The RAF Safety Magazine

Issue 44

AirClues

The Sustainable Aviation Fuel Paradox

1: 50,000 UK Chart Improvements

ROYAL AIR FORCE Safety Centre

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Inspector of Safety (RAF)
Air Cdre Sam Sansome
sam.sansome136@mod.gov.uk

Inspector of Flight Safety (IFS)
Gp Capt Andrew Keith
andrew.keith626@mod.gov.uk

CESO
Lizzy Kijewski
elizabeth.kijewski100@mod.gov.uk

For enquiries to other departments in the Safety Centre – email **Air-SafetyCtre-WgCdrSpry@mod.gov.uk**

More Information:
Additional information can be found in the following locations:

RAF Safety Centre SharePoint Site:
https://modgovuk.sharepoint.com/teams/23116

RAF Safety Centre Internet Site:
https://www.raf.mod.uk/our-organisation/units/raf-safety-centre/

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Write to the Editor:
Air-SafetyCtre-WgCdrSpry@mod.gov.uk

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Foreword

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

Air Commodore Sam Sansome

In my foreword to Air Clues 43 I gave an initial pitch about the introduction of MySafety (the rebranded DURALS reporting system). In this edition you'll find a fuller article in an effort to keep you up to speed on our progress towards the much needed cross-Defence reporting system. There is still some work to do to ensure that it fully meets RAF needs but we are currently on track to switch over from FSIMS to MySafety at the back end of the year. As with all change I'm sure there will be bumps on the way, but please stick with it – and do what you can to prepare for it – as it is a really important project for us to make work.

Among the other articles there is more on climatic injury; Summer is here and it is clear from our reporting and post incident investigations that thinking 'heat risk' is still not muscle memory in the RAF. No matter what we do, cases of suspected and actual Heat Illness are inevitable, but we must get better at planning our activity to reduce occurrences and make sure we know what our immediate actions should be when people are taken ill. Remember, it doesn't have to be hot to be Heat Illness!

I remain very grateful (and so is the editor!) for the willingness of people right across the safety world – military and civilian – to put words to paper and share their experience through these pages. The sheer breadth of subjects hopefully means there is something for everyone, but please don't just read articles from areas that you recognise – you'll be amazed what you can learn from areas outside your comfort zone. Every day is a school day after all.

It would seem that the world, on the macro stage at least, continues to conspire to become less safe in some strange, inverted continuous improvement loop. Whilst there is little most of us can do on that front, on a micro level at least I hope that we can make small adjustments to make our own lives safer and make the RAF more effective. Stay safe.

> "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 Davey – RAF Lossiemouth – Green Endorsement

On 15 January 2024, Flight Lieutenant Davey was the wingman of a Typhoon FGR4 formation tasked with a six-hour night operational sortie over a middle east location. During the final Air-to-Air refuelling (AAR) bracket prior to recovery to RAF Akrotiri, Flight Lieutenant Davey's aircraft developed a complete Cockpit Symbol Generator (CSG) failure leading to a totally dark cockpit: There was a total loss of the Heads Up Display (HUD) and all head down primary instruments and displays. Simultaneously, the canopy demist system unexpectedly reverted to maximum flow: generating a sudden, noisy and disorientating airflow increase. Remaining in AAR contact without a HUD reference, Flight Lieutenant Davey calmly reset the CSG and recovered the primary displays sufficient to complete refuelling safely.

During the two-hour transit home, Flight Lieutenant Davey's aircraft suffered total loss of the CSG on a further three occasions before eventually failing completely. This required him to fly the aircraft using head-down, standby instruments whilst initially maintaining formation deconfliction via Night Vision Goggles alone, which quickly became impossible as he entered medium-level cloud. He calmly informed his lead of the problem, assured formation deconfliction and formulated a sensible plan. Having assumed the lead of the pair, he then suffered a single radio fail, leaving him with one functional communications system to converse with both Air Traffic Control and the other Typhoon. Flight Lieutenant Davey then executed a faultless singleton instrument recovery to RAF Akrotiri, at night and in poor weather, on head-down displays and secondary instruments.

Sara Sherwood (Left) & Julie Cauley (Right) – RAF Leeming – Well Done

On 7 December 2023, at RAF Leeming, Babcock Ops Clerks Sara Sherwood and Julie Cauley were providing operations support to the local University Air Squadrons. On this particularly busy day on unit there was a visiting Hornet Squadron working out of the field and the normal ASP was closed, requiring crew bussing to a remote ASP with the attendant problems of communication and co-ordination. At one point in a day of constant interruptions and program changes, a relatively inexperienced pilot landed to refuel. The clerks noted that the pilot's next sortie would conflict with the departure of a wave of F18 aircraft. Having not recalled hearing it mentioned at the outbrief there was uncertainty that the pilot was indeed aware of the Hornet departures. Having raised their concern to the Duty Pilot it was confirmed that the pilot had not been specifically briefed. He was duly contacted at the remote ASP and made aware of the programme confliction before attempting to depart.

Air Specialist (Class 1) Gurung – RAF Odiham – Well Done

On 18 May 23, during a routine 'Before Flight' Servicing of a CH-47 aircraft, AS1 Gurung identified that that there was a misalignment between the Pitch Change Link (PCL) bearing serrations and the serrations on the swash plate.
AS1 Gurung quickly reported this finding to the Line SNCO, who subsequently declared the aircraft unserviceable, preventing subsequent damage or incident.

Flying Officer Penman – 3 FTS – Well Done

On 18 October 2022, Flying Officer Penman was tasked as the instrument flying safety lookout pilot for a QFI SCT sortie in a Prefect T1 aircraft. He was, at this stage, an inexperienced Elementary Flying Training trainee. Approximately 45 minutes into the sortie, whilst the QFI was busy communicating with ATC and being vectored onto the final approach track, Fg Off Penman saw an Air System through the canopy on the opposite side of the cockpit to where he was sat.
Visual acquisition would have been challenging owing to both the Prefect's cockpit geometry and the position of the QFI's head. Whilst the threat appeared to be on a collision course, it was also moving relatively slowly and presented a somewhat ambiguous situation. Without hesitation, Flying Officer Penman took control of the aircraft and immediately manoeuvred it to reduce the risk of a collision and subsequently effect safe separation. As he did so, Flying Officer Penman reported the traffic to the QFI, both to apprise him of the situation and to facilitate his visual acquisition.

Mr Martin Thompson – RAF Henlow – Well Done

On 4 December 2023, during an evening patrol of Royal Air Force Henlow, Mr Martin Thompson noticed that an obstruction light on the top of a 25-metre-high communications tower was no longer illuminated.
He reported this to his superiors allowing the light to be repaired. What makes this 'spot' unusual is that there is no normal daily aircraft activity at Royal Air Force Henlow, and this is not part of any routine or patrol the Ministry of Defence Guard Service undertake. RAF Henlow is overflown numerous times by civilian aircraft and the Helicopter Landing Sites are in use, but this tower is in an area of the camp that is little used now with the closure and rundown of Henlow.

Mr Antony Flynn – RAF Northolt – Well Done

On 8 November 2022, at RAF Northolt, Mr Flynn was a leading hand Babcock aircraft Handler and was acting as the VASS duty controller in the southside Operations building overlooking the Aircraft Servicing Platform. A civilian Challenger CL350 twin engine business jet had just completed its departure and was taxiing out to the runway via Delta taxiway for departure. Mr Flynn was watching the aircraft as it slowly taxied and thought he saw the aircraft ground fuel panel still open. He contacted Station Operations to ascertain if they had a better view of the aircraft from their vantage point, but they were un-sighted. He immediately contacted ATC to advise the pilot of a potential problem with his aircraft. The aircraft came to a halt, pilot disembarked and secured the open fuel panel and aircraft departed safely.

Mr Matthew Andrews – RAF Northolt – Well Done

On 2 December 2023, at RAF Northolt, Mr Andrews was part of a two-man Babcock Aircraft Handling team detailed to carry out a departure on a large twin engine CL850 business jet located at the southern Aircraft Servicing Platform. The aircraft had closed up and started both its engines and the pilot had indicated to Mr Andrews to remove the nosewheel chocks. As he approached the nosewheel assembly he observed that the nosewheel steering torque link was disconnected, disabling the nose wheel steering. He visually indicated to the crew the problem and the pilot vacated the aircraft, re-connected the nosewheel steering and the aircraft departed safely.

Carly Clachers – RAF Northolt – Well Done

On 19 August 2023, at RAF Northolt, Carly Clachers was newly-qualified and carrying out Airfield Wildlife Control duties. During flying operations, she was conducting routine patrols on the airfield, monitoring and dispersing birds as required. At approx. 1035hrs she was positioned at the Northern Engine Running Bay, observing an Envoy aircraft departure. Shortly after the aircraft rotated, she witnessed a bird fall to the ground to the side or underneath of the aircraft. The bird appeared to make contact with the landing gear before being blown along the runway behind the aircraft, due to downdraft. Ms Clachers immediately contacted Air Traffic Control informing them of her observations and requested permission to enter the runway and remove the carcass.

Sergeant Sampson – RAF Waddington – Good Show

On 13 September 2023, Sergeant Sampson was a Sensor Operator on 14 Sqn, operating the Shadow aircraft. Following the completion of an ISTAR mission he prepared the aircraft for recovery and strapped into his role seat which faces rearwards, with no flight instrumentation with which to reference. With the aircraft on recovery under Air Traffic Control vectors and it being configured for landing, momentary unexpected turbulence was experienced. Although there is no requirement for the Sensor Operator to observe any instruments, Sergeant Sampson felt that the turbulence was unusual and noted that the G-meter had recorded +2.2G. He consulted his flight reference cards as he believed there could have been an exceedance of 0.2G if the flaps were extended. He enquired with the flight deck during a pause in the busy ATC transmissions as to the aircraft configuration. It was confirmed that flaps were at the approach position and both pilots agreed with his observation and concerns. A decision was made to change from the intended touch and go, to land and seek engineering guidance.

Flight Lieutenant Dale – Good Show – 83 EAG

In late-November 2023, while deployed at the Combined Air Operations Centre in the Middle East, Flight Lieutenant Dale was asked to help investigate a safety occurrence report about a Chinook detachment that was frequently experiencing difficulties communicating with the tactical airspace controller. In the dynamic operating environment of the region this potentially left the Chinooks vulnerable to entering airspace that was cleared before they departed but had closed afterwards, or indeed entering Restricted Operating Zones that had been dynamically made 'hot'. Despite the Chinook detachment not being within his area of responsibility, Flight Lieutenant Dale's work in this area not only solved an air safety concern for the Chinook detachment, but the additional interest he generated in the coalition partner's communications node aircraft enabled its capabilities to be exploited for operational purposes on a range of United Kingdom air system types.

Corporal Smith – RAF Waddington – Well Done

On 27 February 2023, at RAF Waddington, Corporal Smith was tasked as the Flight Line Supervisor overseeing and ensuring safe conduct of activities being undertaken in support of the demanding RAFAT Winter Line flying. As he approached a Hawk aircraft to undertake a general panel check prior to pilot acceptance, he spotted a 19 x 16 mm stainless steel bolt wedged between the rear cockpit canopy transparency and the demist pipe - a remarkably sharp-eyed spot. He immediately informed Engineering management and rendered the aircraft unserviceable pending further checks, which subsequently identified the bolt as having originated from the anti-G system, disturbed during recent Major maintenance.

Corporal Campbell (left) and Air Specialist (Class 1) Whittle (Right) – 905 EAW - Commendation

Cpl Campbell and AS1 Whittle were driving on the domestic site before returning to conduct duties. During this time, they heard gunshots from the 25m range. This information was passed on to the VCR via radio which prompted a phone call to the JOC (Joint Operations Centre). The JOC confirmed that the range had indeed been active since 0920L that morning but for reasons unknown during the 'ring-round', ATC had not been informed. During this time, the unit had had rotary operations getting airborne and returning to TANGO dispersal. SOP for ATC is to inform any rotary-wing aircraft if the 25m range is active so that they can avoid it laterally. Given that ATC were unaware of the range activity, this had not been passed to aircraft. ATC was able to confirm the range activity and subsequently pass this information on to affected aircraft.

Mr Geordie Walker – 6FTS - AOC 22 Gp Safety Commendation

Mr 'Geordie' Walker was embedded within the ASMT from 2019, leading the work on DASOR management and ensuring that historic reports were closed, and report progression was greatly improved. His bi-monthly updates provide the DDH with context and understanding of more complex reports, ensuring the DDH had a good awareness of issues within the expansive 6 FTS AoR.

Flight Lieutenant Parke – 6 FTS - AOC 22 Gp Safety Commendation

Flt Lt Parke was a lynchpin of the ASMT from its inception in 2017 until his retirement. He led 6 FTS Assurance during his tenure, helping the team become the best assured in 22 Gp. He displayed the highest value and standards, supporting the development of a multitude of holding officers, as well as his significant contribution to 6 FTS Safety Management.

New Drone Signage in the Machynlleth Loop, Wales

By RAF Valley ASMT

As the popularity of drones continues to soar, ensuring their safe operation alongside crewed aircraft becomes increasingly paramount. Recently, new safety signs have been installed within the Mach Loop in Wales, aimed at safeguarding the airspace and those who traverse it. This Article serves as a guide for both UK drone pilots and casual users, explaining the significance of these signs and why they have been put up within the Mach Loop and their implications for aerial enthusiasts.

Understanding the Mach Loop: Nestled within the picturesque landscapes of Wales, the Mach Loop is renowned among aviation enthusiasts for its low-flying military aircraft and manoeuvres. This scenic region, also known as the Machynlleth Loop, attracts photographers, plane spotters and drone pilots from around the UK eager to capture the thrill of low-level flight.

The Need for Safety Measures: While the Mach Loop offers breath-taking opportunities for aerial enthusiasts, it also poses inherent risks, particularly concerning the integration of drones into this dynamic airspace. The presence of unmanned aerial vehicles (UAVs) amidst low-flying military aircraft necessitates stringent safety measures to mitigate the potential for accidents and collisions.

Introducing New Safety Signs: To address these concerns, authorities have implemented new safety signs within the Mach Loop signalling the dangers of this airspace for drone operations. These signs serve as visual cues, alerting drone pilots and casual users to the presence of low-flying aircraft and the imperative need to adhere to designated safety protocols.

Implications for Drone Pilots: For drone pilots, these new signs highlight the risk of operating near fast-moving low-level aircraft. It is crucial to respect the designated boundaries and refrain from flying in close proximity to other aircraft, especially during periods of heightened military activity. Failure to comply with these regulations not only jeopardises the safety of crewed aircraft but also undermines the integrity of the aviation community.

Promoting Responsible Drone Usage: Beyond compliance with regulatory mandates, fostering a culture of responsible drone usage is essential. This entails maintaining situational awareness, exercising caution when operating near high-traffic areas, and prioritising safety above all else. By adhering to established guidelines and demonstrating respect for airspace regulations, drone pilots can contribute to a safer and more harmonious aviation environment.

The installation of new safety signs within the Mach Loop underscores the collective commitment to enhancing airspace safety and preserving the integrity of aerial operation. For UK drone pilots and casual users alike, these signs and related regulations serve as a reminder of the shared responsibility to uphold aviation standards and prioritise safety at all times. By embracing these measures with diligence and dedication, enthusiasts can continue to enjoy the exhilaration of aerial exploration while safeguarding the skies for future generations.

MySafety

By the RAF Safety Centre

Coming Soon for the RAF!

Did you know there is a mandated Statutory HS&EP requirement to report any injury or environmental occurrence, whether it was a near miss, an incident or an accident?

MySafety (currently known as 'DURALS') is a web-based application to support the reporting and management of safety and environmental occurrences, including recording and tracking of investigations, recommendations, Learning from Experience and Lessons. As we write this, we can hear the collective groan, 'why are we changing this again? I've only just got my head around FSIMS, why can't we just have one reporting system?'. Well, that's exactly why we are changing! The official move to MySafety will mean a common HS&EP (but not Air Safety!) reporting system across the whole of the MOD; the Army and UKStratCom are already there. MySafety has similar functionality to ASIMS, so you will get notifications of incidents that require your input. Yes, yes, yes, another system to learn but when is it coming in for the RAF? We can't commit to a date just yet as we need to ensure that before it is released to the RAF that it is accessible and usable by all, but we will keep you updated. So, for the time being, this is a warning notice that MySafety will be replacing FSIMS so be prepared! It won't just happen overnight, and there will be plenty of notice (I promise!). And please don't think that all your efforts on FSIMS have been wasted – all the reports that have been completed have already made a difference and the data from FSIMS records will be retained for reach back so we can carry on learning from them.

MySafety for the RAF

DURALS officially changed over to MySafety on 18 June 24 but the RAF will formally transfer across to it from FSIMS towards the end of 2024. Continue to use FSIMS until otherwise told.

