The RAF Safety Magazine

Issue 46

AirClues

Programme Marshall Update

Passing of a **Safety Legend**

Aviation Dissociative **Phenomena**

ROYAL AIR FORCE Safety Centre

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

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Foreword

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

Air Commodore Sam Sansome

Welcome to Air Clues 46. As usual this edition has an eclectic mix of articles that should ensure we have something for everyone – I would however encourage you to dip into a few articles that might seem outside your normal interests. I find reading something as a novice often teaches you more than merely confirming your knowledge in a familiar subject, and sometimes even opens up a whole new perspective through which to view your own specialisation.

In February this year Professor James Reason CBE sadly passed, and this edition has a short tribute to this great man. For those that aren't familiar with him and his work then I would strongly recommend finding a copy of his 1990 book 'Human Error' – or if you are an engineer like me then 'Managing Maintenance Error, A Practical Guide' from 2003. Even if you haven't heard of him then I'm sure you'll have heard of his most famous concept – 'the Swiss Cheese Model' – which is quoted and mis-quoted in equal measure whenever we consider the cause of accidents and incidents. I can't think of a single idea that has been more influential on the way we manage safety in the RAF – or indeed across the whole of Defence – than this simple explanation of why accidents happen. I often wonder whether people who come up with brilliant ideas or models like the Swiss Cheese Model know that they've nailed it as soon as they write it down – I suspect James Reason did. If ever I'm lucky enough to come up with something half as brilliant, I'll be sure to let you know. In the meantime, please enjoy this edition of Air Clues and continue to be part of our safety community.

> "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

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

On 24 February 2023, at RAF Akrotiri, AS (1) Prashar was conducting an after flight servicing on a Chinook helicopter which had been undertaking high-end training sorties on a high-tempo deployed exercise. When carrying out a rotor blade inspection he noticed a 10mm cut at the root of one of the blades fitted to the rear rotor head. This damage rendered the rotor blade unserviceable and necessitated a rotor blade change. The cut was challenging to see at first glance due to its height and lack of access.

Air Specialist Class 1 (Technician) Flannery – RAF Coningsby – Well Done

In preparation for the display season, the BBMF Avro Lancaster aircraft had an on-going fire detection system fault, initially diagnosed as a faulty switch, which was replaced and had passed the functional test. However, when testing other switches, the fault began to reoccur intermittently. AS1(T) Flannery researched the fire detection system and created a plan; this was briefed to a member of the NCO team, who gave approval for further diagnosis despite the system appearing serviceable. AS1(T) Flannery carried out a further EWIS inspection and discovered the wiring connection onto the flame switch was marginal and any pressure onto the loom would pull the cable out of a secure connection. AS1(T) Flannery was able to reroute the cable loom to provide slack and clean the cable to create a better connection.

Air Specialist (Class 1) Morse – RAF Northolt – Merit

On 10 December 2024, at RAF Northolt, AS(1) Morse was returning to the Squadron from lunch and observed a substantial vinyl banner loose on West End Rd. It had been blown from a nearby builder's merchant during storm Darragh and was directly beneath the undershoot / approach to runway 25. AS(1) Morse stopped his vehicle and retrieved the item and submitted it for the Air Safety Team to action iaw local procedures. AS(1) Morse's actions prevented the item making its way onto a critical area of the airfield and becoming a hazard to aircraft.

Flight Lieutenant Turner – RAF Brize Norton – Good Show

On 26 June 2024, during recovery from Latvia on an Air-to-Air Refuelling mission, the Pilot Flying Captain handed control to the Co-Pilot, Flt Lt Turner, and left the cockpit for a break. Upon their return to the flight deck, the Captain identified as partially incapacitated due to sickness.
The Captain requested that Flt Lt Turner retain control of the aircraft for the remainder of the sortie and assumed the role of Pilot Monitoring. Flt Lt Turner set the aircraft up for the approach into RAF Brize Norton and delivered a comprehensive single-pilot brief to all 3 crew as a precaution, including non-normal use of the Crewman assisting with checklists. An emergency call was declared to Air Traffic, and the Captain ensured their seat was fully reclined with shoulder straps locked in accordance with Pilot Incapacitation SOPs. Upon handover to Brize Director, a single frequency approach was requested, and medical assistance placed on standby. During initial radar vectoring, it became clear that the Captain could not carry on as PM and Flt Lt Turner made a sensible decisive judgment to continue 'single pilot'. The approach and landing was flown without incident.

Chief Technician Jackson – RAF Brize Norton – Good Show

On 7 December 2023, whilst a bus was unloading passengers from a Voyager to the RAF Brize Norton terminal building, it [the bus] began to emit smoke. Upon closer inspection, there were flames coming from the back left wheel, likely due to an issue with the brakes. CT Jackson responded incredibly quickly, informing the driver that there was a fire and advising that the bus should be evacuated immediately. As soon as the passengers had left the bus, and before the Duty Air Movements Officer (DAMO) was at the scene, he had already retrieved a fire extinguisher and extinguished the flames.

Sergeant Frost – RAF Lossiemouth – Good Show

Sgt Frost was a Weapons Technician on IX(B) Sqn tasked with conducting an independent inspection of an ejection seat that had been fitted to a Typhoon aircraft, ensuring its correct installation. Whilst inspecting the seat, Sergeant Frost identified that the harness release cartridge connector was visible. This struck him as unusual, and on investigating further, he found the connector was disconnected.
With the connector disconnected, the ejection seat could not function correctly, preventing aircrew from separating from the seat on ejection, the consequences of which would have been fatal.

On 14 October 2024, during a scheduled Ejection Seat Change on a Typhoon aircraft at RAF Lossiemouth, Weapons Technician Cpl Farren, noticed a difference between the Installation and Removal Data Modules for the Canopy. The Removal Data Module required the technician to remove a shouldered bush during the disassembly of the Canopy Hinge Bolts, but the Installation Data Module did not specify a requirement for this shouldered bush to be re-installed. Failure to re-install the shouldered bush would lead to excessive play in the canopy hinge, which could lead to misalignment of the canopy during manoeuvre. Such a misalignment has the potential to cause a significant and sudden loss of cabin pressure at altitude. At best, this would require an emergency descent and curtailment of the sortie; at worst, it could result in potentially serious aero-medical consequences for the pilot.

Corporal Farren – RAF Lossiemouth – Good Show

On 14 November 2024, Flt Lt Hutchison was leading a 4-ship of Typhoon aircraft on a night Defensive Counter Air mission as part of a larger package in a Typhoon Air Wing training event. Having joined the Tanker for the second Air-to-Air Refuelling bracket of the sortie, he was in contact on the left-hand hose with another member of his formation on the right.
While refuelling, another pair of Typhoons from a different formation was also joining the tanker. Soon after the lead aircraft had established in echelon-left on the tanker, Flt Lt Hutchison noticed the aircraft moving closer with no apparent corrective action and immediately made a call on the Boom frequency to alert the pilot who then subsequently re-established in the normal position on the Tanker.

