraft ahead, they conducted a gate approach aiming to arrive halfway into the available landing area near South Point. This meant they were descending, decelerating down and left. Upon rolling wings level they were around 65kt, 100ft AGL. At this point, as the handling pilot, they saw a fourth aircraft in their right 2 o'clock, roughly 4-5 rotor spans, estimated 50ft below. The aircraft was in a shallow constant angle approach, South Point far right of the landing area. They called the traffic threat. They elected to steepen the approach and come left, resulting in the 10ft hover ½ distance into the South Point grassed area, left of centre. To the best of their knowledge, at no point during their recovery did any crew member hear any radio transmission, most noticeably a finals call. Despite ACAS being active, there were no ACAS indications or audio warnings.

The Shawbury Tower Controller reported that three aircraft joined via High Ercall, all on the same frequency and all aware of each other. At the same time, an aircraft joined by Pym, who was on the same frequency as the other three, so all were aware of each other. As the three from the High Ercall were getting closer to South Point, the aircraft that joined via Pym called '30 seconds to cross'. The cross was given as there was no reason not to give it. The three aircraft from High Ercall would have been aware of this, as the colour code was white or better (so good visibility) and all calls were on the same frequency. All four aircraft sequenced themselves to land at South Point (as part of the visual circuit), making blind calls as they should, then, one at a time, they air taxied to either the refuel spots or main dispersal. Nothing out of the ordinary was mentioned on frequency.

For the full report, see Airprox No. 2025010 on the Airprox Board website.

Spry's Comment:

Issues with the integration of traffic joining airfields is a common theme in both civilian and military airprox. By their nature airfields funnel aircraft into the same airspace and if it's at the end of a sortie it can be easy to lose focus or to try and expedite established procedures. Gaining good SA on all traffic is vital to maintaining safe separation, so use all means available to build your mental model. Electronic conspicuity is useful but relies on the systems on different aircraft being compatible and turned on, so a robust lookout remains vital. Remember that it's not just you that needs to maintain SA. Flying in a predictable manner and following established procedures allows others to maintain their SA. In this case Juno(A) was able to predict what Juno(B) would do and so off-set accordingly and thus prevented a loss of safe separation. ◻

Ministry of Defence

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Safety is everyone's responsibility

MySafety is accessible online via MODNET or Defence Gateway on any Personal Electronic Device.

Raise a MySafety alert on defencegateway.mod.uk

Safety Contacts:

Group / Station / Unit	Flight Safety Contact	Health and Safety and Environmental Protection Advisors
1 Gp	Air-1Gp-Star	
2 Gp	Air-2Gp-Air Safety	
11 Gp	Air-11Gp-Safety	
22 Gp	22Gp-DFT	
Air Support	Air-Support	
BM	Air-11Gp-BM	
JAC	JAC-Safety	
Test and Evaluation (ASWC)	ASWC-TEAirWg Air Safety	
1 ACC	1ACC-Flight Safety	
2 FTS	SYE-2FTS-DASOR	SYE-2FTS-HQ-SHSA
3 FTS	3FTS-HQ-ASM	3FTS-HQ-Platform Safety
4 FTS	4FTS-Air Safety	
6 FTS	6FTS-HQ-AST	
Air Cadets (RAFAC)	RAFAC-HQ-SafetyCtr	
Air Mobility HQ	Air-1Gp AM	
Boulmer	BOU-Stn-MySafety	
Benson	Ben-Safety	
MOD Boscombe Down	ASWC-BSD	
Brize Norton	BZN-Air Safety	
Combat Air Force HQ	CAFHQ	
Coningsby	CON-OSW-SSC	
Cosford	COS-Stn Flt Safety	
Cranwell	CRN-TotalSafety	
Defence Geographic Centre	UKStratCom-DI-NCGI-DGC	
Fylingdales	FYL-Spt	
Halton	HAL-Ops-Airfield-Ops	HAL-SSHEA
Henlow	HLW-SHE	HLW-SHE Advisor
High Wycombe	HWY-Flight Safety	HWY-SSHEA
Honington	HON-Stn SHEA	
ISTAR Air Wing	Air-1Gp-ISTAR	
Leeming	LEE-ASMT-SFSO	
Leuchars	LOS-OSW-LEU SFSO	
Lossiemouth	LOS-SafetyCentre OC	LOS-P8ASafetyTeam
Marham	MRM-SAFETYANDASSURANCE	
No 1 AIDU	UKStratCom-DI-NCGI-AIDU-OpsCntr	
Northolt	NOR-Safety	
Odiham	ODI- AST	
Swanwick	SWK-78Sqn-Dep FSO	
Shawbury	SHY-ASMT-ASM	SHY-SHSA
Spadeadam	SPD-AirBase	SPD-AirBase-SHSO and EPO
St Mawgan	SMG-ENG-	SMG-SHEF
Syerston	SYE-2FTS-DASOR	
Tactical Supply Wing	TSW-Functional-Safety	
UK AWR	Air-2Gp-SUAM	
UK JFAC	Air-11Gp-JFAC	
Valley	VAL-OpsWg SFSO	
Waddington	WAD-SafetyCentre	
Wittering	WIT-Ops Sqn-SFSO	
Woodvale	WDV-Aerodrome Manager	
Wyton	UKStratCom-DI-NCGI-Wyt-SHEA	
Overseas Flight Safety Contacts		
Al Udeid	83EAG-A3 Flight Safety	
Ascension	BFSAI-ASC Ops	
Akrotiri	BFC-AKI-Safety	
83 EAG	83EAG-FS	
Gibraltar	GIB-RAF-ASM	
MPA	BFSAI-AirOps	
Defence Safety Authority (DSA)	DSA -MAA