Reporting is a fundamental tool for enhancing our safety across Defence. It enables us to monitor trends, allows us to enact data-driven decision making, fosters accountability and transparency, and keeps our organisation compliant with regulations. The transition to MySafety reflects a personal association with reporting, promotes empowerment, and reflects clarity and simplicity. The change also considers wider MOD branding, and will align with existing MOD-wide systems, for example, MyHR. When it comes in for the RAF at the end of the year MySafety will be accessible online via MODNET and Defence Connect and occurrence reporting will be possible via any Personal Electronic Device (PED) connected to the internet via the MySafety Alert (currently DURALS!) on the Defence Gateway.

What is a Functional Safety or Environmental incident? It's pretty much anything that occurs which is not explicitly related to Air Safety. So, trapped thumbs, falling off ladders, fuel spills, hand-arm vibration etc. Pretty much anything that is work-related that has happened, has nearly happened, or is likely to cause an incident to happen. So, if someone forgets to fit a bolt to an aircraft, that is reported on ASIMS, but if they trap their thumb while fitting it that is a MySafety report!

What is an 'occurrence'? 'Occurrence' is a Defence-wide term that encompasses any incident or accident of any level of severity or outcome, unsafe act / condition, near miss or death. All RAF Service and Civil Service personnel are encouraged to report all functional safety occurrences whilst on duty or attending an organised sporting event. Whilst off duty, any incidents in relation to a failure of Station infrastructure should also be reported on MySafety.

Once MySafety is operational for the RAF, Functional Safety occurrences and near-misses are to be recorded on it within 72 hours of the occurrence taking place unless operational reasons prohibit it. Individuals involved in the occurrence must ensure they report the incident to their line manager who in turn, is to ensure the incident is recorded on MySafety.

All of the following definitions are different types of occurrences:

Image: LCpl Christopher Johns DVIDS Public Domain

Dangerous Occurrence: Any occurrence that results in the failure of any load-bearing part of any lifting machinery, freight containers, etc. Any failure which has potential to cause the death of any person relating to pressure systems, electrical equipment / distribution systems. Any accident / incident which resulted or could have resulted in the release or escape of a biological agent likely to cause severe human infection or illness. Any unintentional fire, explosion or ignition involving explosives; or the unintentional discharge of a weapon.

Unsafe Condition: An unsatisfactory physical condition that exists at a workplace, especially immediately before an occurrence, that was significant in initiating the occurrence. It is a condition where something exists that varies from a normally accepted safe condition and can result in injury, death, or property damage, if not corrected.

Unsafe Act: Any act that deviates from a generally recognised safe way of doing a task and possibly increases the likelihood of an occurrence.

Incident: An unintended occurrence which causes injury, death, loss or damage to property, plant or equipment, or the environment.

Near Miss: An unintended occurrence, that whilst not causing harm, had the potential to cause injury or ill health. Environmental near misses are where there was a potential to negatively affect the environment, had it taken place.

Accident: An accident is an unintended occurrence that causes physical injury or death. Accidents are categorised by severity:

a. Specified Injury - Fracture (not including finger, thumbs and toes), amputation, permanent or temporary loss of sight, crush injuries, serious burns, scalpings, unconsciousness or any injury which leads to hypothermia, heat-induced illness or requires resuscitation or admittance to hospital for more than 24 hours.

b. Serious Injury - More than 7 days lost time or unable to continue normal duties* requiring medical treatment, but not admitted to hospital. An injury requiring a formal report to RIDDOR** that is not a Specified Injury, Minor or Dangerous Occurrence.

c. Minor - Any injury, accident / incident that results in up to 7 days lost time and is not RIDDOR reportable. An accident / incident that causes minor damage.

d. Near Miss - An event that, while not causing harm had the potential to cause injury, ill health or damage but not a RIDDOR Dangerous Occurrence.

e. Dangerous Occurrence - One of a number of specific, reportable adverse occurrences, as defined in RIDDOR.

* For more than 7 days.
** RIDDOR – Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013.

All reports will be proportionally investigated. Where any lessons are identified appropriate corrections **must** be taken.

Investigation

- Investigations should not apportion blame.
- As soon as an occurrence happens, report it and think "I need to investigate", so preserve evidence, quarantine larger items and take statements / personal accounts. Take photos and measurements.
- Investigate and write the findings with a timeline referring to the evidence to support them.
- Based on the evidence identify the causal factors.
- Make SMART recommendations to address the elements that need to be fixed or improved so that further occurrences of a similar nature are prevented.

MySafety will introduce an Accountable Person Review. All reports will be passed to the Accountable Person Review Group to perform the function of signing off all Occurrence reports and approving recommendations.

If you want to access MySafety Reporting and it is not available to you locally, speak to your local HS&EP representative. Alternatively, you can look at the suite of information available on the DURALS Comms site at: https://modgovuk.sharepoint.com/teams/311991 or DURALS (on Defence Connect)

Report today for a Safer Tomorrow

The Sustainable Aviation Fuel Paradox

By Sqn Ldr Pete Geddes, RAF Safety Centre, with kind permission of Sqn Ldr Andrew Sweeney and Sqn Ldr Don Earl

Typhoon undergoing Air-to-Air refuelling.

Does it make sense that defence budgets would spend more money on Sustainable Aviation Fuel (SAF) when a potential adversary might invest more in direct military capabilities? Many would say it doesn't. Simplistically speaking the RAF should align with government and global targets to reach Net Zero where practically possible. However, we know that a reliable supply chain is a crucial factor in a successful military. If the commercial world adopts SAF and Defence doesn't keep-up, there is a risk that supply chains could be compromised. Imagine a world where Defence didn't follow the civil sector and couldn't use the increasing availability of sustainable fuels. Fossil fuel production will be scaled back with increasing availability of sustainable fuels resulting in a restricted supply line due to niche fuel requirements of the military. No fuel – no flying!

SAF is an emerging group of fuels with the potential to replace traditional carbon emitting fossil fuels. SAF is manufactured using synthetic or biological sources, known as "feedstocks". Biological feedstocks include biomass, hydrogenated fats and oils, wood waste, alcohols, sugars, household waste, and algae. These reduce the fuel's overall lifecycle emissions which in turn reduces its impact on global warming. To be classed as 'sustainable', SAF products should not require significant use of fresh water and should have no detrimental land use changes that impact food production or afforestation. Current SAF products achieve around 80% reductions in lifecycle emissions. More advanced sustainable fuels – "synthetic fuels" - can be made through the chemical synthesis of green hydrogen and directly captured carbon dioxide. Green hydrogen is produced by splitting water through electrolysis and directly captured carbon dioxide is produced through a chemical reaction; both require electricity from renewable sources.

In 2023 SAF only provided 0.2% of the global aviation fuel market, so it's clear there is a requirement to scale up to its full potential. Most SAF currently available is produced from biological feedstocks, however, there are limits to how far these can scale up. If renewable energy capacity increases sufficiently, the route to make aviation fuel at scale from synthetic feedstocks could be unlocked. Aviation fuel contributes approximately 35% to the RAF's emissions footprint and SAF will play a significant role in the RAF's climate change and sustainability objectives if the technology matures in a timely manner.

The BAe 146 was flown in Feb 22 using a 35% blend of SAF.

To prepare the Service for this energy transition, the RAF has undertaken several trials to demonstrate the feasibility of SAF adoption, to obtain useable data, and ready our aircraft and people for the integration of larger volumes. In Feb 22, RAF Northolt conducted nine sorties using BAe 146 aircraft fuelled with a 35% blend of SAF. These confirmed that the RAF could use SAF without any notable impact to operational capability or logistical functions. From this, we calculated that the use of 35% blend in the latest Envoy aircraft would reduce total emissions by around 650kg per flying hour.

These trials demonstrated what is already possible in line with regulatory clearances that permit all RAF aircraft to use up to 50% blends of SAF with traditional fuel. When blended with traditional kerosene products in this way, the fuel is known as a "drop-in" fuel which are certified as F-35, complying with the specification requirements of Def Stan 91-091 entirely. Drop-in fuels require no changes or re-certification of the aircraft, or the supply chain equipment such as pipelines or bowsers. This is very attractive as it avoids some significant costs, or the requirement for separate infrastructure. Sustainable aviation fuels in their pure unblended form, do not meet the F-35 specification, so they are either mixed with kerosene jet fuel (hence why up to 50% blends are already approved), or they require additive blending to bring their parameters in to alignment with the F-35 specification. The DfT's recent 100% SAF transatlantic flight used fuel following the additive blending pathway.

For the aviation sector to achieve Net Zero, it is necessary for all aircraft to be capable of utilising 100% SAF. This introduces us to the other category of SAF known as "non-drop in" fuel. Non-drop in fuels tend to be SAFs in their purer form without kerosene or additives, which achieve a higher level of carbon abatement. However, as they do not meet the parameters of the F-35 specification they require greater consideration and evaluation to certify aircraft, as well as supply-chain equipment and infrastructure. To further our knowledge of non-drop in fuel, the RAF undertook trials at RAF Brize Norton in Nov 22 on a Voyager aircraft. This was the world's first military transport aircraft to be operated using 100% SAF and was conducted in conjunction with Airbus, Rolls Royce, and other industry partners.

The Voyager trial used non-drop in fuel that was not fully aligned to the F-35 fuel specification and was cleared on a one-off basis via a military permit to fly. One of the slightly differing physical parameters of non-drop in SAF is lower fuel density. This results from not having the aromatic content naturally found in fossil fuel, leading to poor elastomeric compatibility. The naphthalene content of aromatics is essential for elastomeric components, such as seals within the aircraft & supply chain equipment, to swell and "seal" the system. Without this, the seals shrink and can cause leakage. This issue was well known before the Voyager trial and proved it in a physical sense. It is this reason why non-drop in fuels will require aircraft additional evaluation and certification work

Voyager was flown using 100% SAF in Nov 22.

to identify elastomeric seals that might be vulnerable and replace them with alternative products that are compatible with a new specification of fuel.

Noting the costs and time to clear a new fuel specification on all aircraft and supply chain equipment, the different aviation sector stakeholders are collaborating in an ASTM Task Force to agree additional requirements for performance and a specification that can be used routinely to achieve these carbon benefits. This is still a way off and the Voyager trial helped to provide data to further this goal.

Given the success of these trials, the RAF is now looking at how it can scale up its routine operations using SAF. Global SAF production is currently very limited, and comes at a higher cost, so we are working with industry partners and across government to explore how the RAF can support scaling-up production. Moving forward, the RAF hopes to align with the UK government's SAF mandate, meaning all UK main operating bases should start receiving SAF blends by the end of 2030.

The largest challenges to the RAF's ambitions regarding SAF will be increasing availability and reducing costs. However, it is clear this challenge is one that the broader aviation sector is fully committed to overcoming. The RAF continues to work with these stakeholders so that it can play its part and contribute to the UK government's net zero 2050 legislation whilst preserving the vital energy supply chains needed for modern air warfare.

So what does this mean for RAF units?

In short, they need-not worry as any SAF available in the coming years will be blended with kerosene before it arrives on to unit in accordance with the requirements of Def Stan 91-091. As a drop-in fuel it is compatible with F-35 fuel stocks and can be co-mingled with no cause for concern. The RAF's Climate Change & Sustainability team, A4 Fuels and the Operational Energy Authority are working closely with the aviation sector as it agrees a non-drop in specification, and certification work to clear the fuel on aircraft will be initiated at the appropriate time, where any necessary technical changes will be made. This may well include new seal specifications, as well as addressing other challenges include the lower lubricity of non-drop in SAF, which might affect the servicing schedules due to increased engine wear.

Spry's Comment:

At present, the more important aspect to understand is the differing characteristics of existing fuel types. F-34 vs F-35 (presence of icing inhibitor 'FSII') has caught out aircraft operators many a time. Likewise, a propellor-driven aircraft can confuse bowser drivers over the engine that powers it; some are piston, and some are turbine. This is obvious to you as the operator, but not necessarily to a contractor whilst on an aircrew-supervised land-away. Don't let anyone put the equivalent of 'petrol in a diesel car' and vice versa! As you have now seen this article, watch out for a new fuel specification in the future and ensure you only use fuels cleared for your aircraft. ■

AirClues

Near Troops? **Think Drone! Part Two**

By Major Steve Watts (Rifles), Combat Manoeuvre Centre

The Field Army through the "How We Fight 2026" (HWF26) concept are building towards a modernisation programme and making the Land Force more agile and lethal. One major part of this work is the inclusion down to the lowest tactical level of small Uncrewed Aircraft Systems (sUAS). The types of systems employed range from 250-gram Black Hornet 3 sUAS through to sub 25kg Battle Group (BG) systems. These systems will operate across the entire battlespace in the Deep, Close, and Rear Areas.

sUAS and RPAS use by the Army is nothing new, having been in service in parts of the Army for over 10 years. The significant point to takeaway is the ambition and scale of employment. These sUAS will be employed in very high numbers in comparison to crewed aviation assets. For example, an Infantry BG will employ small sub 4kg systems at Section, Platoon, and Company level with larger sub 25kg systems operating up to Battalion or BG level. This could see around 60 sUAS for one BG, meaning a deployed Brigade Combat Team (BCT) with multiple BGs would have hundreds of sUAS. Furthermore, the employment does not look the same as planned missions for crewed aviation, in that sUAS flights flown will last minutes not hours, and there will be far more "quick tactical flights" as the battle requires. A single sUAS may conduct 10 flights or more per day, so across a BCT that could mean thousands of short flights by sUAS flying in the Near Surface Battlespace in a single day.

As a concept, the Near Surface Battlespace is new but, in reality, it is where crewed aviation and larger Remote Piloted Air Systems (RPAS) have operated historically. The key difference is the number of new users in this space and the impact they are having on Land Operations down to the lowest tactical level. As events in Ukraine and Gaza have shown, the mass use of sUAS used to conduct ISTAR and lethal effects directly against targets on the ground is increasing. To win, the British Army must also adapt how they operate, and introducing their own sUAS enables them to conduct the same types of operations at scale is vital work. This will mean a highly congested Near Surface area, particularly below 400 feet AGL where sUAS operating in the Open (sub 25kg, Visual Line of Sight (VLOS)) and Specific 1 (sub 25kg, Beyond Visual Line of Sight (BVLOS) up to 2km) Category will be dominant.

What this means for the crewed aviation community is clear. When operating in this battlespace you must anticipate large volumes of sUAS being persistently present. The way in which we teach the new System Commanders and Operators to fly focusses on tactical employment. Wherever possible they should fly as low as physically possible with the uncrewed aircraft contouring the ground and using features to mask their signal from enemy Electronic Warfare, ground observers and Air Defence. Most aircraft will therefore be very low - below 100 feet AGL - but operating Beyond Visual Line of Sight (BVLOS) due to the ground.

All crews are taught about Battlespace Management (BM) and how they should deconflict with other air users in Time and Space. This is a key feature of the courses, with Immediate Action drills that include landing the sUAS immediately if another aircraft is heard or seen to avoid Mid Air Collision (MAC).

There are two limiting factors to note. Most in service sUAS do not have software that enables other airspace users to see them, and they can't see others. Secondly, at the lowest tactical level there may not always be trained airspace controllers such as Joint Terminal Attack Controllers (JTACs) controlling the airspace. What this means currently is that the Land Force relies on deconfliction based on planning, briefing, and BM between deployed units, Defence Training Environment (DTE) staff, and higher headquarters Air Cells. Whilst most of the Field Army operate in VLOS now and the risk is lower, over time units will build SQEP and transition to BVLOS making airspace use and management more challenging.

In conclusion, sUAS is now here and growing at scale with a wide set of Use Cases for the Field Army. This creates a congested Near Surface battlespace that will challenge both crewed and uncrewed users. The tactical advantage that sUAS gives the Land Force is vital and can't be overly constrained if it is to win the next war. This means that crewed aviation will need to deconflict airspace with greater consideration for small tactical systems operating at scale. It is understandable that this will lead to safety concerns; these concerns shape how we move forward to ensure we have a safe Near Surface battlespace for all users.

Spry's Comment:

This is an area of capability within the Field Army that will continue to grow and evolve. When there is interaction between ground units and aviation, for example a Support Helicopter pick up, a Fast Jet show of force, or a Tactical Air Transport drop of some description, the risk of MAC with sUAS will inevitably increase. MAC could result in a potentially catastrophic outcome for the aircrew or, at the very least, a loss in capability for the ground troops.

Whilst sUAS regulations and SOPs are in place to minimise risk of fratricide, proactive engagement between the crewed and uncrewed aviation communities is essential to understanding TTPs (Tactics, Techniques and Procedures), constraints and limitations of the other's operations. Ultimately, pre-flight communication and prearranged deconfliction plans will assist in reducing any risk of MAC.

For the aircrew reading this, next time you are working with troops on the ground, or involved in planning deliberate ops, it is vital to consider sUAS use by the troops; ask the Ground Force Commander about their TTPs. Negotiate a deconfliction plan that all elements involved (ground and air) are aware of and happy with.

For ground unit UAS operators: when planning and working with crewed platforms, be forthcoming with how you employ sUAS as part of your TTPs. Ensure that some deconfliction plan is agreed. Be aware that, even with prior awareness, your sUAS will be difficult, if not impossible, for the aircrew to spot. Without a prearranged deconfliction plan it has to be assumed the aircrew will not see your drone to avoid it. It is incumbent on you to land your drone or keep it out of the way to remove the MAC risk.