Flight Lieutenant Hutchison – RAF Lossiemouth – Good Show

On 30 October 24, at RAF Northolt, AS (1) Gray was conducting personal fitness and was running along the airfield boundary and domestic site, the delineation between the amber and red FOD zone and is adjacent to a live taxiway. It was dusk and, with light fading, she noticed a fire hydrant identification sign resting against the airfield boundary fence. She quickly scanned the area but could not see an associated hydrant marker post. Realising the sign could already have travelled some distance and with the risk of it migrating into the red zone and onto the airfield, AS(1) Gray picked it up and continued her run. Upon returning to her place of work she reported the FOD by following the FOD Leaflet within the Northolt Air Safety Management Plan.

Air Specialist (Class 1) Gray – RAF Northolt – Well Done

RAF Safety Centre **Safety Trophy 2024**

By RAF Safety Centre

In 2024 submissions for the annual RAF Safety Centre Safety Trophy were assessed by the Safety Centre Heads of Departments: Air Cdre Sam Sansome (Inspector of Safety (RAF), B2 Lizzy Kijewski (CESO RAF) and Gp Capt Andrew Keith (Inspector of Flight Safety (RAF).

The competition is open to submissions for Individuals, teams or whole units across the Whole Force.

The 2024 nominees comprised: Defence Geographic Centre, Feltham; RAF Waddington Station; Sgt Thomas J Cranie (RAF Boulmer); Sgt Shane Law (RAF Waddington); Cpl Carl Collins (RAF Stafford); FS John Marshall (Swanwick Mil); 78 Sqn Flight Safety Team (Swanwick Mil); Chinook Air Safety Team (RAF Odiham); Support Engineering Flight (AES & SES) (RAF Benson); FS Darren Bridges (AvTA) (RAF Halton); RAF Music Services (RAF Cranwell & Northolt); and the RAF Centre of Aviation Medicine (RAF Henlow).

The 2024 winner was the Defence Geographic Centre at Feltham.

Air Cdre Sansome presents the Safety Trophy for 2024 to the Defence Geographic Centre

“Out-of-date charts were required to be manually updated by aircrew using an unwieldy amendment publication; a tedious task which was extremely prone to human error and significantly increased sortie planning times and aircrew burden prior to flight. This task needed to be carried out on every one of the 204 sheets and replicated on every UK flying station. Furthermore, this remedy was only applicable to paper editions, as electronic versions are not editable. DGC set about transforming the cumbersome and unsatisfactory legacy production process. This work involved multiple teams across DGC who each encountered sizeable technical hurdles on what was a significant collaborative project taking over two years to complete. Despite the many obstacles, GC has now produced an automated, single map, which reduces a 4-year update cycle to just a few months, delivering a full GB-wide refresh with new obstruction data every 28 days, is available in the digital formats required by current air systems that can be simply downloaded by users on demand, without any requirement to locally update individual sheets.”

Safety Trophy 2025 Submissions

Submissions for the 2025 Safety Trophy should be sent not later than 30 Aug 25 to:

Air-SafetyCtre-WgCdrSpry@mod.gov.uk

using the submission form on the Safety Centre Comms Page at:

https://modgovuk.sharepoint.com/teams/23116

L G Groves Memorial Prizes and Awards 2024

By Sqn Ldr P R Miller, RTSA-RW1 SO2

Left to Right: Sgt Shaun Walters, Flt Lt Tom Hamilton, Air Cdre Paton, Mr Anthony Groves, Mr Simon Brown (Met Office), Flt Lt David Jolly, Dr David Simonin

Presented annually since 1946, the L G Groves Awards Ceremony was established in memory of Sergeant Louis Grimble Groves, RAFVR, 517 Sqn Coastal Command, who lost his life while flying on a meteorological sortie on 10 September 45. The 2024 awards were presented by Air Commodore Paton, 1Gp ISTAR Force Commander, at the L G Groves Memorial Safety Awards ceremony which took place at the RAF Museum, London, on 10 September 24.

Aiming to encourage the study of Air Safety and to stimulate research in the science of aviation meteorology, whilst also recognizing the work of personnel engaged in meteorological observer duties; the awards are open to personnel from all 3 services, the Met Office and civilian support staff. The prizes and awards offered are a £1,000 Air Safety award, a £500 Ground Safety award, a £1,000 Meteorological award, and a £500 Meteorological Observation award.

This year the **£1,000 Air Safety award** went to Flt Lt Tom Hamilton for his exceptional airmanship and captaincy during Op GREENLIGHTER. In Feb 23, Flt Lt Hamilton operated as the lead pilot in a C-130 detachment tasked with supporting humanitarian efforts in Türkiye following a recent Earthquake. Flt Lt Hamilton demonstrated excellent captaincy and a mastery of balancing operational imperative with operating risk to ensure that all tasking was safely completed during an extremely busy 17-day period. One notable example occurred on the first sortie where Flt Lt Hamilton, and his crew, experienced a hydraulic leak which led to the loss of the utility hydraulic system which serviced several aircraft systems including the landing gear and wing flap control system. Flt Hamilton, assisted by his crew, ensured that the aircraft landed safely while simultaneously co-ordinating the preparation of a spare aircraft to complete the sortie. This exceptional airmanship and captaincy, in the face of significant operational imperative and during a highly fraught operational tempo, saved the mission and prevented the aircraft being made unserviceable for the duration of the C-130's service life.

The **£500 Ground Safety Award** was won by the Sgt Shaun Walters for his contribution to improving the safety of aircraft and equipment at RAF Lossiemouth. Demonstrating excellent drive and determination, Sgt Walters successfully initiated and delivered three impressive projects to reduce FOD, provide a secure deployed tool store capability for Typhoon squadrons, and enable efficient tool control trending and analysis across the Typhoon Force. These initiatives were achieved during the Air C2 transition at RAF Lossiemouth which required Sgt Walters to adapt and restructure his role to enable him to support the now separate Typhoon and ISTAR Air Wings and the Airbase.

Dr David Simonin (Met Office) was awarded the **£1,000 Meteorology Prize** for his contribution towards improving weather radar observations for the UK regional model. In response to anticipated changes in supercomputer landscapes and the increasing complexity in coupling earth system components, Dr Simonin is leading the Met Office's effort in Next Generation Processing and Assimilation of Observation (NG-PAO). The project aims to promote scientific advances in the field of observation processing and data assimilation, as well as offering a more portable, scalable, modular, and easier to use system. Dr Simonin's achievements and the success of NG-PAO will enable to the Met Office and its partners to make significant scientific advances in observation processing and data assimilation.

The **£500 Meteorological Observer Award** was awarded to the Mobile Met Unit (MMU) Engineering Team and was received by Flt Lt David Jolly. The MMU Engineering Team installed a series of automatic weather stations in the Op SHADER area of operations in 2020. Ever since they have made regular visits to service and maintain the equipment, the last of which was completed by Flt Lt David Jolly. Flt Lt Jolly's actions ensured that the equipment continues to provide reliable observations which has improved flight safety and contributed to operational success. Flt Lt Jolly and the MMU Engineering Team have made an invaluable contribution to flight safety by ensuring that accurate meteorological observations are available to aircrew in a data sparse part of the world.