Also see Air Safety Matters No.57 – 'Near Troops – Think Drone'. □

Air Safety Improvements to the UK 1:50K Air Chart Series (M726-AIR GB)

By Mr Mark Darlow Hd Task Team-7 and Flt Lt Graham Stewart SO3-Air, Defence Geographic Centre (DGC)

Part 1. Mitigating Against Controlled Flight into Terrain or Obstruction (CFIT/O) – M726-AIR.

Mark Darlow

Flt Lt Graham Stewart

The way that UK 1:50K scale air charts are produced has very recently undergone a bit of a revolution which will result in significant air safety improvements for most air users. This article, which builds upon our previous articles in Air Clues Issue 34, outlines the changes, the safety benefits and how you can access them.

So, What Exactly Is This M726-AIR Thingy? The M726-AIR is simply the Ordnance Survey (OS) 1:50,000 scale Landranger map series over which the Defence Geographic Centre (DGC) has added a vector layer of all known vertical obstructions over 150ft (80ft in Tactical Training Areas) and all known powerlines, including Hazardous Cable Locations (HCLs). Although you might not recall the name, all military aircrew in the UK will be very familiar with the M726-AIR chart series and have used them since 2009 to achieve a vast number of flying tasks both operational and training. It's provided in both traditional paper (hardcopy), and in digital (softcopy) versions for use on mission planning systems and cockpit displays. The softcopy version comes in two formats known as ASRP (the NATO standard) and CADRG (the US standard).

Fig 1. 'Bare' OS Landranger

Fig 2. M726-AIR

Obstructions and Powerlines via DVOF. The critical additional obstruction layer is derived from the Digital Vertical Obstruction File (DVOF). This is a database of all known vertical obstructions which is meticulously maintained and updated every 28-days by Task Team-7 at DGC (who incidentally will be moving to No 1 AIDU in 2025).

DVOF Accuracy. For DGC's DVOF database to be accepted for use by the Civil Aviation Authority (CAA) and National Air Traffic Services (NATS) in their own civilian products and services, a one-off audit by way of a physical survey of a designated area in Scotland was required. This demonstrated that the accuracy of DVOF was in the order of 90% - and we're confident it has improved since because of ongoing improvements. However, despite its extremely high accuracy, DVOF can never be considered to be fully assured because, without some kind of live and ongoing physical survey of the entire UK, we simply cannot guarantee that we've discovered and accurately captured absolutely everything that's being built.

UK law only requires vertical obstructions above 100m (328ft) to be reported to the CAA and DGC, and it's fair to say that it's probably not a commonly known or rigidly followed law.

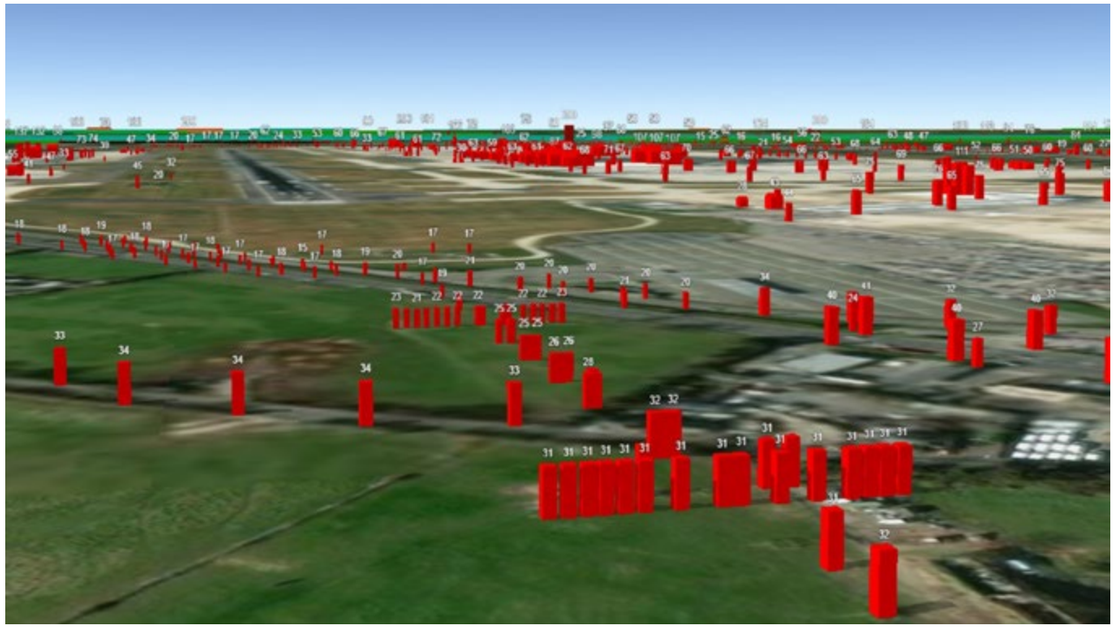


Fig 3. UK DVOF Database Viewable at:
https://arcgisportal.ahe.r.mil.uk/arcgis/apps/experiencebuilder/experience/?id=389436dd56e6408997ff5cc244a30e73&page=page_0

Aside from the possibility of a NOTAM to alert you to the odd particularly hazardous new obstruction, between the 28-day editions, there is no DVOF amendment bulletin. Therefore, while UK DVOF and the M726-AIR derived from it are provided to facilitate planning and to enhance situational awareness, don't solely rely upon them to absolutely guarantee the safety of navigation of your aircraft or air system. Outside of the UK, where DGC must rely on the contributions of third-party nations, World DVOF accuracy is likely to be considerably worse than our home-grown UK DVOF – so beware!

The raw DVOF database is also available for users to interrogate on MODNET (see above), and also to download separately via MilFLIP - onto any system that can ingest and display it. Most mission planning systems can do this to greater or lesser degrees, but few aircraft types can view DVOF in the cockpit.

In this intelligent pure digital-data format, DVOF can be used and fused with other datasets, for any number of flight-related tasks such as terrain avoidance or automated obstacle collision alerting for example. DVOF for example can show all known obstructions, whereas on the 50K scale chart, to avoid clutter, we must apply a specification and group together densely packed obstructions into a single feature. However, not all users have the luxury of being able to use DVOF in such creative ways and so the good old-fashioned map-based M726-AIR GB depiction of vertical obstructions, despite the limitations, is still required. We have the databases readily available to significantly mitigate against CFIT/O, yet it's not mandated that they're used - answers on a postcard

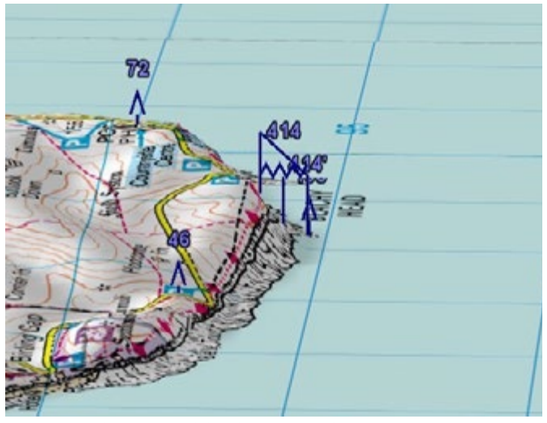


Fig 4. DVOF, Elevation Model and 50K OS Landranger Map

Previous M726-AIR Production Method

Because the M726-AIR is derived from the OS Landranger with a requirement to be printed into individual sheets showing marginalia, historically it has exactly mirrored the coverage footprint of the 204 separate sheets that made up the original, even in electronic version. In deciding which of the individual sheets should be prioritised for a periodic refresh, DGC would consider the number of DVOF changes that had occurred coupled with the amount of time that had passed since the last edition of that sheet came out. This rationale, necessitated by the limited resource at DGC, resulted in only a small proportion receiving an update each year. Some of the sheets therefore reached over 15 years old, with the average being about three to five years old.

Worse still, in the old electronic version, with no sheet lines visible, while it may have appeared that you were viewing a single seamless chart, beneath this illusion lay a hidden patchwork quilt of individual charts, each with different production dates; some relatively new and some very old. Another paradox existed where some sheets overlapped, and the same geographical area might appear on two separate sheets, one more recent than the other. Hopefully, your mission planning system would have the functionality to bring the most recent chart to the top, but who really knows if it did? Clearly this particular slice of Swiss cheese had some holes in it that could potentially align with others……..

Following the 2022 Juno wire strike, DGC visited RAF Shawbury and other stations to brief our work, the limitations of our products and to better understand the mission planning and in-cockpit systems in use and how our data and products was being used and represented in the air. Even though the HCL in question was known, it was evident that CHAD mitigation was not practical for users and therefore not effective at mitigating against the HCL threat. This untenable situation resulted in DGC's top air hazard being that the lengthy chart refresh rate was placing an unacceptable amendment burden on users. To remedy this, the boffins at DGC set to work with the aim of automating the production process such that the whole of Great Britain could be refreshed with current DVOF data every 28 days and that this new single product could be made available to download directly from No 1 AIDU's online Aeronautical Information portal, MilFLIP.

Fig 5. OS Landranger Coverage

Part 2. M726-AIR GB - Improved Mitigation

New Semi-Automated M726-AIR GB Production Method. There's really no need to bore you with lengthy descriptions of the endless meetings that were held, the sleepless night and the many and various technical hurdles that needed to be overcome in order to realise this lofty ambition. Suffice to say, it took quite some effort which at several points, appeared that we had actually succeeded in increasing the overall production time rather than reducing it! However, ultimately the task was successful and although it's not quite what you might call a 'push-button' process, it does result in a rapid, single GB-wide, 28-day M726-AIR in two digital formats which can be downloaded directly from MilFLIP.

The new product is visually almost identical to the old one and has been trialled and accepted as fit by Joint Aviation Command. The first edition **which has a DVOF date of AIRAC 23-12** should already be available as this article goes to press, with DGC ramping up production to provide replacements initially every 6 months and then ultimately every 28 days as soon as we're able - we do have other stuff to do you know…

Users who can view and manipulate the raw DVOF database will still have the advantages of digitalisation over those who can only use this simple map image depiction, but regardless, the new M726-AIR GB remains a significant leap

Fig 6. M726-AIR GB (London) Hazardous Cable Depiction

forward in terms of accuracy, currency, improved safety, reduced user workload and production overheads.

Air Safety Benefits. The 28-day DVOF database is the single best mitigation we can provide to reduce the chances of CFIT/O and soon, in very simple terms, thanks to massively improved currency, the M726-AIR GB will far more accurately reflect the current real-world, ground truth reflected in DVOF. This accuracy will further improve as we move towards a 28-day refresh rate, with the M726-AIR GB eventually being a near mirror of the DVOF database (give or take a single AIRAC).

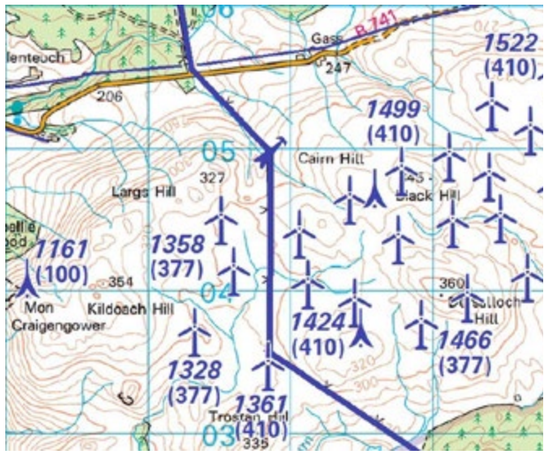


Fig 7. M726-AIR GB Wind Farm depiction.

Once up to full speed, and assuming your Ops staff diligently download the newest edition and ingest it into your systems and remove from use the previous edition, you will have sight of pretty much every vertical hazard that we are currently aware of - **but don't forget the cut off height specification of the chart!**

M726-AIR GB 1:50,000 specification:

Obstructions 150ft agl and above shown.

Obstructions 80ft agl and above shown in UK Tactical Training Areas 7T, 14T and 20T.

For users of this new 28-day digital M726-AIR GB, there will no longer be the requirement to consult the Chart Amendment Document (CHAD) as it will align with the bang up to date DVOF database.

Ironically, automation also revealed a couple of unintended added bonuses that we were not expecting; in addition to freeing up resource some at DGC who no longer must slavishly reproduce each of the 204 OS sheets, the automated M726-AIR GB process also cures baldness and significantly improves libido – winner! Automation truly is a wonderful thing; thank you Mr Henry Ford, your legacy lives on.

Hardcopy - A Farewell to CHAD? The ultimate aim for hardcopy versions is to print new editions every six months in line with the 250K and 500K LFCs (commencing circa Spring 2025), and so while CHAD will still be needed for paper version, each individual sheet will ultimately, be only up to six months old, rather than several years, and the CHAD burden for hardcopy sheets will consequently reduce considerably.

So How Can I Get My Hands on This Miracle Cure? Simply head down to the 'Digital Data' section of MilFLIP - if you know your way around MilFLIP, it will be readily discoverable.

Reporting Errors. It must be fully understood by users that DVOF is not an assured product. The obstructions and powerlines contained within it and subsequently shown on our charts are researched and collected from a variety of disparate sources, by a small team using best effort, within limited resource. Furthermore, DGC have little to no control over the data that is provided to the World DVOF dataset by third party nations and managed by the NGA in the USA. The final and ultimate mitigation against CFIT/O remains, as it has always been, the mark one eyeball and the watchfulness and diligence of aircrew coupled with strict adherence to the hard-won rules and regulations that govern low flying. Should anyone routinely discover any errors in the new chart or the DVOF data itself, such as changed or missing vertical obstructions, or powerlines that are not shown as being suspended across a valley, simply email us at dvof@mod.gov.uk and, after some confirmatory research, we'll update the DVOF database - which in turn will generate corrected digital M726-AIR GB 50K charts, hopefully in time for the very next 28-day AIRAC cycle. In this way, all low-level operators, (including Search and Rescue, Air Ambulance and Police helicopters) will benefit from your diligence. To be clear, **any location** users deem hazardous can be added to our database for symbolisation on DGC and No 1 AIDU products with the zig-zag symbol. HCL's can be anything from the classic powerline across a valley, to simply hard-to-spot cables or even zip wires and cable cars. **The bottom line is, that if you think it's dangerous and want it portrayed on the charts, then report it!**

Please note that due to the age and size of cable, the span, and the temperature etc, we must calculate the cable height using the assumption that the cable is taut. This can lead to overly high figures that may cause problems for users, particularly when night flying. If users can provide estimated cable heights, we are happy to revise our calculated height and add them to the database as reported. Please be aware that the recording of HCL's and zig-zag symbology is limited to UK air charts and some overseas training areas. **In general, throughout the rest of the world HCL's are only recorded as a single point obstruction feature within World DVOF and may not be depicted at all on charts.**

DVOF Errors and Omissions

THE DVOF IS NOT A COMPLETE OR ASSURED DOCUMENT. CREWS SHOULD REPORT ERRORS AND OMISSIONS, AND USE LOOKOUT TO AVOID COLLISION WITH VERTICAL OBSTRUCTIONS.

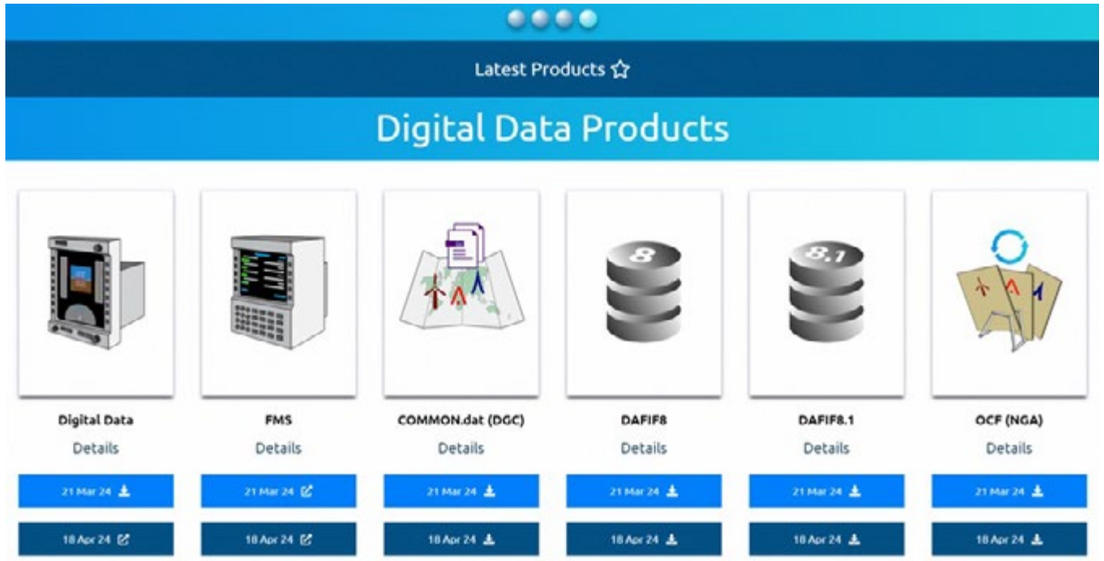


Fig 8. MilfFLIP Digital Data

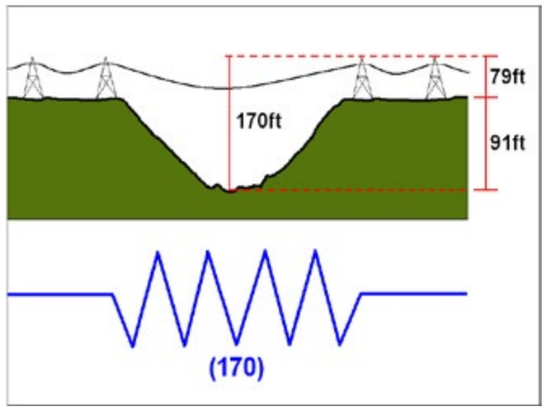


Fig 9. 1:50,000 Hazardous Cable Location symbology

Submitting a D-ASOR? In the unfortunate event that an erroneously depicted vertical obstruction or cable has caused you to skip a few heartbeats and occasioned a D-ASOR, then please follow the following guidance which will immediately alert DGC and MAMC (Ops Low Flying) of your occurrence.

1. For Uncharted Obstructions, Powerline or Hazardous Cable Locations, Occurrence Mangers should ensure they select **'Occurrence Type'**.

2. Then under **Additional Reports**, select tick box **Uncharted Obstruction**.

3. Additionally, if you can email details directly to dvof@mod.gov.uk, this may make the difference of it being included and published before the next AIRAC cut off day.

The Future…Data-Centricity. More astute readers may have noted, perhaps with some suspicion and even alarm, that in the previous three-part article in Air Clues Issue 34 way back in March 2021, we argued that making un-editable (flattened), fully finished map products was actually not the best solution going forward and was in-fact evidence of a stalled digital transformation. We argued then that our aeronautical output should be **data-centric (like DVOF) and not product centric**. So, are we now eating a slice of humble pie? Not a bit of it! The fact that we have (at some not inconsiderable and incredibly commendable effort), dramatically increased the refresh rate of our ageing 50K product is in one sense, simply doing things the old-fashioned way, but very, very quickly! A bit like turbo charging a Morris Minor - it addresses the symptoms rather than fixing the cause. So, what we've achieved is the absolute best we can, given current real-world limitations.

In the same way that DVOF is a raw digital dataset whose attributes and metadata can intelligently and automatically be manipulated and interrogated, then so it should really be for all aspects of aeronautical information, including mapping. It's only in their original data formats that this incredibly rich and crucial information can ever be read by machine learning or analysed by artificial intelligence, and then be used and improved upon in innovative operational and safety enhancing ways that we haven't even thought of yet.

Yet no innovation is possible if the useful information is flattened into a dumb, un-editable scanned digital image of a paper map, regardless of the speed that we do it. Despite newspapers being able to be refreshed every single day (at similarly great effort), surely no-one would still argue that they're more accurate and useful than a live streaming news feed? While the new automated M726-AIR GB is undoubtedly a quantum leap forward in improving air safety today, despite a valiant reprieve, the days of the physical fully finished map product must surely be numbered?

That said, the current reality is that both DGC and No 1 AIDU are wedded to the legacy, product-centric technologies that are today employed by pretty much all Air (and Land) customers in a multitude of in-use and expensive to replace systems and platforms. **These legacy systems demand images of charts, rather than the actual information that is represented on those charts.** There's little point is us mapmakers producing exquisite and reprogrammable datasets that users simply don't have the ability to ingest. The required replacement capability of a truly digital, near-live, global military Aeronautical Information Service (AIS), and ultimately electronic Aeronautical Information Management (AIM), utilising vector, rather than rasterised mapping, remains only an aspiration. Completing a digital transformation will require that both data providers and users advance from dumb products to utilising an intelligent digital service - in the same way that the nautical world and commercial aviation has done for decades. Worth a read - The ICAO (International Civil Aviation Organization) has developed a roadmap to guide the transition from AIP (Aeronautical Information Publications) to AIM (Aeronautical Information Management). This transition aims to significantly enhance the management, exchange, and safety of aeronautical information.

Rapidly reconfiguring military cockpits is clearly not a practical option; however, the critical information could easily be made available to aircrew to access via carry-on solutions such as tablets loaded with suitable aero applications. Indeed, many units have already self-selected this solution through off the shelf local purchases, bypassing the lengthy procurement process to achieve quick and obvious air safety and operational wins. But here too there is no overarching pan-Defence policy to mandate or govern their use. It's extremely difficult for us to provision universal geospatial data products and services when each customer has employed their own bespoke mapping solution!

But let's end on a positive note. When our first articles were published back in 2021, the concept of military aeronautical information data-centricity was little more than a twinkle in our eyes. Today, the self-evident need for air information to be accurate, up to date, globally available and in digital data formats is slowly beginning to form into an almost universal front line requirement. The technology is not revolutionary, it already exists off the shelf, so demand the best, you deserve it!

For further information or to arrange a station visit and expanded presentation of the above and more, perhaps tailored to your units own individual role, please contact DGC via dvof@mod.gov.uk

AIP (Aeronautical Information Publication).
An AIP is a publication issued with the authority of a state. The AIP provides thorough details of regulations, procedures, and other relevant information for flying aircraft within a specific country.

AIS (Aeronautical Information Services).
AIS supports flight operations by disseminating static information publications such as the AIP, Notices to Airmen (NOTAM), and Pre-flight Information Briefings (PIB). It ensures the safe and efficient use of the aviation system by digitally disseminating essential aeronautical information. AIS is responsible for managing and distributing data related to air navigation, including NOTAMs and other critical updates.

AIM (Aeronautical Information Management).
AIM is the dynamic, semi-automated, integrated management of aeronautical information through the provision and exchange of quality-assured digital aeronautical data. It collaborates with all relevant parties to ensure accurate and up-to-date aeronautical information.

No 1 AIDU RAF Northolt, the new home of Task Team-7 at DGC in 2025

Doc's Corner:
Aircrew and Over-The-Counter Medications

By Wg Cdr Felicity Leaming, Command Flight Medical Officer

Image: CCO Commons-Pexels.com-pexels-pixabay-139398

There are many medications, treatments, and supplements available to treat a wide variety of conditions that are available over the counter in pharmacies, supermarkets and even online. Despite the guidance in RA 2135 and in AP1269a, it can be difficult to tell which medications are compatible with flying duties and when aircrew should consult their MAME (Military Aviation Medical Examiner) before using them. When does a topical treatment for hair loss become a treatment that needs discussed with a MAME? Should pilots speak to their MAME every time they take paracetamol for a mild headache?? This topic came up in a recently at a meeting in CAM and so I thought it might be time to discuss the topic in Air Clues.

In the UK, preparations marked as a "medication" need to be approved for use and granted a licence by the Medicines and Healthcare Products Regulatory Agency (MHRA). The company producing the medication must prove that it is effective and safe to use before it can be granted a licence and before doctors can prescribe it. Sometimes, if a medication is new or is being used in a trial to gather evidence of effectiveness, it may be used "off licence". For aircrew, we usually rely on medications which have been in use for a long time, and which have not been identified to cause problems, as very few medications are tested specifically for use in aircrew.

Some medications have a safety profile that means they are available for over the counter use (OTC) and don't need prescription or professional medical oversight, e.g. ibuprofen. Some other preparations are not classed as "medications" at all, and so don't need MHRA approval – examples of these include St John's Wort, echinacea and CBD oil. In these preparations, the preparation is also considered to have an acceptable safety profile for general use by the MHRA but may have variable levels of active ingredient and is not subject to the same approval processes as licenced medicines.

The MOD Standing Committee on Aircrew Medical Standards (SCAMS) and the Aviation Medicine Therapeutic Working Group (AMTWG) review current and new drugs on a regular basis, using evidence from such areas as the British National Formulary (BNF), Electronic Medical Compendiums (eMC) and receive guidance from specialists in pharmacology. The evidence is then kept for future review by the AMTWG Secretary. All approved drugs are reviewed on a 3-5 yearly basis to ensure that the most up-to-date advice is available to MAMEs. As explained above, because the effects on flight performance are not specifically tested for every medicine (which would be an impossible undertaking), a relatively cautious approach is taken in policy, especially for new or uncommon medications.

AP1269a provides the guidance to MAMEs below:

Reason for Treatment

- Acute conditions requiring short-term drug treatment will normally entail grounding until recovery has occurred and drug treatment has stopped.
- An adequate indication for long-term drug treatment must exist.

Drug Properties and Effects

- The drug must achieve the intended effect.
- The drug should be compatible with any other treatment. Some treatments will have a 1+1=3 effect and can exacerbate symptoms or add on symptoms.
- High doses of single drugs are associated with greater side effects; combinations of drugs in lower doses may be preferred.
- Sudden withdrawal of the drug, for whatever reason, should not be dangerous, nor should the treated condition be so inherently serious that stopping a medication results in deterioration.
- Drugs which cause, usually asymptomatic, long-term undesirable changes should be avoided where possible. Where such drugs are used, their long-term effects must be carefully monitored.
- The difference between therapeutic and toxic doses, the therapeutic ratio, should be large.
- New drugs should rarely be used. Use over a long period is necessary to ensure adequate information on suitability.

Control of Therapy

- Aircrew should be grounded for a period at the outset of treatment and remain grounded until no early side effects are seen. An arbitrary period of 4 weeks is usual, longer may be required, especially if increases in dose or additional drugs are required. However, in acute self-limiting cases where there is a need to complete a course of treatment after symptoms have subsided, a shorter trial period may be appropriate.
- The lowest possible dose of the drug should be used; healthy people are often highly sensitive to drugs, and traditional doses may be too high.
- Follow-up should continue indefinitely, or until treatment is completed.

Practical Considerations

- A simple drug regimen, ideally a single daily dose, will assist compliance. Operational requirements preclude complex regimens.
- The drug must be widely available, preferably world-wide.
- Of particular importance is the MAME's familiarity with the drug; use of a minimum list is advisable. A particular hazard is poly-pharmacy with novel drugs, instituted by specialist centres unaware of the circumstances of aviation.

As you can see, even simple medications for common conditions can be difficult to navigate for MAMEs! OTC medications considered entirely acceptable for some everyday activities can cause flight safety issues and need to be carefully managed. Early discussion and oversight from a MAME can help both manage the condition and ensure flight safety.

MAMEs need to ensure that the medication is compatible with all relevant types of flight and also safe for duties overseas. Sometimes, full flying duties may be permitted

when using a medication but the medication is not compatible with use in an austere deployment – for example, a compound that needs frequent blood level monitoring or temperature control. This would be reflected via the Medical Employment Standard.

Some quite common medications are acceptable for short term use but may in the longer term hide a medical issue that needs to be addressed. For example, taking ibuprofen for back pain for 4 weeks might prevent a more appropriate and effective treatment (such as physiotherapy) from being identified as a requirement. Any distracting illness or issue should result in aircrew self-declaring that they are unfit to fly. For this reason, your MAME is keen to discuss any medication use.

Services in some other nations, such as the Royal Netherlands Air Force, have a list of drugs that aircrew can take without discussing with their aviation medicine examiner. This is only allowed for short periods of time but does allow flexibility for aircrew. AMTWG are looking at whether this might be permissible for UK MOD aircrew. As you can imagine, the diverse roles for our aircrew both at home and on operations mean that this may take some time!

Case History:
A case was reported to the British Medical Journal in 2015 where a young male pilot in his 20s developed fainting episodes after using high dose topical minoxidil (Regaine) for male pattern baldness which he bought over the counter. He was fit and well and using the gym several times a week. He noticed he had begun to feel generally tired and weak, and he had fainted twice. His medical investigations showed a low blood pressure but nothing else. On further questioning he mentioned that his symptoms had started when he began the treatment. Once he stopped the treatment his symptoms resolved.

The above case history shows that even treatments which may not be marketed as medication and do not require prescription can cause symptoms which would affect flight safety. Viagra (sildenafil) can cause changes to colour perception which get worse with long term use. Some medications for cold and flu contain sedating anti-histamines to help with sleep, which can cause drowsiness for several hours after they are taken.

The bottom line is that any medication may cause problems for aircrew, whether available by prescription or not. If you need a medication or treatment for any condition, please discuss it with your MAME so we can make sure you get the best option for your condition that still allows you to do your job safely.

AirClues

Just Culture,
Beyond the Defence Aviation FAiR II Tool

By Pete Hibbert, MOD STEP Programme Manager, Baines Simmons

In 1997, Professor James Reason, creator of the Swiss cheese safety theory model, put forward the idea of a Just Culture. His theory was that if an organisation is 'Just' with how it treats its people, it would naturally create a reporting culture as people within would feel able to report safety incidents; learning would occur, and improvements would be made.

UK military aviation has been fostering, in some areas more successfully than others, a Just Culture since 2009, and through human factors and safety training, everyone in military aviation should know about it. However, in this article I'm going to expand on what a Just Culture truly is, or at least what it should be.

Humans like to blame. It's easy to do, it makes us feel superior and we even have biases that mean we like to link someone's observable behaviour and actions to their character, normally in a critical manner. This means that blame is often how we respond to human failings, it's how we treat each other, and unfortunately from an early age it's often how we expect to be treated. This means that for humans 'blame is such a delicious emotion[1] .

Dr David Marx said, *'In sport, if someone makes an error they are often punished. This can lead to losing the match, race or game, and yet in life, do we expect the person that makes the error to lose the game? Blame is even present in our laws which can mean that error is a punishable offence. So, what should the framework of justice look like when we are asked to stand in judgment against our fellow human beings?* [2]

You have a framework, the Defence Aviation (DA) Flowchart Analysis of Investigation Results (FAiR) II tool, and surely that takes care of your Just Culture, doesn't it? DA FAiR II certainly does help at the organisational level, but it does nothing to support a Just Culture at the personal, day-to-day, interaction level. According to the Office of National Statistics, in the UK you have, approximately, a 1 in 300 chance of dying from an avoidable, treatable, or preventable cause before you reach the age of 74[3]. So, what has this got to do with blame and a Just Culture?

You may have heard the story of Elaine Bromiley, late wife of Martin Bromiley OBE. They are often mentioned in safety training and the story is widely shared on social media.

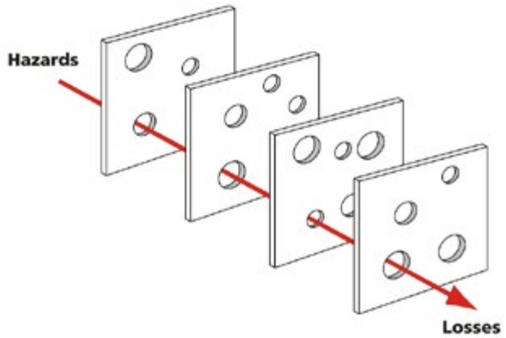


Image: Wiki Commons Davidmack, CC By-SA 3.0

Elaine was tragically killed whilst undergoing routine surgery in an NHS hospital. Whilst being attended to by a highly competent medical team in a modern, well-equipped hospital, she died, because of a simple error. Yet, Martin didn't want anyone to be blamed. In fact, he wanted the individuals that made the error to continue their careers as medical practitioners, without any blemish on their records. Why? Because they were the ones who would never do it again; they were the ones who would educate others[4].

I wonder how many of us would be able to support a Just Culture to that same extent. I very nearly found out for myself a few years ago when my father was in hospital in Cheshire. He'd been quite poorly but he was getting better, the doctors had even started to talk about discharging him. I was working at Baines Simmons's old offices near Woking when my sister called me and said, '*Get here now if you want to say goodbye to Dad.*' As I started thinking about the 4-hour drive and how I wouldn't make it in time, she said, 'Hang on, there's a doctor waving his arms at me. I'll call you back in a minute.'

Five minutes later, she did indeed call back. I was expecting the worst but to my surprise she said, *'Don't worry, he's going to be fine.*' At this point, I was a little confused as within a few minutes it had gone from Dad's dying to everything's okay.

A little further into the conversation I discovered that the reason my 80-year-old father had gone from a steady recovery to asking for his mother was as the result of an accidental 10x drug overdose and, now this was known, the doctors concluded that he would be fine with treatment to

counter the drug. The next thing my sister said was, 'When the doctor told us about the drug overdose, he handed me some paperwork explaining how to sue the NHS. What do you think we should do?'

Thankfully, just as I was starting to think about how that money could be spent, my brother-in-law, who just happens to be in the RAF and has completed human factor training, shouted down the phone *'Just Culture, Pete, Just Culture.*' And he was absolutely right; a nurse had made a genuine error; they hadn't deliberately administered an overdose. We did not sue but, to this day, I wonder if that error had killed my father, would I have been strong enough, like Martin Bromiley, not to sue? Would my respect and understanding of what a Just Culture really is have stood the test? I can't be certain, but I hope it would have.