L G Groves Memorial Prizes 2025 Submissions

The deadline for submissions is 30 May 25.

Nominations should be sent to:
Sqn Ldr Michael Richards
(Air-RTSA-RW2 SO2) using the 2025 proforma which can be found either on the RAF Safety Centre Comms site, or by contacting Sqn Ldr Richards directly.

https://modgovuk.sharepoint.com/teams/23116
(MOD Users only)

L G Groves History

It was 79 years ago on 10th September 1945, that Plt Off Keith Proverbs and his 8 crew from 517 Squadron, tragically lost their lives when their aircraft a Halifax Met. Mk. III crashed in dense fog trying to land. The awards scheme celebrates their very human achievements and adds to the incredible legacy that was set up by Keith and Dorothy Groves in 1946 to celebrate advances in air safety, to ensure the improved safety of future generations, so that they may take to the skies in altogether improved conditions to those tolerated by the men of MET 517 squadron in the 1940's.

The Squadron carried out two flights per day, each about 9 hours long starting at 12 noon and at midnight. Each flight had the code name "Epicure". They carried out the first Epicure flight on 29th November - in December they did 9 more.

Each flight consisted of flying into the Bay of Biscay and somewhere off the south coast of France; they would descend to sea level (50 feet above the waves at day and 100 feet at night) and then start a spiral climb to about 18,000 feet before turning for home and descending again. As they did this, the Met Observer (Sgt Louis Groves) would take readings of temperature, wind speed and direction, barometric pressure etc and code them.

It would then be the Wireless Air Gunners (WAG) turn to guide them back to base using morse code. At a distance, up to 50 miles, morse code would have been used by the WAG on duty on the wireless and the message relayed to the pilot.

On one side of the beam the WAG would hear a series of morse dots and on the other side a series of dashes. When correctly aligned with the runway he would hear a steady signal.

As they approached the runway, they would hear short special signals telling them their distance from the airfield so that the pilot could come down to the correct height for a landing. Even without the fog, on a dark and rainy night with very limited visibility, the runway lights of those days were goose-necked flares (kerosene filled drums with wicks). Plt Off Keith Proverbs would not have expected to see the runway until he was almost on top of it.

The crew lost on 10 September 1945

Programme MARSHALL
Surveillance Characteristics

By Wg Cdr Kirsti Fordham, SO1 BM Safety & BM Safeguarding

Welcome to the world of MOD ATC surveillance systems! Perhaps not everyone's cup of tea, but if you've found yourself trying to understand how ATC provide a radar service to pilots, please do read on for equipment-related insights…

This article is intended to provide an overview to a wider audience of the current aerodrome radar service equipment. In the last few years most of the equipment has been replaced as part of a DES equipment programme, MARSHALL. This is a £1.9 billion Category A Government Major Project Portfolio (i.e. a huge programme!), delivering an entire ecosystem of replacement Air Traffic Management technical equipment rather than just separate elements. This ranges from radios to radars, navigation aids to CCTV, and all the maintenance, across almost 60 MOD locations. You may already be familiar with the term 'Aquila'; this is the principal company delivering the equipment, 'MARSHALL' is the overall programme name itself.

As part of such a major change, noting much of the old equipment had been in use for decades with minimal changes, the ATC community has undergone a wide range of briefings, training and assessments, to help ensure the safe integration of new equipment, procedures and operating models. This has extended to the flying community to make sure both pilots and ADHs understand the new operating environment. The collective feedback from ATC and pilots, has been invaluable to allow the equipment and its operating practices to fully integrate into effective ATC services.

Now that this equipment is in widespread use at the majority of aerodromes, it's a timely opportunity to share what it is and how it functions to the wider Air Clues audience.

So which ATC systems are we talking about?
In general, ATC use two types of surveillance systems: non-cooperative or primary radar, and cooperative radar. Primary radar measures the time it takes for radio waves to reflect off objects ('ping-pong') whereas cooperative radar detects transponder emissions from aircraft such as aircraft ID and altitude. For MOD aerodromes, controllers need both systems to determine the geographical position and an altitude; this allows them to understand the 3D position of aircraft, monitor how it changes over time, and combine it into efficient and safe procedures.

What's changed?
Until a few years ago, MOD airfields relied upon 'Watchman' radar for primary radar, and a Secondary Surveillance Radar (SSR) to gain additional transponder data, the 'squawk', including Mode 3/A (4-digit ID) and C (altitude). Watchman in particular was at the end of its lifespan, and many controllers and pilots became all too familiar with hearing 'Watchman U/S' broadcast on ATIS. Enter Programme MARSHALL and its new equipment.

Current Systems
So what do we use now? For most MOD aerodromes, it is a system of three main parts:

Controllers in the Approach Room

- A non-cooperative primary surveillance radar, 'Solid-State Approach Radar – Next Generation', known as 'STAR-NG'.

- A cooperative system, Wide Area Multilateration, with a networked system of fixed sites utilising data transfer across fixed line and microwave links, which detects data from aircraft transponders (and some other transmissions).

- An interface for controllers, TopSky. This displays the picture from sensors, alongside other information including flying programme, meteorological information and system management functions.

A few units use a combined set-up with a co-mounted STAR-NG and cooperative RSM970S (e.g. RAF Akrotiri, RAF Spadeadam), and a small number have yet to complete their transitions to new sensors (RAF Leeming, MOD Boscombe Down). Royal Navy Air Stations are undergoing an upgrade to Watchman radars as part of their MARSHALL delivery.

Key differences
There are several significant differences in the controller experience with these new sensors.

The greatest impact is the result of the TopSky display presenting a greater level of processing, which reduces the radar clutter for controllers. Processing isn't new. Watchman also had a range of processing options that controllers could manually apply, relying upon experience and judgement, but a significant degree of false contacts and clutter was routinely displayed. TopSky removes elements of ambiguity and gives a consistent picture that isn't adjustable by controllers.

Another element of change is how aircraft are presented on screen. Watchman displayed an orange/yellow bar and fading history trail, which varied in size depending on the aspect and range of the aircraft to the radar aerial. STAR-NG presents a white cross and dotted trail, which does not change relative to range or aspect. Whilst the Watchman is sometimes described as more responsive, it could present issues with accuracy and merging with other tracks as the target 'bar' grew larger.

For those who have worked with differing ATC radars, such as at Area radar, it's been less of a change. For those who've never worked with a more processed 'plot extracted' system before (see later), the greater degree of automated processing feels rather different.

During routine ATC services, WAM is now the principal sensor and provides more accurate tracking due to its higher update rate. WAM is designed to operate with the current regulatory standard of transponders (Mode S), so controllers now see a wider range of data than Mode 3/A and C where the aircraft transponder is also compliant and correctly selected. It also has greater coverage at lower levels, doesn't have a 'cone of silence' in its overhead and gives better accuracy by removing slant range error, due to its use of distributed ground stations rather than a single point source.