Within the NHS, there have been many incidents of accidental drug overdoses. At www.civilitysaveslives.com, Dr Chris Turner recalls one such event where a little girl was given a 40x drug overdose of the very toxic drug, Aminophylline. Thankfully, she survived, and the NHS launched an investigation which concluded that the nurses administering the drug had not been competent and that they should be sent for some extra training. But that wasn't the whole story; the investigation missed something. As the nurses were preparing to administer the drug, they twice asked the attending paediatric doctor about the correct dosage and twice they were snapped at, *'For God's sake leave me alone, can't you see that I'm busy?'*

Many studies have now been carried out into team working dynamics and they found that in normally high performing teams, one factor alone was responsible for 40% to 60% of performance degradation. That factor is incivility or plain old rudeness. These studies concluded that the single most important factor determining the performance of competent teams is how they treat their teammates.

If you've ever been shouted at or insulted at work, you may have experienced feeling ashamed, belittled or humiliated. That feeling can slowly turn to anger and eventually you shout, *'How dare you?! How dare you insult me?'* Fortunately, this is normally only in our heads.

The RAF employs competent, knowledgeable, and diligent professionals. On a good day, most of you can deal with around 5 to 7 things at once. However, add in a family issue, preparing for the upcoming deployment or exercise, getting hassled to book on a STEP course, and those 5 to 7 things quickly become a max. capacity of 3 or 4. Then add in what happens when someone humiliates us and our bandwidth reduces our ability down to only being able to think about 'that' incident. We carry the comments with us all day until we either reach the moment when we finally put it at the back of our minds, or we make an error.

We have also seen that this does not have to happen to you for you to be affected. We know that the way someone has treated the last person is likely to be the way they treat the next, and witnesses to mistreatment suffer a performance loss of 20% and are 50% less likely to help colleagues.

So, what has this got to do with Just Culture. I would argue that it is very much part of it. A Just Culture of understanding and tolerance isn't something that only kicks in after an event, it should be all around us all the time. We talk about Human Factors and Human Performance and if we want the best of the latter, we have to support people and not belittle them.

During my time working as a liney, I remember seeing an aircraft that had returned from a navigator training sortie. Out of the front seat came the instructor; struggling to get out of the back seat was a young nav student who looked like they'd had a pretty torrid time. Before the student had even unstrapped, the instructor said loudly, 'Come on Marco Polo!' He then came down the steps to talk to me. After a quick greeting, the instructor looked back up at the student, still trying to extract themselves from the cockpit before turning back to me and saying very loudly, to ensure that the true recipient of the message would hear, 'This idiot just had us over uncharted territory.' Considering we were in the UK, I thought that was quite an impressive feat in a Hawk. I looked at the fumbling, poor young nav student and I laughed.

Even though that event was over 20 years ago, I remember it clearly, only I now think about what those comments, along with my laughter, may have done to that nav student. What frame of mind were they in for planning and flying their next sortie a few hours later? It is quite feasible that because they'd just had a bad trip, that the next sortie would be a pass / fail check-ride with the boss. At the time I thought the comment was meant in jest, and perhaps it was but, in

reality, it was nothing but blame. I don't know what happened to that student, maybe they've risen through the ranks and are reading this article. Wherever they are, I am sorry.

Some may say it's only banter (catch me in a bar sometime because I'm always up for a bit of banter), but there is a time and a place for it. Some may say that educating people about incivility is akin to 'let's all hug each other' nonsense. Well, on this issue, healthcare is showing aviation that to get individuals, and teams, performing at their peak, we have to behave in ways that respect and value each other.

Also, take a look at your unit and consider that underreporting is a common issue in various high reliability areas, such as healthcare, energy supply, and aviation. It has been shown that the extent of underreporting often depends on the severity of the underreported events.

When delivering safety training out and about on units, my colleagues and I often come across a perception that Just Culture is simply about how someone would be treated after an event, we've heard comments such as *'We have a Just Culture because we have the FAiR system.'* But the mere use of the FAiR system alone does not define a Just Culture. I would argue that you do not have a Just Culture unless people can hold their hands up and say something like 'I'm having to break the rules to complete our tasking' (which we know happens on every unit every day), safe in the knowledge that they will be treated fairly no matter who they are.

I'm sure many of us will openly espouse a Just Culture, yet 'verbal leakage' in our every day, unguarded language often demonstrates a disjoint in our underlying beliefs… *'Who did that?', 'Which idiot screwed up this time?', 'Why won't they just follow the procedures?'* Comments and even thoughts like this demonstrate that we are personally struggling to be 'just'.

There is a famous Latin quote often used in human factors training to describe human error, 'Errarehumanum est' – s'Errors are part of being human' or 'To err is human.' The second part of the quote is not often used, - 'Perseverare autem diabolicum.' In full, 'Errarehumanum est, perseverare autem diabolicum' – 'Errors are part of being human, but to persist is diabolical.' That saying is just as true today; humans make errors and continue to make the same errors. If we are to truly learn from our errors and not repeat them, we need a robust reporting culture underpinning a robust Just Culture.

I will finish with this from the International Civil Aviation Organisation (ICAO), *'The application of a Just Culture should be subject to audit, with the failure to establish a Just Culture to be treated as a finding '* [5] and reiterate that having an effective Just Culture ensures that valuable information about potential risks and vulnerabilities is brought to the attention of the organisation. But it is more than just how the Occurrence Review Group or duty holder apportions blame when things have gone wrong.

An effective Just Culture should extend into our day-to-day personal interactions to enable things to go right, so it's also a supporting culture facilitating human performance.

The easiest, and by far the best, way to think about a Just Culture is as a trust culture, in which we should be able to trust that we will treat each other fairly, be that as an individual or as an organisation.

Peter Hibbert is the STEP Programme Manager for Baines Simmons and has written several articles for *Air Clues*.

1 Professor James Reason
2 David Marx, Whack.a.Mole
3 ONS - Avoidable mortality in Great Britain Statistical bulletins
4 Martin Bromiley talking about a Just Culture - https://www.youtube.com/watch?v=JzIvgtPIof4
5 ICAO Assembly – Technical Commission. 39th Session. Improving Just Culture.

Are Air Loadmasters Reluctant to Report?

By MACr Jason Howard

I am a Fixed Wing Air Loadmaster (WSOp (ME) ALM) and have had the honour and privilege of both operating the Hercules C-130J and being one of the last STANEVAL ALMs on an aircraft with a distinguished and celebrated service. As a young inexperienced ALM on one multi-sector task in around 2008, I had an aircraft prepared for despatch that was out of trim (identified and corrected), flew with an incorrect weight & balance (albeit in trim) on another leg and in subsequently correcting that, an entire aircraft load shift (circa 8000kg) when all the restraint locks were removed without direction; catastrophic injury and the aircraft tipping narrowly avoided by a stray pallet D ring halting the movement. None of these occurrences were reported by DASOR, it wasn't the done thing for ALMs at the time, which has always sat wrongly with me.

Could it be possible that ALMs today are still reluctant to report such things, where no damage or injury occurs? Possibly due to fear of repercussions or embarrassment, perhaps a degree of groupthink following discussion with those involved, or perhaps the rest of the crew.

Could it also have something to do with perception, image, and cross-trade diplomacy? It makes me wonder; how often are reportable occurrences overlooked? I propose what is reported may be the tip of the metaphorical iceberg.

I will admit, my suspicion on the low levels of reporting was largely based on crew room chatter and the odd confession of an occurrence being vented, often considerable time after the event. On more than a few occasions after an incident, I would hear about others who had experienced similar but near misses. In either case when challenged whether they reported would often get the response *"I probably should have"* or *"I sorted it informally with [insert trade supervisor title here]".* The frequency of these conversations versus the number of reports submitted has always felt at odds.

In order to validate my conjecture, I turned to ASIMs. Initially focussing on the C-130J, I discovered the first C-130J report submitted was in 1999, likely transposed from ASIMs predecessor 'Flight Safety Signals'. A total of 6443 submitted during its service. However, it took a few upgrades for ASIMs to start recording reportee roles (c.2009) and rank (c.2010).

From the point role and rank details could be analysed, the first non-commissioned aircrew report was submitted in Jul 2011 *(asor\Brize Norton - RAF\30 Sqn\Hercules\11\5355-Unsatisfactory restraint of 500lb bomb racks under a 4535KG net on aircraft pallets)*. I was a little shocked to discover it was written by me, 4 years after I joined the fleet, and the only ALM report out of 401 aircrew reports during 2010/11!

That report was of the second identical occurrence I had experienced in as many months. Bear in mind that the type of load involved was being carried daily during OP ELLAMY and this report came towards the latter end (resulting in a change to the restraint method). How many others had witnessed the issue and not reported it? Or worse still, not even noticed!

More surprise followed, when my analysis deduced that nearly 10% of the 224 C-130J ALM reports from 2010-OSD in July 2023, were submitted by me (C-130 ALM numbers reduced as aircraft numbers reduced from 25 to 14 C-130Js prior to OSD. The ratio was generally 2.5:1 crew to aircraft so ~63 reducing to ~35 ALMs). Given that I had a relatively modest 3600 hours on type over 16 years, either I have been seriously unlucky, or something was being missed.

Expanding the analysis slightly I compared C-17 reporting over the same period, with very similar results. In 2023, C-17/C-130 ALM reporting accounted for approximately 9% of all aircrew submitted reports. This did not seem as bad as I

thought, until I reviewed the whole of the Air Mobility Fleet, to discover the fleetwide average of non-commissioned aircrew (NCA) reporting since 2019 has sat above 20%, and Chinook Crewman have been above 19% since 2013!

Somewhat reassuringly, the Atlas Fce may be bucking the ALM reporting trend, having submitted over 25% of reports since 2019. Perhaps the culture is shifting, and I would not be disappointed to see this article age badly!

ALMs in many cases are the final barrier to a 'Top Event' in bowtie speak, representing the loss of control over the hazard. Generally speaking, prior to the ALM conducting their duties others have completed the same or similar processes; sometimes in duplicate/triplicate. The people conducting earlier processes may have made decisions that the ALM/

Crew subsequently deem unacceptable, hopefully for valid reasons. Meaning whenever the ALM identifies or addresses a fault it is inherently a criticism to an individual or entire cadre's performance or underpinning process. ALMs see hazard observations as part and parcel of the job, a routine occurrence that is managed on a daily basis. Arguably identifying anomalies is the norm for an ALM.

I like to think an ALM would aim to resolve any issues in the most efficient manner possible and having done so, considers that having eliminated the problems they have performed their function in the chain and therefore no flight safety risk to life exists. But this does not recognise that the top event was, in many cases, only one barrier away from being realised. In my time in STANEVAL, the vast majority of reports featuring an ALM were either a technical failure or when they, as the final in a chain of barriers, have failed to prevent a top event. Be it damage to an AS or the carriage of undeclared DG. But how many times has the ALM barrier been struck before an incident slipped by? It is impossible to know!

So why might ALMs still not be routinely reporting hazard observations?

As alluded to, for an ALM to report a hazard observation they must essentially criticise. Their checks often being a duplicate, making many faults found the result of a human factor. Either a process is inadequate, or another person has *potentially* failed to adequately perform their duties, representing a weak barrier.

To criticise is controversial, particularly when it is across specialisations. Whether that is Pilots, Engineers, Safety Equippers, Caterers, Air Despatchers or Movers or anyone else involved in aviation. Nobody likes to be criticised, particularly by a different profession declaring "I'm going to DASOR you for that!" and reporting in this instance is clearly one-sided.

Unless an ALM goes to the effort of researching an issue in depth themselves, which is highly impractical, there will always be a side that is unknown. Ignorance of which is considered an affront to those 'in the know'. Therefore as soon as one side is reported a lack of awareness of the 'big picture' is seen as a defence to diminish a reports validity entirely, rather than an opportunity to educate in all directions.

In an effort to avoid the above, ALMs have been encouraged to be collaborative in reporting, obtaining a narrative from all involved. This is done extremely effectively in most para incidents but can be challenging and time consuming, delaying reporting, with a loss of momentum and motivation to report at all. Where collaboration is unachievable, there is an inclination to avoid reporting due to not having all the facts, rather than report and allow the omissions to be discovered by investigation.

Infrequent reporting of regular occurrences risks a situation where ALM reports may be seen as a unique, novel, or an impassionate reaction to a grievance or frustration. But the reality is they should probably be as regular and normal as loose articles or FOD. Unfortunately, unlike loose articles or FOD, it is usually much easier for the ALM's intervention to be attributed to a person and felt as a personal attack.

Another factor may simply be not knowing what type of report to submit. I try not to overthink which type of report to submit. Whether it be it ASIMs/FSIMs/RIDDOR/INFORM etc, although probably not official advice, use the system most accessible to you and let the safety professionals reallocate as required.

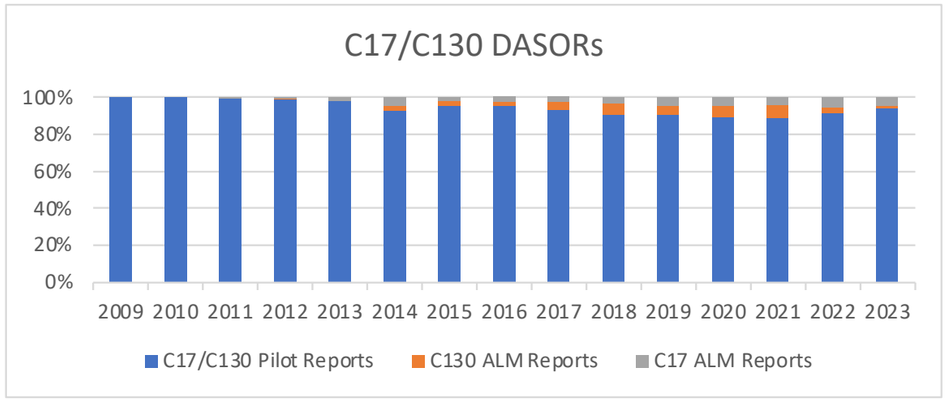
So why don't ALMs report? Well, to report is to criticise and to criticise is to offend, and God forbid we offend anyone in this day and age! Even if the intention is raising awareness and avoid a Top Event.

What can be done about it?

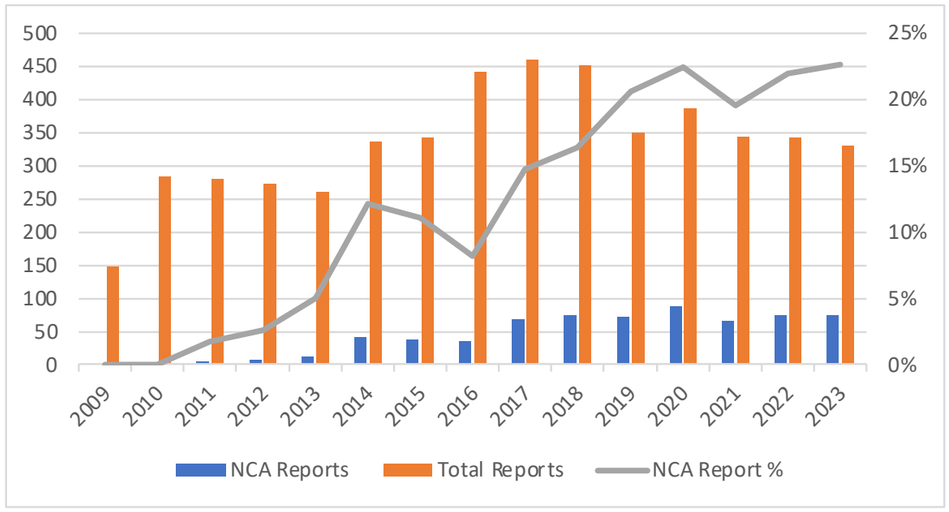
Somehow, as an organisation we need to learn to take the narrative with a pinch of salt, they are personal and flawed. Narratives are limited in scope to an individual perspective and may be written whilst fatigued and frustrated, or written when rested, with memories faded and pertinent information overlooked. In Human Factors terms, cognitive filters of deletions, distortions and generalisations have a greater effect the longer the delay. This does not invalidate the submission but should encourage healthy discussion and robust investigation. As an organisation that encourages appropriate challenge, only once we manage to resist offence and outrage will a truly engaged air safety culture emerge.

It is important to see the wood for the trees. What has led to the reportee being in a situation that felt abnormal? What the reportee may see as the hazard may have been a symptom of other elements which may also be worthy of review, which could go back as far as to when the task was first conceived or even to the reportee's training and exposure.

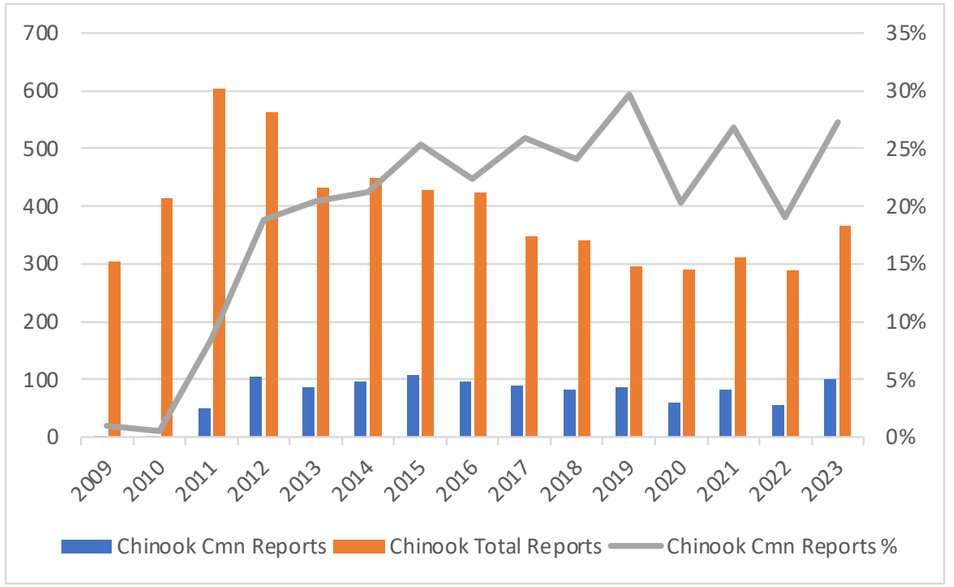
Better reinforcement on what must be reported is essential. Engineers are good at this, not a day goes by that we don't see a report of missing component, omitted process, signature, or loose article check. Did that missing signature affect the safety of a flight? Probably not. Do I want to be the one to be at the wrong end when it does? Absolutely not!



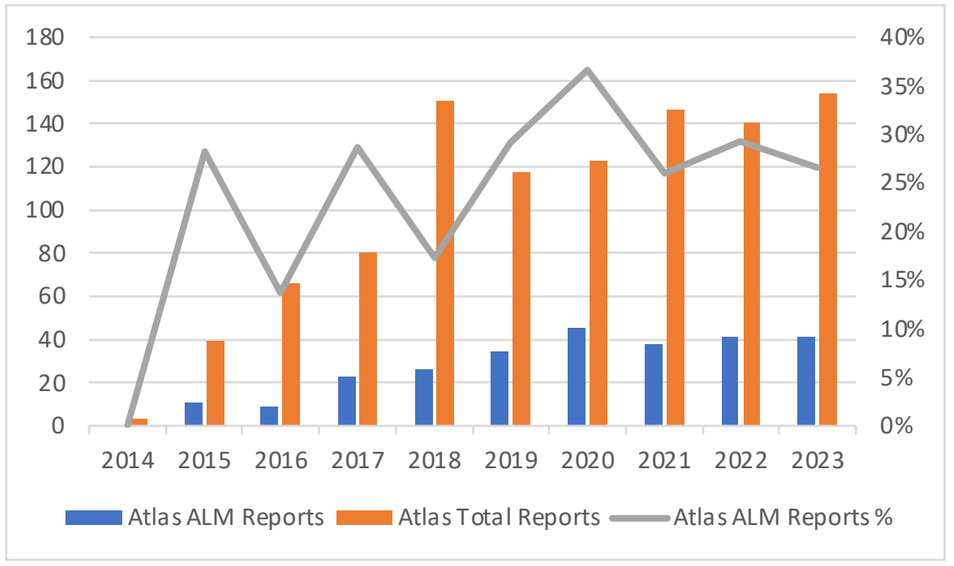
Total C-17/C-130 DASORs submitted by Aircrew highlighting NCA contribution



NCA Reports across the Air Mobility Fleet



Chinook Crewman Reports



NCA Reports across the Air Mobility Fleet

What should be reported?

Hopefully by now, everyone involved in aviation is aware of the mandated reports of RA1410 (Occurrence Reporting and Management), but in the context of this article it is worth considering those which may be particularly pertinent to Loadmasters.

- Errors that significantly reduce the levels of safety normally expected.
- Occurrences involving a serious increase in workload which correspondingly reduces safety margins due to fatigue; this includes cumulative fatigue.
- Damage to an Air System sustained during any activity whilst on the ground occurring outside the period of operation of the Aircraft.
- Occurrences involving Foreign Object Debris or loose articles either in or on an Air System and whether or not any damage results.
- Releasing an Air System to service from Maintenance in which the material state endangers flight safety.
- Occurrences that represent an actual or potential Flight Safety Hazard.

- Any item that becomes detached from or falls from an Aircraft. [unintentionally]
- When an individual during Air System operations has been adversely affected by injury; incapacitated due to illness, the use of drugs or alcohol; or affected by noxious fumes or food poisoning. This includes Aircrew or support personnel who, for any reason, are required to report to a medical officer after an Incident.
- Equipment failure or deficiencies causing significant concern to the user.

There are however some other orders that mandate the submission of an occurrence report.

- Suspected and confirmed cases of climatic injuries must be reported and investigated iaw JSP 375
- The Dangerous Goods Manual requires reporting of all incidents, accidents and near misses that occur during the carriage of DG. This includes incidents involving; undeclared DG in freight, baggage or hand luggage, or when a consignor, carrier or consignee has failed to meet with regulatory requirements in any respect.
- Additionally, there are some Duty Holder orders that also mandate reporting for specific activity i.e. unplanned EROs.

The list of reportable occurrences is fairly broad and could reasonably cover anything that did not run as expected e.g. leading to an increased workload/distraction, foreign equipment that did not feel fit for purpose, the possibilities are endless. My best advice would be to simply consider,

- Was it normal?
- How would I feel if I had an incident where a colleague had previously observed the hazard but failed to report? Or vice versa!

Some may consider this to be excessive, but I personally would rather see a thousand minor reports that led to nothing but raise awareness, that a single report that has come too late.

Spry's Comment:

This is an open, honest, and detailed article highlighting the issue of reporting; something the Flight Safety Team review on a regular basis. Reporting culture is critical in any safety management system. It is certainly true that many occurrences were not reported before the MAA's inception. There are things that those in the Safety Hierarchy are aware of, but we know much isn't being reported. It all comes downs to a few main requirements:

- Trust in the system – a 'just safety culture'; one that does not apportion blame or use a 'long screwdriver'. This is something that will be lost in an instant. There are myriad examples of trust in the system being lost due to an ill-timed comment.
- Change. An ability for the system to do something about the occurrence itself i.e. suitable investigation and recommendations.
- Accessibility. A system that is easy to use and readily available. Something that wasn't always the case, especially on our more tactical aircraft like the C-130J and Chinook.
- A Feedback Loop. Without this, reports simply get lost in the ether of ASIMS. Letting the person know what actions have been taken to mitigate future occurrences is one of most important steps. We need to be better in this area.

Flying hours have reduced significantly in the last 20 years. In 2000, the flying hours for the RAF was approximately 350,000. In 2023 this had reduced to 133,500! However, the data presented in this article is valid because it uses a rate of ALM reporting. It's great to see the situation may have improved. Let's hope this continues.

There is a unique dynamic for the ALM cadre. They interface with various external agencies; therefore, there perhaps should be more reporting in this area. We would like to see more of the Human Performance-related DASORs e.g. tiredness, distraction etc. Many of these aircrew arrive for work 3-5 hours before take-off so are more exposed to these kinds of issues.

In April 2013, a Boeing 747-400 aircraft crashed moments after take-off out of Bagram Airfield in Afghanistan. This is a famous accident where 7 people unfortunately lost their lives. Effectively, the 80 tonnes of freight had not been secured properly. We will never know how many times a minor shift in load had occurred previously or whether there was a reporting culture issue within that airline. In our view, if there is a doubt about whether to report, there is no doubt. Simply report by In-Form or DASOR and let the occurrence managers deal with the administration part; that's their job.

Please continue to report. We need the evidence to make any necessary changes and improve the system; perhaps save a life. We may never know we have saved a life, but that's the beauty of aviation safety. ■

Volunteer Reporting Systems

By Dr Robert (Bob) Baron - President/CEO The Aviation Consulting Group, LLC.

The benefit of a Voluntary Reporting System (VRS) is fairly obvious; if hazards and errors are reported, then risk controls can be put into place to mitigate future occurrences. This in turn creates a safer working environment, reduced exposure to litigation, as well as a more profitable organization. A VRS is an important element of a safety management system (SMS). However, since an SMS is not mandatory for all operators (at the current time), some organizations have not espoused the benefits of a VRS.

The Heinrich Ratio states that, for every fatal accident, there will be three to five nonfatal accidents and 10 to15 incidents; but there will also be hundreds of unreported occurrences. Unreported occurrences are extremely problematic since no risk controls can be deployed if nobody knows these occurrences exist. However, the resistance encountered in implementing an effective VRS generally stems from employees' fear of retribution or punishment for disclosing such information. From a personal standpoint, employees may understand the advantages of voluntary safety reporting, but in practical terms, they may also feel that the potential punitive implications for reporting hazards and errors far outweigh the advantages.

The foundation for a successful VRS is a Just Culture. A Just Culture is a culture that acknowledges that well-intentioned people still make mistakes, and they should not be punished for the errors they never intended to commit. Yet, a line is still drawn where wilful violations and purposeful unsafe acts will still be addressed by punitive measures. The general indications are that only around 10 percent of actions contributing to bad events are judged as culpable (Reason, 2004, as cited in Global Aviation Information Network, 2004, p. vi). A Just Culture includes trust. Employees must know that they can report without sanction. Once this trust is established, then an organization can have a reporting culture, something that provides the system with an accessible memory, which, in turn, is the essential underpinning to a learning culture (p. vi).

Along the same lines, Eiff (1999) suggests that, "An effective and systematic reporting system is the keystone to identifying the weakness and vulnerability of safety management before an accident occurs. The willingness and ability of an organization to proactively learn and adapt its operations based on incidents and near misses before an accident occurs is critical to improving safety."

Are you ready to start your VRS? If so, there are a number of steps that you will need to take in order to get your basic VRS up and running. These steps include:

Promotion and Buy In: You will need to communicate why a VRS is going to be established within your organization. Upper-level buy-in is a must. In fact, those people within the highest positions of the company should make it clear (as in your company's signed Safety Policy) that the VRS is non-punitive and has the complete support of management.

A VRS Department: Depending on the size of your organization, you may need to create a VRS department,

which should be part of your SMS, if one exists. Larger organizations might want to create a dedicated position for the VRS, but smaller organizations may do well by delegating the VRS functions to a safety manager or someone else in a safety position.

Data Collection: You will need to determine what type of data collection form will be used. In some cases, you may want to develop your own form based on your organization's specific requirements and profile. The form should have both paper and online submittal options for employees. Once the form has been developed, you should determine and convey reporting thresholds to employees. In other words, what is reportable? You probably don't want to hear about someone breaking a latch on their lunchbox, but you most certainly would want to hear about a string of similar errors that employees are making while operating a drill press. Remember that these are voluntary, not mandatory, reports (they are not required to be submitted).

Database: You will need to develop a VRS database. For smaller organizations, the database can be fairly simple and created with programs such as Microsoft Excel®. However, larger organizations may require more powerful software that can be custom designed for your specific needs. The importance of a good database cannot be overemphasized since this will provide you with search ability, trending analysis, and graphics that will help tremendously with your data analysis. A good SMS software program will have customizable VRS functionality built right in.

Investigations: In addition to maintaining the VRS database, the person in charge of the VRS may also be responsible for event investigations, which may be delegated to other trained individuals. It should be noted that investigations in this context are conducted not to assign blame or punish employees, but rather to determine why an event occurred, so that the same type of event does not happen again in the future. Remember, this is all part of a Just Culture.

Employee Feedback: Provide feedback to employees. This is one of the most important parts of the VRS and yet many organizations stop short at this stage. The concept is very simple; take all of the information that is obtained through the collection and investigation of reports and then let your employees know what is being done. For certain reasons, many organizations seem to overlook or omit this important part of the VRS. It's all about transparency. In order to gain credibility, buy- in, and show genuine concern, the safety team must offer feedback to employees on a consistent basis. And it all starts with a simple, "Thank you for submitting your report." After that, feedback can come in many forms. Some methods for presenting feedback include safety meetings, bulletin board announcements, emails, monthly newsletters, or a combination of these. The point is that feedback lets employees know that the reports they are taking time to submit are actually being addressed and acted upon. This goes a long way in the preservation of an effective VRS. Voluntary reporting will stop if nothing is being done to address issues and/or there is little or no feedback in the process. I can guarantee you that.

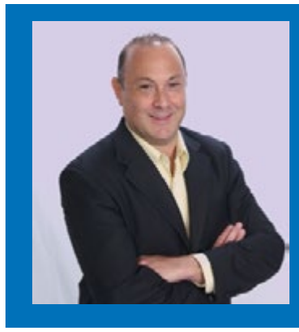
In summary, a VRS is a very effective way to know 'what's going on below the waterline' in order for the organization to act proactively. If these events rise to the surface, they can become incidents or accidents, and then the organization must act reactively, usually in a knee-jerk fashion.

Remember that a Just Culture includes a formal VRS. The purpose of a VRS is not to punish, but instead, to promote a culture of learning and continuous improvement by surfacing the otherwise unknown things that could precipitate a very expensive safety lesson.

References

Eiff, G. (1999). Organizational safety culture. Proceedings of the 10th International Symposium on Aviation Psychology (pp. 1-14). Columbus, OH: Department of Aviation.

Global Aviation Information Network. (2004, September). A roadmap to a just culture: Enhancing the safety environment.



Dr. Bob Baron conducts aviation safety training, consulting, and program implementation for aviation operators on a global basis. Sensitive and knowledgeable about various cultures, Dr. Baron uses his 36+ years of academic and practical experience to assist aviation organizations in their pursuit of safety and quality excellence. He has extensive experience working with developing nations and island countries. He also provides training and consulting to some of the largest airlines and aircraft manufacturers in the world, as well as civil aviation authorities and accident investigation bureaus.

Physical Training Whilst Sick

By the RAF Safety Centre

In recent months, the RAF has intensified its focus on ensuring the safety and well-being of personnel during physical training activities. A key aspect of this initiative is the requirement for individuals who are feeling unwell or experiencing symptoms of illness to report to PEd/medical staff before engaging in any form of physical training.

When you are sick, it can be important to recover quickly, but you might also find yourself with a dilemma about your physical training schedule. You might be wondering if it is ok to power through or take a few days off.

In a recent Service Inquiry into the death of a Service Person, the investigation noted that the individual was conducting physical training whilst ill, and that this might have been a contributory factor. If they had raised the illness to PEd staff or seen a doctor first, it is possible there could have been a different outcome. This prompted us to discuss the whole subject. In this issue of Air Clues, we will debunk some common myths and provide you with the tools to ensure you are getting the most out of your physical training.

Here are some quite common Myths you should always avoid whilst you are sick.

- You should always push through your illness.
- You can sweat out a cold.
- Illness doesn't affect athletic performance.
- Cardio is always safe when sick.
- Hydration and nutrition can counteract illness.

These myths are just that, myths, and following these misconceptions could really put your health and fitness at risk. By training whilst sick you can exacerbate your illness and prolong your recovery.

Ensuring the safety and wellbeing of SP is paramount to Defence, especially when it comes to training during illness. Symptoms such as fever, vomiting, diarrhoea or a productive cough are particularly important not to ignore. They all suggest your body is busy fighting off infection and would benefit from a rest. Personnel are encouraged to use self-certification or opt-out policies for minor illnesses where there

is a genuine risk from exercising whilst unwell. PEd staff are there to help, and if in doubt raise your concern to staff for advice. Personnel should report to medical services if you are concerned about your illness and ability to undertake physical training, the med centre will see you if you have prolonged or unusual symptoms, broader medical concerns, repeatedly need to self-declare unfit or in the rare circumstances when exercise is both genuinely required and time sensitive.

Our advice is **ALWAYS RAISE YOUR CONCERN TO PED STAFF OR A MEDICAL PROFESSIONAL FIRST**. You can always ask for a telephone conversation to take advice.

Apart from the fact that you might spread your illness to others, there are some instances where exercise can seriously affect your recovery, or worse. Working out while you're feverish increases the risk of dehydration and can make your symptoms and fever worse. Increasing the stress on your body when it is already fighting off infection can put unnecessary strain on your heart and kidneys etc and can have serious implications for your health. Additionally, having a fever decreases muscle strength and endurance and impairs precision and coordination, increasing the risk of injury. You can always recover from lost exercise, but you might not recover from the damage that exercising whilst sick might do.

If you find yourself in a situation where your training is 'on the clock', such as RAFFT remedial training, please do not be tempted to continue because of the perceived repercussions – you must speak to PED staff or a doctor – they have the power to take this pressure off you. It is the same for basic or group training, which has even more likelihood of extreme exertion. Look after your mates too, just as you would when monitoring them for heat exhaustion. If they talk about being ill but wanting to *'get on with it'*, persuade them to report or have the courage to tell the staff yourself.

For others, who have a target goal in mind, taking a few days off won't impact your fitness level. In fact — as any top athlete with tell you — good exercise routines build in opportunities to rest and recover. So do this whilst you are sick and speak to a medical professional at the same time to see when it might be safe to return to your schedule. If not, you could risk **Exertional Collapse** and that's when things can get really serious.