Performance Characteristics – some greater detail
TopSky benefits from Plot Extraction, where the system actively processes the radar returns and filters out noise and clutter, displaying only significant detections or 'plots'.
By contrast, the legacy Watchman displayed all radar returns with minimal processing, requiring manual interpretation to distinguish genuine targets from false echoes.

This flow path gives an indication of the STAR-NG, and TopSky processing:

A greater number of processing techniques is now in use, but it is automated not selectable by the controllers themselves, giving some benefits by removing human error in application and judgement. Each system is subject to site specific performance optimisation, and as ever, radar performance is subject to a variety of trade-offs.

As part of track processing, plots are correlated over time and those that don't meet the criteria to be categorised as an aircraft are filtered out. Tracks are formed when a sequence of three or more consecutive plots are detected, which also meet the specified dynamics for velocity; acceleration, either in a straight line or turn rate; and rates of climb and descent.

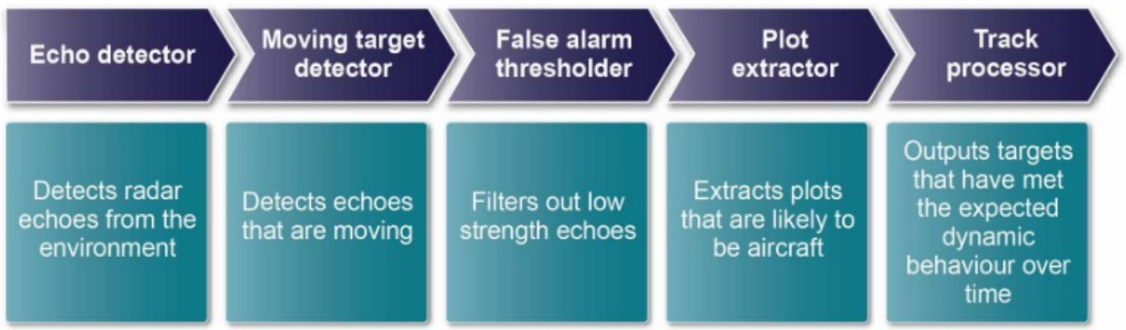
Area Filters
There are also a greater variety of 'area filters' than with Watchman. These function in differing ways to maintain established plots versus potential interference from other returns, such as buildings and terrain. They also include elements where established tracks continue to be displayed, but the generation of new tracks is inhibited in these areas. The necessary areas at each aerodrome are determined when STAR-NG is commissioned, and is used only to the minimum degree required.

Angel Filters
Angel processing is an adaptive technique to prevent clutter while maintaining high levels of detection. Groups of tracks that are moving slowly (< 78 kts) in approximately the same direction are filtered out within TopSky. This helps to remove effects such as weather moving with the prevailing wind and migrating birds. Each site has specific optimisations, to account for local conditions e.g. terrain generated air mass effects. This has presented a particular problem when providing a Surveillance Radar Approach (SRA) with aircraft of slower approach speeds and in periods of stronger headwinds, resulting in some targets being dropped. This can be mitigated through the use of WAM to provide SRA approaches. ATC regulatory change has been required to approve this, and the overall investigations and implementation has taken longer than desired. However, these regulatory hurdles have been mostly overcome, and SRA is now possible using both WAM and STAR-NG at some locations. Further work remains in progress for other locations, and in the interim, alternative control procedures are in place to safely manage an aircraft if a track is no longer displayed.

Additional Functions
A variety of additional functions are now available to enhance the controller's situational awareness, including the ability to select and highlight specific tracks ('Incom' function), Short Term Conflict Alert (STCA) and Danger Area Incursion Warning (DAIW). Some are more suitable in certain areas, such as aspects of STCA which are helpful in straight and level flight. However, in higher traffic density areas and for formations, STCA has limitations which are addressed through agreed operating practices to avoid spurious alerts becoming a distraction.

Some key challenges
There are a few areas that have needed specific focus to develop controllers' understanding of the systems. Examples include when tracks may not display fully, and by extension, how that transfers into operating procedures and pilot understanding of service delivery. These have been captured through briefing packages, additional training, orders and information sharing to controllers, pilots and ADHs. This allows controllers to quickly recognise and diagnose any differences in behaviours of the radar and if needed they can change a procedure, or explain to the pilot where radar services are limited, iaw with standard ATC service delivery.

Radar Cross Section (RCS)
The MARSHALL requirement for RCS detection is ≥ 1 m^2; this translates very broadly as the size of a small General Aviation aircraft, but is hugely dependent on aircraft construction material, shape, profile etc. Combined with low speeds,



Controller Interface

it makes gliders and microlights hard to detect, and small drones highly unlikely, as they fall below the required threshold. Unsurprisingly, a platform designed to have a low observable radar profile can also be harder for STAR-NG to detect.

High Energy Manoeuvres
When aircraft operate at turn rates, speeds or acceleration outside the STAR-NG performance envelope, track termination may occur. If the track is terminated, a sequence of 3 plots all falling within the envelope is required before a track will be re-initialised. The best mitigation is to ensure that the transponders in use are Mode S compliant and correctly selected, as WAM contributes to continuous tracking as well as STAR-NG. If a controller loses track ID, they will use standard ATC procedures such as applying a Basic Service instead of a radar service, checking the pilot has the transponder selected, and can pass general information for other traffic in the vicinity if considered relevant.

Slow Moving Target
Slow Moving Target (SMT), often referred to as a 'speed gate'. This processing avoids false tracks being initialised from slow moving clutter such as road or railway traffic. With SMT processing activated, tracks that do not meet the minimum speed threshold are not displayed. If a track decelerates below 40 kts ground speed and stays below for 3 consecutive returns, it may be removed from the controller's display.
To re-display the track, the ground speed needs to increase to at least 40 kts, across a number of three consecutive plots, and to laterally transition out of the SMT processing box surrounding it. In this way, an aircraft that goes above 40kts, may not immediately be displayed. This is classified as 'Temporary Non-Display' (TND) as described in controllers' orders. The most effective mitigation is use of a transponder, so that WAM can continue to provide coverage and controllers can maintain track identity.

False Association
TopSky is designed to associate STAR-NG and WAM/SSR data into a combined track. If TopSky incorrectly attaches track data to the wrong aircraft this is known as False Association (FA). It is not a frequent occurrence, but if a combined track is in close proximity (e.g. < 2 NM) to another that is not transponding, there is potential for FA. How this displays depends on which of STAR-NG or WAM is selected by the controller as the principal source. The transponding aircraft's data may temporarily attach to the non-transponding track incorrectly, and/or a shadow STAR-NG may appear parallel to the WAM contact. Controllers have received training to recognise FA and will not provide control instructions to reduce the separation between FA tracks unless coordination has been agreed.

Transponders
When 2 aircraft operating Mode 3/A and C only fly in close proximity, there is a chance that their squawks will 'garble' on the screen presented to controllers, i.e. false information can be presented for both the 4-digit ID and altitude readout, or could be removed completely. A software update will shortly be implemented which reduces the maximum distance between

aircraft that this can occur, but it will always be a characteristic of the system as an aspect of how Mode 3/A operates.

The best mitigation to many of these pitfalls is to operate with Mode S capable transponders, correctly selected and transmitting. One of the principles of Mode S is that every aircraft has a unique aircraft address. This allows WAM to selectively interrogate individual aircraft rather than interrogating every single aircraft within range of the system. It provides the added benefit that each aircraft creates its own unique track within the surveillance system. This in turn makes it far easier for the system to maintain track identity on aircraft and avoid 'garbling' effects compared to the legacy Mode 3/A system.

However, it is recognised that not all military (or civilian) aircraft are yet Mode S transponder equipped or approved to operate with it, either on a temporary or a permanent basis depending on the aircraft and the operating context. Adaptations to control procedures, in particular for formation flying, as well as developing a better understanding of aircraft fleet configurations (including visitors), all contribute to better service provision. This includes examples such as ensuring transponders within formations are switched off in good time when closing from trail to tighter formation to leave just one aircraft squawking, aligned with MAA regulations.

Some aircraft without a traditional transponder use ADS-B Out. ADS-B uses the Mode S protocol to transmit aircraft data, which WAM detects. However, WAM will not display this ADS-B Out aircraft-provided position/altitude, as is it not assured for ATC use. Instead, WAM will calculate the position independently, and display that as the aircraft location.

'Broader Reflections' – pun intended

It is also worth remembering the wider elements of much increased reliability and serviceability that has now been achieved through use of this modern equipment, thus increasing ATC's ability to provide an effective service. The characteristics described above are only a small element of the system's overall performance and have been subject to scrutiny and risk management processes, probably to a far greater extent than previous systems.

It's recognised that there have been challenges in transitioning to the new equipment. Wider safety reporting has been invaluable to gather the greatest understanding of our new equipment and operating practices. Safety events and hazard observations break down into actual technical performance issues, but also power supplies, networks, aircraft speed, profiles, transponder incompatibility, human error in understanding of equipment amongst others. Happily, as a combined ATC and flying community, that general distrust of new equipment has abated through better knowledge, training and communication, and so allows us to focus the technical and safety investigation capacity on any genuine air

Controller Training

safety impact or technical failure if/when they arise. We'll all continue to learn and develop; no radar is an all-seeing eye, no system or human is infallible, but through effective reporting and investigation we can utilise the principles of strong safety management to exploit what we know to make flying and controlling effective and safe.

Looking to the future

The MARSHALL programme is currently under contract until 2037, and is still evolving. As a new generation of ATCOs and pilots come through the training pipeline, it's surprising how quickly new equipment and systems become fully normalised. However, no doubt there's still plenty of scope for the controlling cadre to reminisce for years to come about Watchman and orange splatter just as we still (just about!) have those who can reminisce about manual adjustments to servo and gain for controlling talkdowns. Change can be painful, but we're just about there with the MARSHALL equipment – installed, in use, understood and accepted.

Spry's Comment:

What is clear here is that, despite obtaining a radar service, there will be traffic that the new equipment might filter-out or not detect. Slow-moving non-squawking aircraft such as microlights and gliders have always been a MAC risk, but we must continue to look out for them, backed-up by a radar service. The naked eye is still one of the best sensors to avoid MAC. For controllers, it's important not to import legacy techniques from Watchman. If a 'primary only' track is spotted and then disappears, there is almost certainly a real aircraft there, even if displayed temporarily. A pilot would rather have this potential traffic called to them than not at all. ■

Programme MARSHALL Imagery provided by BM, Crown Copyright ©2024

Exercise BERSAMA LIMA- Safety across Southeast Asia

By Flt Lt Alex Still, Chief Combat Plans & RAF Safety Centre

Exercise BERSAMA LIMA 2024 (BL24) was a significant military exercise in Southeast Asia held in October under the Five Power Defence Arrangements (FPDA), which includes Australia, Malaysia, New Zealand, Singapore, and the United Kingdom. 2024's exercise, hosted by Singapore, at Changi Naval Base involved over 2,000 personnel, 38 aircraft, 5 ships, and more than 250 ground troops. It focused on enhancing interoperability among the armed forces of the member nations, covering land, air, and naval operations.

FPDA and HQIADS

First a bit of history: the FPDA, established in 1971, was originally designed to protect Malaysia and Singapore after the British military presence in the region reduced. It has since evolved into a broader framework for military cooperation, focusing on joint defence exercises like BERSAMA LIMA and disaster relief.

The Five Power Defence Arrangements (FPDA) is a long-standing multilateral security initiative involving Malaysia, Singapore, the United Kingdom, Australia, and New Zealand, the FPDA stands as one of the oldest military cooperation frameworks in the region. Its primary focus is to ensure the collective security of Malaysia and Singapore, promoting peace and stability across Southeast Asia through joint exercises, intelligence sharing, and defence readiness, adapting to modern challenges by incorporating training on areas like Humanitarian Assistance and Disaster Relief (HADR) and cybersecurity.

BL24 emphasised modern military collaboration, including combined air operations, naval gun firing, and field exercises in both jungle and urban settings. Notably, the Exercise saw the inaugural use of Australia's F-35A Lightning II fighter and a P-8A maritime patrol aircraft from New Zealand, adding to the complexity of the drills.

Central to the FPDA's activities is the Headquarters Integrated Area Defence System (HQIADS), located in Malaysia. HQIADS coordinates FPDA operations, including air, sea, and land components, with the aim to safeguard the region and foster seamless interoperability between the five member nations. At the heart of its operations lies the responsibility for air defence, where multinational coordination is critical for maintaining airspace integrity.

Defence Engagement and Regional Support

In 2024, the FPDA conducted Exercise BERSAMA LIMA, a major multilateral exercise, with the Royal Air Force playing a vital role. This exercise was part of an ongoing effort to strengthen defence relationships, enhance operational integration, and promote regional security. BL24 was one of the largest air and maritime exercises in the region, aimed at fostering defence cooperation, refining tactical and strategic capabilities, and reassuring nations in Southeast Asia of the FPDA's commitment to regional stability.

Naval assets conducted manoeuvring exercises, naval gun firing, air-defence exercises and diving serials, while

RSAF-15SG departs on a BL24 Mission

the respective nations Air Forces exercised combined air operations, complex air defence scenarios, and Air-Land training in the form of troop lift missions. The land forces conducted professional exchanges and force integration training that culminated in a field exercise involving both jungle and urban environments.

The Exercise served as a critical platform for multinational defence engagement, with RAF personnel operating alongside their counterparts from Australia, New Zealand, Malaysia, and Singapore. The RAF's participation provided an opportunity for knowledge sharing, operational support, and the development of robust working relationships with allied nations. These joint activities reinforce the RAF's ongoing contribution to collective security and its commitment to upholding the stability of the region.

High-End Warfighting and Strategic Importance

BERSAMA LIMA 24 saw complex high-end warfighting scenarios, challenging participants with simulated air and maritime threats, as well as land-based operations. This exercise is not merely a demonstration of FPDA's military prowess but also a test of interoperability and real-world defence readiness. The joint forces simulated defence responses to evolving threats, including modern missile engagements, air-to-air combat, and anti-submarine warfare.