Exertional Collapse
Exertional Collapse refers to the sudden loss of control or consciousness occurring during or immediately following physical exertion. It often results from a combination of factors such as dehydration, heat stress, overexertion, illness, and cardiovascular issues. An individual who is poorly performing or demonstrates distress during, or immediately after physical exercise, may be at risk of exertional collapse, and potentially even death. Prompt recognition and appropriate management are crucial for ensuring safety and preventing further complications and must be recognised early to enable timely intervention.

Understanding Exertional Collapse
Duty of Care: All instructors, Commanders, and leaders must understand and mitigate the risks associated with Exertional Collapse. Exertional Collapse can occur in military and civilian settings due to various factors and it is important to recognise the signs in yourself and others. Within the military we all have a duty of care for those above, below, and around us to ensure we are looking after the welfare and protect the health and lives of our fellow service personnel.

Recognising Early Signs: It is important to recognise the early signs of exertional collapse to prevent severe complications during physical training. For military personnel, recognising the early signs of exertional collapse is crucial due to the high, physical demands of training and operations. Individuals showing poor performance or distress during or after exercise may be at risk. Early identification helps prevent serious health issues such as heat related illnesses, and dehydration which can impair performance, compromise mission effectiveness, and potentially lead to life threatening conditions. Timely intervention ensures safety and readiness, which maintains operational efficiency.

Always prioritise our personnel and if required immediate cessation of the activity for all participants is essential to prioritise treating the individual.

Risk Factors for Exertional Collapse. There are many risk factors that can impact and increase the likelihood of exertional collapse here are some of the major ones to look out for in your self and others.

Personal Risk Factors:
- Dehydration
- Recent/current illness (fever)
- Recent vaccination (within 24 hours)

- Poor fitness levels
- Excess body fat
- Prior poor fitness test performance
- Prior collapse during exercise
- Accumulated fatigue
- Underlying cardiac conditions
- Asthma
- Sickle Cell Trait (SCT)

Environmental and External Risk Factors. It is also important to note the environmental conditions as well as a person's individual risk factors. Some examples are:
- Lack of acclimatisation (heat, cold, altitude)
- High ambient temperature, humidity, and cold weather
- Certain medications
- Stimulant-containing dietary supplements (energy drinks)

Immediate Actions for Exertional Collapse

Steps to Follow:
1. STOP the activity immediately.
2. EVALUATE and ADMINISTER FIRST AID: Check Airway, Breathing, Circulation; treat as required.
3. CALL emergency services if needed.
4. ADMINISTER oxygen if available.
5. HYDRATE the individual if they can tolerate liquids.
6. INITIATE cooling techniques as needed.
7. ENSURE medical follow-up.
8. REVIEW others' safety and assess when to safely resume activity.
9. INFORM the chain of command as necessary.

Protection for our Personnel
Ensuring the safety and wellbeing of our personnel is paramount and implementing comprehensive policies such as the universal training precautions (UTPs), and the physical training opt out policy can significantly contribute to this goal. Universal Training Precautions involve reducing the risk of exertional collapse and these UTPs should be integrated into the planning, design and conduct of fitness tests or any type of physical activity. They should also be included in an individual's own preparation.

Universal Training Precautions (UTPs)

Reducing Risks:
- Acclimatise to heat, cold, or altitude.
- Gradually increase exercise duration and intensity.
- Maintain proper hydration.
- Avoid stimulants, diuretics, energy drinks, antihistamines, NSAIDs, opioids, and performance-enhancing supplements.
- Avoid alcohol before exercise.
- Follow work/rest cycles.
- Observe participants for at least 10 minutes post-exertion.
- Ensure medical facilities are available during physical activities.

By adhering to these precautions, we minimise the risk of accidents and injuries, ensuring a safe environment and conditions where personnel can focus on learning and developing their physical fitness without undue concern for their safety.

Physical Training Opt-Out Policy
The physical training opt-out policy is another crucial aspect to safeguarding our personnel. This policy allows individuals to excuse themselves from physical training sessions if they are experiencing physical illness, or for other valid reasons that could compromise their health or safety. It is recognised that there may be times when an individual is well enough to conduct many of their work duties whilst not feeling well enough to take part in physical activity.

The Opt-Out policy has been developed to accommodate personnel who, for various reasons, may need to be excused from participating in physical training activities. It is designed to ensure our personnel can opt out of physical training if they do not feel well enough or are injured. It states that personnel are not to take part in physical activity of any nature where, they do not feel sufficiently well enough to take part and should inform the activity owner if this is the case.

This policy relates to both physical training sessions and broader military training or tasks involving physical activity. However the physical activity opt-out policy does not provide a 'bypass' mechanism for activities that must be completed: where an individual has the need to opt-out of an activity that forms part of a formal career course, output standard assessment, operational readiness requirement, or other mandatory activity, the chain of command must arrange an alternative time for the individual to repeat the test or serial when the individual is well enough to take part.

When to Opt-Out:

- Individuals who do not feel well enough for physical activity should inform the activity owner and are not to participate.
- The policy applies to physical training and broader military tasks involving physical activity.
- Opting out does not automatically require reporting to medical services unless there are wider health concerns.
- Re-Scheduling Mandatory Activities:
- For formal career courses, assessments, or operational readiness requirements, an alternative time will be arranged for the individual to complete the task when well.

Formal Basic Training: Speak up and look out for each other.

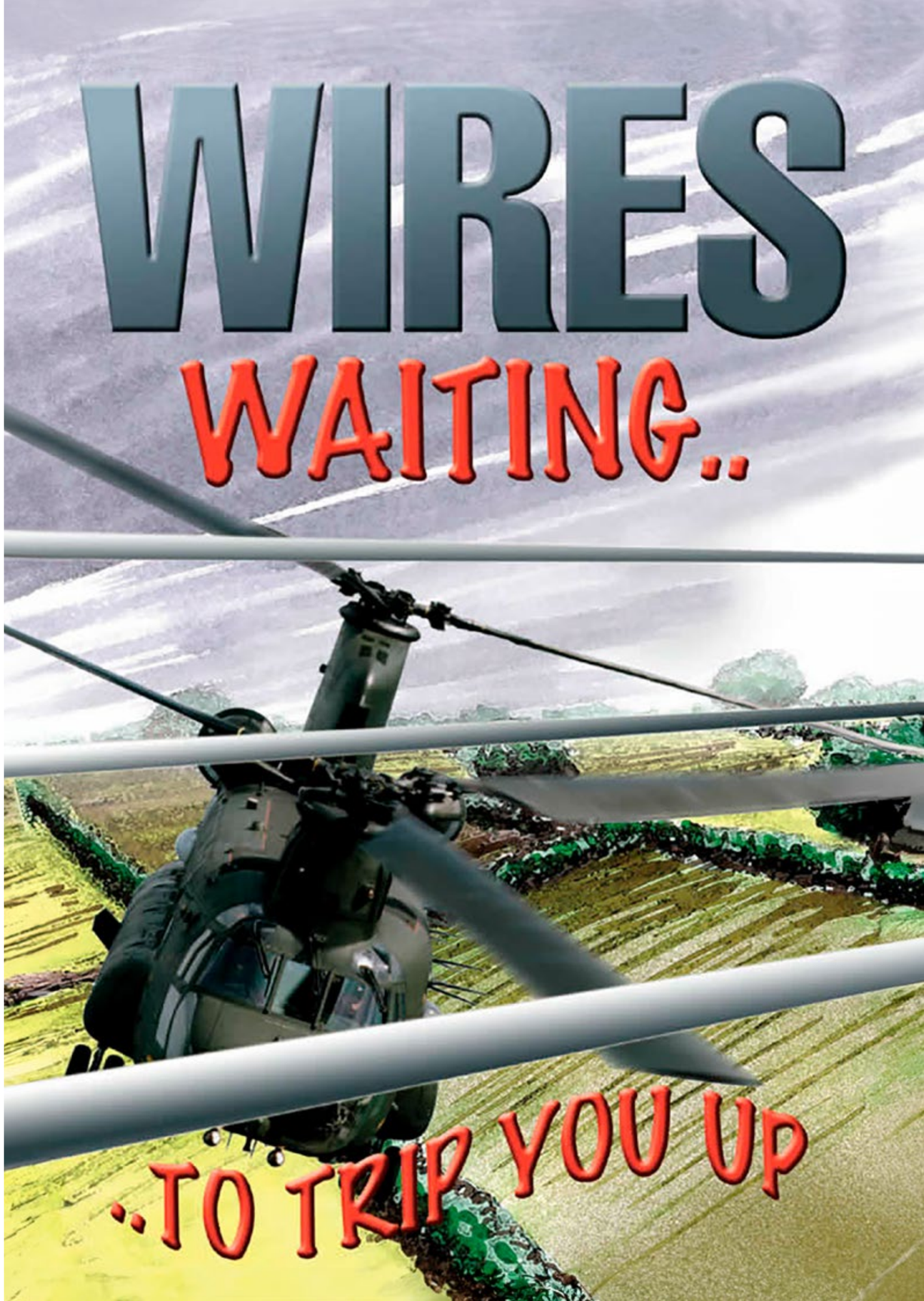
All of these policies are put in place across the entire spectrum of our personnel but it is most likely the hold the biggest impact during initial and basic training where they come to the fore. During formal basic training, it is critical for service personnel to communicate with training staff if they feel unwell. Basic training can be physically demanding, and conditions such as illness or heat stress can exacerbate health issues. If you experience symptoms of illness, heat stress or distress during training, inform your instructors immediately to prevent further complications. Additionally, be vigilant and supportive of your peers. Watch for signs that a colleague might be suffering from illness or injury during training, especially in extreme temperatures and encourage them to seek help if needed.

Stay Informed. Stay Safe.

For any concerns or further information, contact your Commanding Officer or Medical Services

References:

JSP 375 (Health and Safety Management)
JSP 419 (Adventurous Training)
JSP 660 (Sport Regulations)
JSP 545 (Recruiting Regulations)
JSP 822 (Vol 4, Care and Welfare in Training)



Stay Protected From Heat Illness This Summer

A Message from Director Defence Safety Emma Austen, DDS

Operational demands and training can expose our personnel – you - to extreme temperatures. Whether it's from the sun during deployment to Cyprus or even in the UK, from exertional activity from physical training or working in warm offices, many of you will face working in warmer temperatures as part of your roles.

Everybody in the RAF has a responsibility to ensure they are not a danger to themselves or others whilst operating in hot climates. This article delves into the significance of prioritising heat illness prevention measures within defence and underscores the vital role that you play in safeguarding yourselves and your colleagues.

Understanding the risks

Why is it an issue? Heat illness encompasses a range of conditions, from heat exhaustion to life threatening heatstroke. These conditions arise when the body's core temperature rises to dangerous levels due to prolonged exposure to high temperatures and humidity, coupled with inadequate hydration. In demanding environments where our personnel operate, such as deployments to arid regions or strenuous training exercises in the UK, the risk of heat illness becomes heightened. However, the risk is not omitted in the UK – particularly as summer approaches.

The impact on operational readiness

Not only does heat illness pose a threat to individual health, but it also undermines our operational readiness. When our people become debilitated or downgraded by heat related ailments, they are unable to perform their duties effectively which compromises our overall defence effectiveness. Furthermore, the loss of people power due to preventable heat illness incidents places additional strain on unit resources and wellbeing.

Preventive measures

To mitigate the risk of heat illness, proactive measures must be implemented at all levels. These include:

1. **Education and awareness.** Comprehensive training programmes that educate personnel on the signs, symptoms, and preventative strategies of heat illness are essential. By increasing awareness, our personnel are better equipped to recognise the early warning signs and take appropriate action to prevent escalation. You should all be aware of the Commander's Guide and Individual's Guide to heat illness, the contents withing JSP 375 Chapter 41, and the available training materials on DLE.

2. **Acclimatisation when deploying:** Acclimatising when deploying is a powerful tool. It confers biological adaptations that reduce physiological strain, improve comfort, improve exercise capacity, and reduce the risks of serious heat illness. Planning should ensure that acclimatisation is always factored into a deployment or exercise.

3. **Hydration protocols:** Proper hydration is paramount in mitigating heat illness risk. Hydration protocols should emphasise the importance of drinking water regularly, especially in hot environments or during physically demanding tasks. Access to potable water sources should be ensured and consider electrolyte-replenishing drinks if necessary. Further details and guidance can be found in JSP 375, Chapter 41. However, as individuals, you must take responsibility for ensuring you are hydrated.

4. **Heat stress monitoring:** Utilising advanced technologies for monitoring heat stress levels can aid in identifying high-risk scenarios and implementing preventative measures proactively. This should include monitoring a WBGT and individuals' physiological parameters to assess heat stress levels accurately. Whilst these technologies may not be readily available at this stage to all personnel, utilising and investing in them is of importance. You can find out more on Programme SALAMANDER on page 45 of the Non-statutory inquiry report: *Inquiry into recent heat-related accidents within the Ministry of Defence (MOD) 08 September 2022 (Defence Accident Investigation Branch).*

Image: Wet Bulb Globe Thermometer

5. **Appropriate clothing and equipment:** Ensuring RAF personnel are equipped with appropriate clothing and equipment designed to optimise heat dissipation and airflow is essential. Lightweight, breathable fabrics and protective gear that minimise heat retention without compromising safety should be prioritised.

6. **Scheduled rest and recovery:** Incorporating scheduled rest breaks into operational activities allows personnel to recuperate and regulate body temperature effectively. This practice is particularly crucial during prolonged exposure to heat or during physically demanding tasks such as intense physical training. Annex C of JSP 375 Chapter 41 includes further details on work/rest tables.

A collective responsibility

Preventing heat illness requires a collective effort that extends beyond individual responsibility. Commanders, leaders, and medical personnel play integral roles in fostering a culture of safety and accountability. By prioritising heat illness prevention and implementing comprehensive mitigation strategies, we demonstrate our commitment to protecting the health and wellbeing of our personnel whilst enhancing operational readiness.

The call to action is simple.

1. Be aware – of yourself and your colleagues
2. Read the heat illness guides and know the signs to look out for
3. Train appropriately
4. See it, report it

And finally, engage with your Safety Centre. They are here to help improve safety across your organisation.

They work closely with my team to ensure that all policies are understood and implemented across the commands. If you identify a safety related issue, you should engage with your Safety Centre who will take action.

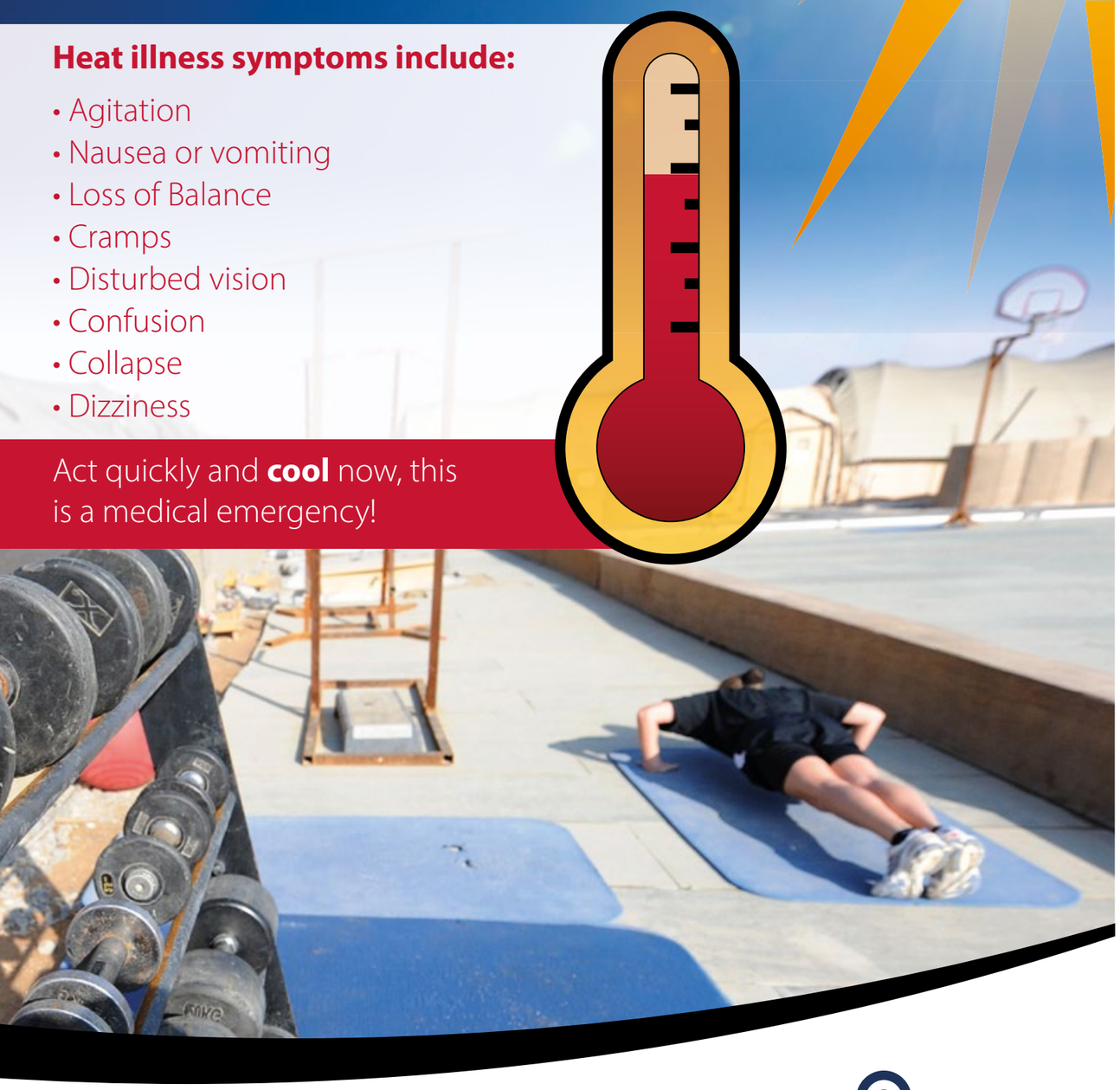
Heat Illness

Recognise the signs and symptoms, **lives depend on it!**

Heat illness symptoms include:

- Agitation
- Nausea or vomiting
- Loss of Balance
- Cramps
- Disturbed vision
- Confusion
- Collapse
- Dizziness

Act quickly and **cool** now, this is a medical emergency!



ROYAL AIR FORCE Safety Centre

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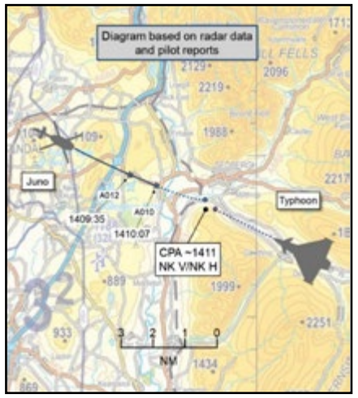
Airprox Highlights

With Comments from Wg Cdr Spry



Juno v Typhoon
3 August 23
Airprox No. 2023169

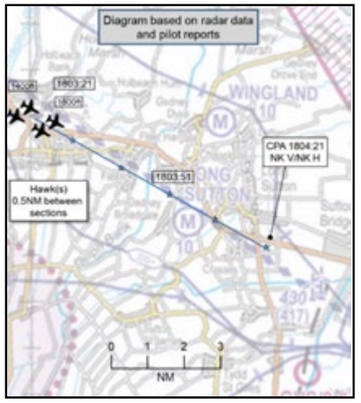
The Juno Pilot reported that, after briefing the second part of their sortie at Blackpool, they crewed the aircraft. Due to serviceability issues on start, they lifted approximately 40min later than planned. They considered amending their CADS booking but, due to time pressures of getting back for RAF Shawbury airfield closure, they elected to continue. They conducted the navigation to Windermere and Kendal without any issues. Upon proceeding east from Kendal, the left-hand-side pilot (student aircrew under instruction) called "bird, 12 o'clock" immediately followed by "Typhoon!" at which point the handling pilot put in an avoiding action. They broke left due to the Typhoon moving left-to-right and it was then in their 1230, therefore separation was increased by moving left. Simultaneously, the Typhoon pilot also broke left and levelled-out. The rear-crew instructor kept eyes-on the Typhoon as it passed down their starboard side at approximately 300ft laterally and to their rear. The Typhoon then climbed, rolled to the right, and disappeared from view. Shortly afterwards, a low-level radio call was heard from the Typhoon pilot. Post immediate action, all crew members looked at the navigation display to see if there was any ACAS (Aircraft Collision Avoidance System) traffic but nothing was showing. At this point, the instructor took charge of the navigation to allow the students to regain their composure. The Juno pilot commented that the main issue was that the ACAS on the Juno failed to alert the crew to the location and proximity of the Typhoon.

The Typhoon Pilot reported that, 2 days after landing from a sortie which included low flying in LFA17, it was reported that an Airprox had occurred with a Juno. They were not aware of the Airprox whilst airborne. The Typhoon pilot commented that the Typhoon radar had been unserviceable. Also, that on exiting low-level, ATC noted that no squawk was observed despite in-cockpit indications being normal. Some transponder modes may have been working but they were unable to assess which were working.

For the full report, see Airprox No. 2023169 on the Airprox Board Website.

Spry's Comment:

If you ever questioned the importance of an aviation deconfliction tool, then I challenge that sentiment after reading this Airprox! It's not clear why the Juno crew didn't update their CADS booking with the amended times, but Murphy's Law well and truly played its part in this incident. The Typhoon and Juno's flight paths took them over the same point at the same time from different directions, but neither were aware because the conflict didn't exist on CADS. Sorties will slip for weather or aircraft availability, but it is important that your flight entry on CADS is as accurate as possible. CADS SOPs can be found in Section 5 of the UKMLFHB.



Hawk v Microlight
15 June 23
Airprox No. 2023121

The Hawk Pilot reported that during the transit to a tasked flypast, the formation had been split into 2 sections - the front section at approximately 1800ft AGL and the rear section half a mile in trail and approximately 400ft below the front section. As the rear section had been passing the town of Holbeach, [they recall] a microlight had been spotted on the nose in very close proximity. Elements of the rear section had just sufficient time to 'flinch' upwards and flew over the top and slightly to the right of the microlight at approximately 20ft miss-distance. The formation had been in receipt of a Traffic Service and of note a minute or so earlier the controller had begun to call a contact but then called 'disregard'. The formation transit route had been subject to NOTAM and the formation had been on track and on time as per the NOTAM.

The Microlight Pilot could not be traced.

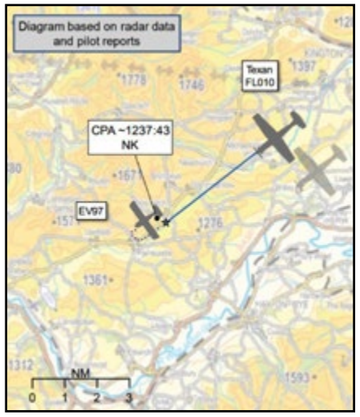
The Waddington Radar Controller reported that they had been the Lincs TATCC Waddington Radar controller on duty for a formation departure and recovery. Prior to the duty, they had received an e-mail regarding the intent for the formation to fly a route in Lincolnshire, at approximately 1000ft, remaining under a Traffic Service throughout. The route took them clockwise from Waddington to the southeast, around Fenland, up past the east of Wittering and back to Waddington. Amongst other things, the e-mail stated that the formation had been advised of the limits of Waddington radar coverage at certain areas around their intended route, particularly when at range from the radar sensors. On the day, the pilot called to confirm the route. They stated their SOPs to call additional nearby air traffic units on secondary radios for Traffic Information, whilst remaining with the Waddington Radar controller on a primary radio throughout. The formation departed as planned and were placed under a reduced Traffic Service for terrain and Traffic Information from below. At 1803, the Waddington Radar controller began to call traffic in the [formation's] 12 o'clock, however, as soon as they had begun calling the traffic it faded from radar, so told the formation to disregard as the conflicting traffic was no longer there. At 1805, with the formation in the vicinity of Sutton Bridge, the Waddington Radar controller received a garbled transmission that they could not understand. They had asked the pilot if they were turning southwest and they acknowledged that they were. When closer to Waddington, the formation confirmed that garbled transmission was a report of an Airprox with a microlight. The Waddington Radar controller quarantined the radar replay and observed that at the time of the report of the Airprox by the formation the radar replay showed no traffic in the vicinity. They had asked Marham to check their record and replay, but Marham stated they observed no conflicting tracks either.

For the full report see Airprox No. 2023121 on the UK Airprox Board Website.

Spry's Comment:

This was a very close call and the UK Airprox Board gave this a Cat A, the highest level of risk for an Airprox. The Reds' route had been NOTAMed, they were monitoring ADS-B, they were under an appropriate ATC service, and they adopted good practice with their radio management. With the lead remaining on LARS throughout and calls to local ATC delegated to a member of the formation, it allowed for the best opportunity for effective radar coverage. Ultimately, you can do everything to ensure you and other air users have the best situational awareness of each other, but the mark one eyeball remains the most important mitigation for MAC. Keep a good lookout for traffic that doesn't appear on radar! In this instance, the last second 'flinch' may just have been the difference between this very close call and a collision. ■

AirClues



Texan v EV97
7 August 23
Airprox No. 2023170

The Texan Pilot reported that, during a low-level sortie in LFA 7, whilst conducting a re-attack of a target in 'Line Abreast', both aircraft in the formation had an intermittent TCAS contact roughly co-alt, 10NM in the 12 o'clock. Due to the sporadic nature of the Texan TCAS in azimuth, it was decided to continue with the route and try and visually spot the traffic, whilst at the same time putting out a position call on the LL Common frequency. With no response heard and the TCAS on both aircraft now clear, the heading was maintained until both pilots had a late spot of a GA aircraft, it was assessed to be below and to the right of the formation, on a reciprocal heading.

Once clear of the conflict, the sortie was continued. Once on the ground, it was discovered that the approximate location hosted a small airstrip (Lane Farm Airpark), whose layout would be consistent with a light aircraft on short final where the sighting occurred. However, this was only discovered through Google Maps.

The EV97 Pilot reported that they were practising an approach to Lane Farm from the west and about halfway down the strip they increased power to climb out, when they saw a Texan above and to their right, approximately 300-400m south of the runway. They then landed from the east without incident.

For the full report see Airprox No. 2023170 on the UK Airprox Board Website.

Spry's Comments:

A timely reminder of the competing needs of military and civilian aircraft operating in Class G airspace below 2000'. Although the Texan pilot was operating on Low Level Common (130.490) due to being outside any LARS coverage, the EV-97 was operating on Safety Common (135.480) due to operating from an unattended airfield without an allocated frequency. Given this very small airfield was not marked on the military charts, the Texan crew had little chance of knowing this. This underlines the significance of visual lookout, augmented by use of Electronic Conspicuity. TCAS is unreliable in azimuth, so if you have awareness of a conflicting aircraft's height, consider introducing vertical separation if available. Military pilots should also note that GA pilots may operate VFR in Class G on a Frequency Monitoring Code (FMC) when close to controlled airspace, or without a radio altogether . ■

Model Jet v Hawk
10 June 23
Airprox No, 2023116

The Model Jet Pilot reported that they were the event organiser of a model aircraft fly-in held at the BMFA National Centre at Buckminster near Sewstern between Friday 9th and Sunday 11th June 2023. At approximately 1447 on Saturday 10th June, they were flying their model aeroplane at around 1000ft AGL in an easterly direction following completion of an 'Immelman-turn' aerobatic manoeuvre. Two other models were airborne in a circuit formation at differing altitudes. The model pilots had been briefed to be extra vigilant for the presence of full-size air traffic as no NOTAM was present advising full-size aviators to avoid the site when using the usual flight planning maps. They were informed that this is because the Buckminster model flying site is listed in the AIP. As they flew their model from west-to east over the airfield, a shout of "Full-size!" was made, closely followed by "It's a [Hawk formation], get down low". They immediately complied and dived their aircraft in a near vertical dive to a height of around 50ft AGL. The formation of aircraft appeared beyond the small copse to the east in an opposing direction to their own pass. Consequently, as they were flying in the opposite direction, their view of the Hawk formation was fleeting, but had been enough to register that their modified height, speed and line would not now cause a collision. As they made a left turn at the easterly end of the airfield, and turned to a westerly flight path, they observed the rearmost Hawk of the formation emit a short burst of smoke which was taken as an acknowledgment that they had been seen. One of the model-aircraft observers had the Flightradar24 app open on their mobile phone, and it showed the Hawk formation at a height of 900ft at a position just south of the nearest bend on the B676 immediately north of the pilot's position.

The Hawk Pilot reported that, during the planning/briefing stage of a routine transit sortie, including multiple flypast events, several warning NOTAMS were noted near, or on, the planned route. One such included a standing 7-day warning for UAS flights with an associated contact number. The number was called by the lead nav but was not answered. The route was flown as planned without apparent incident. The Squadron has since been informed that an Airprox occurred with a model aircraft in the vicinity of Buckminster. No NOTAM warning of model aircraft flying was evident on the day, one has since been appended with a start date of 24th June 2023. [They believe] the site was unmarked on the map or in the AIP.

The Waddington Controller reported that they were the Waddington Radar ATCO controlling a formation of Hawks. There was a planned outage for Lincs WAM and Cranwell STAR-NG, meaning that they were controlling Coningsby STAR-NG alone. They were retrospectively informed that there had been an Airprox with a model aircraft in the vicinity of Buckminster. They do not recall any traffic in confliction which would have led to an Airprox. There was traffic around the area which was called but nothing inside 3NM. The Waddington controller had been listening to the Hawk formation intra-flight radio, and no mention of an Airprox was made on any frequency.

For the full report see Airprox No. 2023116 on the UK Airprox Board Website.

Spry's Comments:

The jet-powered model Hawk here could weigh up to 25kg and operate above 400' AGL; all beyond the standard CAA restrictions on operations of UAS. This is not something a pilot would wish to collide with! The British Model Flying Association has permission from the CAA to operate these aircraft from registered sites and all 24 of them are listed in the UK Civ AIP. For that reason, routine model flying will not be subject to a NOTAM as it's assumed all pilots will be familiar with the AIP. Since this incident, all 24 sites have been added to the military low flying charts. They appear on the map as a 'red diamond' but specific details from the AIP are provided in the UK Military Low Flying Handbook; not technically a mandatary avoid here, but there is not currently a more appropriate symbol to use on the charts. A wise pilot would avoid where possible or contact the club to deconflict their activities when planning to fly through. ■

Safety Contacts:

Group / Station / Unit	Flight Safety Officers	Health, Safety & Environmental Protection Advisors
1Gp	01494 495454	-
2Gp	01494 495049	-
11 Gp	0300 165 7695	-
22 Gp	030 6798 0101	-
Air Support	01494 497923	-
BM	95760 3230	
JHC	01264 381526	-
Test & Evaluation (ASWC)	01522 727743	-
1ACC	01522 603359	-
2FTS	01400 264522	01400 264551
3FTS	01400 267536	-
4 FTS	01407 762241 6666	-
6FTS	01400 266944	-
Air Cadets (RAFAC)	-	01400 267817
Boulmer	01665 607325	01665 607282 / 7289
Benson	01491 837766 6666 / 7525	01491 827109 / 7254
MOD Boscombe Down	01980 662087	01980 662312
Brize Norton	01993 895764 / 6666	01993 895525 / 7062
Coningsby	01526 346575	01526 347256 / 7196
Cosford	01902 704037	01903 37472 / 237
Cranwell	01400 266666	01400 267469 / 7498
Defence Geographic Centre	0208 8182816	94641 4816
Fylingdales	-	01751 467216
Halton	01296 656666	01296 656640
Henlow	01462 851515 6150	01462 857604
High Wycombe	01494 494454	01494 496489 / 5094
Honington	01359 236069	01359 237782 / 7516
Swanwick	01489 612082	-
Leeming	01677 456666	01677 457637 / 7231
Leuchars	01334 856666	-
Lossiemouth	01343 816666 / 7714	01343 817796 / 7697
Lynham	-	01189 763532
Marham	01760 337261 6666	01760 337595 / 7199
No1 AIDU	02082 105344	-
Northolt	020 8833 8571	02088 338319 / 38521
Odiham	01256 702134 6666 / 6724	01256 702134 7650 / 7733
Scampton	01522 733053	01522 733325 / 3137
Shawbury	01939 250351 6666	01939 250351 7529 / 7559
Spadeadam	-	01697 749204
St Athan	01446 798394	01446 797426 / 8250
St Mawgan	01637 857380/95423 7380	01637 857162
Syerston	01400 264522	01400 264551
Tactical Supply Wing	95461 7177	-
Valley	01407 762241 6666	01407 767800 / 7685
Waddington	01522 726666	03001684954
Wittering	01780 416377	01780 417611
Woodvale	01704 872287 x 7306	
Wyton	01480 52451 7554 / 7146	-
Overseas Flight Safety Contacts	**Telephone**	**Email**
Al Udeid	9250 060 451 3043	83EAG-DepFSO@mod.gov.uk
Ascension	00247 63307	BFSAI-ASCOpsOC@mod.gov.uk
Akrotiri	94120 6666	BFC-Aki-Safety-AssuranceSFSO@mod.gov.uk
83 EAG	9250 060 451 3050	83EAG-AIROPSFSO@mod.gov.uk
Gibraltar	9231 98531 3365	GIB-RAF-ASM@mod.gov.uk
MPA	00500 75490 or 94130 5490	BFSAI-AirOpsWg-ASM@mod.gov.uk
Tactical Leadership Programme	0034 967 598527	aa3@tlp-info.org
Naval Air Station Jacksonville	001 904 542 4738	-

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All information correct at time of publication.
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