BL24 also synchronised exercise scenarios between the command post and the various field exercises and units to enhance operational realism. To keep pace with contemporary security developments, the exercise also included Subject Matter Expert Exchanges (SMEEs) on a variety of topics – including dive safety, humanitarian assistance and disaster relief and unmanned aerial vehicles.

The exercise showcased the cutting-edge techniques and technology employed by FPDA nations. These operations strengthen the collective ability to respond rapidly and effectively to any potential threat, ensuring that nations in the region remain safe and secure. The strategic importance of the exercise lies in its contribution to regional deterrence – BERSAMA LIMA sends a strong message that FPDA nations are united in their commitment to defending the region and preserving peace.

Participating nation ships

Admiral Kwan Hon Chuong, exercise director and Republic of Singapore Navy Fleet Commander Rear, highlighted the importance of the exercise. "Exercise Bersama Lima 2024 has been designed to deepen the strong partnership and interoperability among our militaries…….I am confident that all our participants will find great professional value and forge friendships through the exercise."

Safety in the Skies: De-Confliction and Aircraft Coordination

A key aspect of Ex BERSAMA LIMA 2024 was ensuring the safe operation of all military assets involved. With over 60 aircraft from five nations participating, including fighters, transport aircraft, and airborne early warning platforms, the potential for mid-air collisions and airspace congestion was a significant concern. To combat this FPDA staff along with exercise participants reviewed the specific airspace considerations prior to the beginning of the exercise and put into place effective de-confliction procedures which were paramount to the success of the exercise.

77 Sqn RAAF F-35, flying from Paya Lebar

FPDA personnel led the development of a unified approach, integrating the SOPs and procedures of the 5 different nations to ensure interoperability. A key element in enabling a safe and effective exercise. Exercise IAs were then tasked to ensure each air mission was deconflicted in height, time and space, which is no small feat in a limited and congested exercise airspace.

To ensure the safe execution of operations, comprehensive safety working processes were developed and put in place. These involved detailed airspace management plans, real-time tracking of aircraft positions, and robust communications procedures between air traffic control units across multiple countries. RAF personnel, alongside their FPDA counterparts, contributed to the meticulous planning process, which included pre-flight planning conferences/ briefings and a coordinated debrief system to identify and resolve any potential hazards.

HQIADS played a central role in managing and de-conflicting air operations, coordinating with all participating nations to ensure that aircraft could operate safely within the exercise area. By implementing a layered air defence system, HQIADS was able to monitor all aircraft movements and manage risk, ensuring that no aircraft entered restricted zones or posed a hazard to others. In addition, the establishment of dedicated exercise airways and specific engagement zones allowed for clear separation between military operations and civilian air traffic.

Throughout the exercise, safety was the top priority, with all personnel adhering to strict safety protocols and operational guidelines. Despite the complexity of operations and the high volume of aircraft in the skies, all training was achieved and there were no major safety incidents—a testament to the professionalism and preparedness of all involved. The successful coordination of such a large multinational exercise demonstrates the importance of continuous training and the development of effective de-confliction methods.

Exercise BERSAMA LIMA 24

Conclusion: A Blueprint for Regional Security

Ex BERSAMA LIMA highlighted the RAF's continued contribution to regional stability through its involvement in the FPDA framework. The successful execution of this complex exercise demonstrates the RAF's capability to engage in high-end warfighting and to support allied nations in maintaining peace and security. Furthermore, the meticulous safety planning and de-confliction processes ensured that all operations were conducted with the highest level of professionalism and operational safety.

As the RAF continues to play a key role in the FPDA, exercises like BERSAMA LIMA remain critical to enhancing interoperability, strengthening defence relationships, and ensuring the safety of air operations across the region. Looking ahead, this exercise sets a benchmark for future operations, reminding us that safety is at the core of all military activity—no matter how complex the scenario.

Personnel wishing to get involved with exercises such as BERSAMA LIMA should consult A1 Opportunities and apply through their CoC for LM approval.

All imagery Reproduced by Kind Permission – Australian Defence Force (F-15SG & F-35) and Royal Singapore Air Force (all others)

Managing the Birdstrike Risk at RAF Lossiemouth

By Sqn Ldr Doug Timms

RAF Lossiemouth (LOS) is a coastal airfield surrounded by arable land, pig farms and small patches of woodland. During the winter, thousands of geese migrate to the nearby Findhorn Bay and Spynie Loch. There are large resident populations of seagulls and corvids who frequently cross the runways to access the neighbouring pig farms and, in the summer, numerous species of birds ranging from swallows to lapwings are attracted to the area. Whilst this may sound like a birdwatcher's paradise, it also presents a significant risk to aircraft operating from LOS.

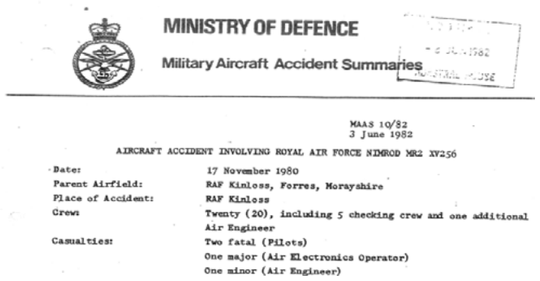
With the transition of LOS to a 24/7 QRA base and the arrival of Poseidon, aircraft are now operating from the airfield at all times and can be launched with minimal warning. During certain times of the day, and seasons, the risk posed by birds to aircraft on take-off and landing can be significant, especially for large aircraft such as the Poseidon.

The consequence of a birdstrike during a critical phase of flight can be catastrophic. At nearby RAF Kinloss (KIS) in November 1980, Nimrod XV256 was lost after it flew through a dense flock of seagulls at 20 feet shortly after take-off, critically damaging three out of the four engines.

Despite the best efforts of the pilots, the only option was to conduct a controlled crash landing and 27 seconds later the plane came down on the treetops of a forest about 1,300 yards from the end of the runway and was quickly engulfed in flames. Tragically, both the pilot and co-pilot were killed with the rest of the 18 crew managing to evacuate the wrecked aircraft thanks to the heroic actions of the aircrew.

The Risk

Following 2 Typhoon birdstrikes with seagulls, one on take-off and one on landing, which resulted in 2 engine rejections in 2015, the LOS Birdstrike Working Group (BSWG) was established to develop and deliver an action plan to reduce and manage the birdstrike risk at LOS. The group consists of representatives from the Airfield Wildlife Control Unit (AWCU), ATC, Platform Air Safety Teams and is chaired by the OC Safety Centre. A LOS Birdstrike BowTie was developed to identify and assess current and future barriers and forms the basis for the quarterly meeting. The BSWG has effectively brought the SMEs and operators together to focus on how best to manage and mitigate the risk. The AWCU provided SME advice on the numerous options considered and a long-term plan was drawn up based on the 3 pillars of removing the hazard, reducing the hazard and detecting and avoiding the hazard.



MINISTRY OF DEFENCE

Military Aircraft Accident Summaries

MAAS 10/82
3 June 1982

AIRCRAFT ACCIDENT INVOLVING ROYAL AIR FORCE NIMROD MR2 XV256

Date:	17 November 1980
Parent Airfield:	RAF Kinloss, Forres, Morayshire
Place of Accident:	RAF Kinloss
Crew:	Twenty (20), including 5 checking crew and one additional Air Engineer
Casualties:	Two fatal (Pilots) One major (Air Electronics Operator) One minor (Air Engineer)

The Plan

Remove the Hazard

The AWCU were contracted to conduct a controlled depredation of seagulls on the Domestic Site following approval from Scottish Natural Heritage. The advice received from the AWCU SME was that this could have some benefit if followed by an enduring programme of nest and egg removal. As anticipated, the activity had limited success due to the sheer number of seagulls on the Domestic Site and their ability to relocate until the threat has passed. Whilst it is always the first option that comes to mind to remove the threat, culls are generally of limited benefit unless repeated frequently and not a credible or cost-effective option in most cases.

Reduce the Hazard

Two options were identified to start to reduce the resident seagull and corvid population. The primary action was to begin an enduring programme of nest and egg removal on the Domestic Site to gradually reduce the resident seagull population. Not only would this reduce the air safety risk but also reduce the considerable noise, nuisance and mess caused by seagulls. Following the successful submission of a Business Case, the nest and egg removal programme has been running since 2017, delivered by the AWCU and an external contractor. The programme has been highly successful, considerably reducing breeding success and we are now starting to see the benefits of a reducing population on the Domestic Site as older pairs die off and there are less younger gulls to breed. Effective habitat management is also key to reduce the attractiveness of the airfield to birds and much work has been completed to improve the measures like timely grass-cutting and reducing ponding on the airfield. The AWCU also agreed to undertake annual shooting-out of the rookery nests behind the Officers' Mess to reduce and displace the resident population.

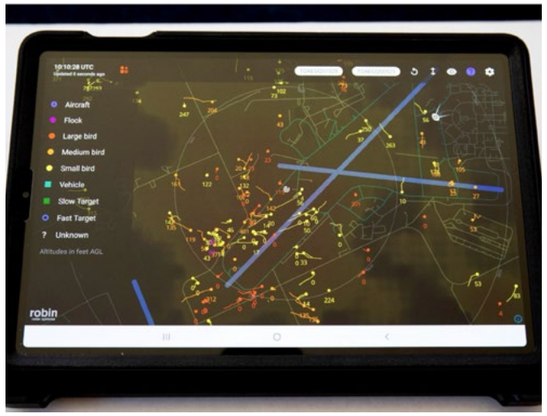
Detect and Avoid the Hazard

This is where the potential for the biggest gains could be made but involved some long-term work to get results. Three key areas were identified to enhance our ability to detect and avoid the birds. Firstly, engagement with the operators, AWCU and ATC was undertaken to optimise the LOS Birdstate Procedures and understand what information the aircrew wanted and the process for delivering it. The actions to be taken at each Birdstate Level were reviewed and the ATC Supervisors empowered to make decisions based on the information they had at the time This work proved extremely beneficial when the Robin Radar MAX Bird Detection Radar was delivered in Nov 20.

The aspiration to operate a Bird Detection System (BDS) at LOS began back in 2014 with the closure of RAF Kinloss and the arrival of Typhoon to LOS. Whilst KIS was still a relief landing ground it was rarely used and scoping work was undertaken to relocate the old BDS from KIS to LOS. The system had enduring funding and was potentially deployable, however, it was old and had limited capability compared to more modern systems. Due to contractual issues, the relocation was cost prohibitive, and the radar remained at KIS - which proved to be fortuitous as the system was used during the Poseidon and Typhoon bolthole to KIS for the LOS runway resurfacing works. Annual submissions for a BDS at LOS were staffed but did not progress beyond unfunded Initial Look Requests, despite the LOS Delivery Duty Holder and the Operational Duty Holder (ODH) , AOC 1 Gp, supporting the requirement.

With the programmed arrival of the Poseidon to LOS, the birdstrike risk was brought into focus. The Air Safety Birdstrike Risk for the Poseidon was assessed as considerably higher than Typhoon due to it being a multi-crew platform with no ejection option. A Duty Holder Advice Note was produced with the ODH only content to accept the risk with the additional barrier of a BDS operational at LOS. Following years of limited progress, the Rapid Capability Office (RCO) and LOS were tasked to deliver an operational BDS by the start of Poseidon operations at LOS. We were effectively given just 6-months to identify a suitable BDS, obtain clearance to operate the radar, identify a suitable location, conduct siting boards, and deliver hardstanding, power and internet connectivity to a bare bones site on the airfield. This was to be completed during COVID restrictions and the runway resurfacing programme at LOS. To add further complexity, the selected suppliers of the BDS, Robin Radar, were a Dutch Company and would require special dispensation to be able to deliver and set up the radar due to COVID protocols.

Following some outstanding collaborative work from the RCO, Robin Radar and LOS, the numerous issues, complexities and requirements were overcome and the Robin Radar MAX BDS was delivered to LOS in Nov 2020 as part of Trial WINCHELL. Over the next 6-months an evaluation of the



Robin Radar Tablet display

In use in the ATC Tower

radar was undertaken as LOS established CONOPS to optimise the new capability. After numerous iterations of how best to exploit the BDS real time information, the previous work undertaken to establish the flow of information from the AWCU to ATC and onto the cockpit provided the best solution. The AWCU pass information on bird locations and numbers, whether acquired digitally or visually, to ATC for awareness and onward transmission to the cockpit or amendment to the Birdstate if required. Trial WINCHELL was deemed a success and following a one-year extension, Robin Radar were awarded a 5-year contract to operate the Robin Radar MAX BDS at LOS until 2027.

The other long-term project was to increase the number of AWCU operators active on the airfield during the core flying window from one to two. This had been successfully trialled using the AWCU operator from KIS to enhance the coverage and capability of the AWCU Team. After failing to have this requirement included in the AWCU contract renewal in 2018, persistence paid off and an additional AWCU operator during core flying hours was eventually funded in 2024. This his significantly increased the capability of the AWCU to dynamically manage and monitor bird activity on and around the airfield.

Benefits

The formation of the BSWG, and birdstrike being recognised as one of the top LOS Airfield Operating Risks, has enabled better understanding and management of the risk. Using BowTie risk analysis, barriers have been identified and delivered, with the effectiveness of these barriers regularly assessed. LOS now has an enduring programme to reduce the breeding seagull population, increased AWCU presence, enhanced Birdstate Procedures and, with the BDS, the ability to detect, track and predict bird activity at LOS 24/7. Greater priority is given to habitat management and every LOS birdstrike or reported near miss is investigated to understand what happened and identify what we can do better next time.

As with the majority of air safety initiatives, it is always challenging to quantify the benefits as success generally means an undesirable event or occurrence doesn't happen. Has LOS reduced the risk – yes; have birdstrikes been prevented – almost definitely; is there still a risk – definitely; is there more work to do – yes, with the extension of pig farms around the airfield fence-line the risk is always changing and evolving, which requires constant review and management.

Current and Future Challenges – Pig Farms

The encroachment of pig farms on the arable land next to the airfield is presenting significant challenges. The pig farms are a major attractant to seagulls and corvids who fly from their roosting sites across areas of the airfield to spend the day feeding and loafing on the pig farms. This has become especially severe at the 28 Threshold, where pigs are located directly next to and underneath the Threshold. Restrictions are in place (Birdstate MEDIUM) when using Rwy 28 at dusk and dawn, however, bird activity is significant throughout the day keeping the AWCU and ATC on high-alert.

Surprisingly, there is no regulation or safeguarding to prevent pig farms being built on land next to an airfield – it is merely seen as a change of arable use and does not require planning permission. The recent proposal to move a local pig farm to a field adjacent to the main runway 05 Threshold, with a rookery on the other side of the airfield, has presented an intolerable risk with the potential of birds crossing the 05 Threshold co-level and in the path of aircraft touching down on Rwy 05. This has resulted in ongoing negotiation with the Land Agent and the Landowner to come up with an acceptable solution to prevent the development. In response, the Robin Radar BDS areas of interest have been reconfigured to cover the area of the proposed pig farm to allow data capture of bird movements across the rwy and provide evidence of increased risk should a legal route be pursued. Data from a Robin Radar at a civil airfield in Germany was successfully used as evidence in a legal case to order a farmer to change their farming practices.

Before and After – The impact of pig farms on bird behaviour. Field next to the 05 Threshold

Pig Farms next to the 28 Threshold

Summary

Working on the management of the LOS Birdstrike Risk has been challenging and rewarding. It can take a long-time to initiate and get approval for equipment and workforce uplifts, having to navigate through complex and lengthy processes and inflexible contracts, which do not always readily accept customer requirements. Persistence and gaining high level stakeholder endorsement to drive solutions forward is essential to success.

Reducing risk requires both work and resource and, apart from amending or updating procedures, will come at a cost. The ability to highlight cost vrs benefit justification for safety interventions is always difficult and requires some vision and often a leap-of-faith – however, to put it into some perspective, if LOS has prevented just one Typhoon engine rejection, the cost of the BDS, the additional AWCU operator, and the nest and egg removal programme will have been justified.

AWCU Perspective on LOS – Kayleigh Simmons – Wildlife Consultant

The AWCU collects data from the BDS on the number and size of birds crossing the airfield, both runways and numerous bird hot spot areas surrounding the airfield, such as the pig farms, coastline and Spynie Loch. Near-misses between birds and aircraft are detected and quantified, and other relevant information, such as wind, rain and temperature, is recorded and cross-referenced to help better predict bird movements during different weather periods. Migration patterns, including timings and directions of flight, are also recorded.

With time, all this data will help better predict bird activity on and surrounding the airfield, helping LOS make informed decisions and change procedures to reduce the risk of bird strikes.

The introduction of two operators on the airfield has been incredibly successful. Aircraft can regularly use both runways at LOS. Due to the increased bird presence surrounding the entire airfield, having an extra pair of eyes to ensure the whole airfield and perimeter are monitored during routine flying is highly beneficial in reporting bird activity and changing the birdstate as required. Additionally, birds are incredibly clever and quickly learn that once the AWCO (Airfield Wildlife Control Operator) moves to another area of the airfield, there is reduced risk for a short time, and they can return to feed. Having two operators ensures they do not have time to resettle on the airfield as there is more of a consistent presence all over the airfield.

The nest and egg removal programme on the domestic site has been ongoing for many years, drastically reducing the bird risk here at LOS. Juvenile gulls pose a significantly increased risk to aircraft due to their decreased flying ability and lack of experience. Removing this risk before it comes to fruition is incredibly beneficial. Additionally, over time, the gull population on the domestic site is reducing, with the older site faithful gulls naturally decreasing and new younger gulls finding safer alternative areas to nest with persistent dispersal techniques.

The Birdstrike Wg has been greatly welcomed by the AWCU. The collaboration between all sections working towards the same goal has been paying off, with significant improvements already being made. However, the job is never finished. There are still vast improvements to make in the future, as the risk continues to adapt and change over time.

AirClues

RAF Lossiemouth Birdstrike BowTie

Seagulls

BCU Activity
BCU operators cover both the Airfield and the Domestic Site on an opportune basis. Enhanced situational awareness provided by the Bird Detection System (BDS). Lethal force used to remove birds presenting air safety threat. Additional BCU operator during LOS flying window. BCU analysis of BDS Report Viewer included in contract.

ATC Procedures
DAM bird state protocols AW DDH orders.

TRC
General comms - Caravan to BCU Weak - Timeline from TRC to BCU to ATC to cockpit Weak - TRC not always operational Weak - Comms coverage.

Aircrew See and Avoid
Pilot and Co-pilot Look out Non-effective at night / Poor light.

Aircrew Briefing
Birdstrike risk discussed as part of the out-brief and considered in the operational risk matrix (ORM). P-8A SOPs. Typhoon does not use ORM.

Reduce Food Source
LOS and local area (Pig farms). FOD plan to keep bins closed. Monthly BCU engagement with local farmers to coordinate feeding times 13 K area survey completed this year - Recommendations to be progressed.

Habitat Control
Long grass policy on airfield and some areas of the domestic site. Runway resurfacing work has removed some areas of ponding on airfield.

Access to LDP Building Areas limited for BCU

Sparse Bird-proofing on Domestic Site

Ponding adjacent to Bravo Taxiway

Reduction of Gull Population
Graham's contract in place to remove nests and eggs on domestic site during nesting season targeted reduction in goal population on the domestic site on request from the airfield operator and approval by SNH.

Use of Lasers
Use of lasers by BCU to lift and disperse birds. Only effective at night. Only one laser available.

Corvids

BCU Activity
BCU operators cover both the Airfield and the Domestic Site on an opportune basis. Enhanced situational awareness provided by the Bird Detection System (BDS). Lethal force used to remove birds presenting air safety threat. Additional BCU operator during LOS flying window. BCU analysis of BDS Report Viewer included in contract.

ATC Procedures
DAM bird state protocols AW DDH orders.

Aircrew See and Avoid
Pilot and Co-pilot Look out Non-effective at night / Poor light.

Aircrew Briefing
Birdstrike risk discussed as part of the out-brief and considered in the operational risk matrix (ORM). P-8A SOPs. Typhoon does not use ORM.

Reduction of Corvid Population
LOS BCU conduct an annual shooting out of rookery nests behind Officer's Mess. Did not happen in 24 - need to review for 25.

Habitat Control
Long grass policy on airfield and some areas of the domestic site. Runway resurfacing work has removed some areas of ponding on airfield.

Reduce Food Source
LOS and local area (Pig farms). FOD plan to keep bins closed. Monthly BCU engagement with local farmers to coordinate feeding times 13 K area survey completed this year - Recommendations to be progressed.

Use of Lasers
Use of lasers by BCU to lift and disperse birds. Only effective at night. Only one laser available.

Small Birds

BCU Activity
BCU operators cover both the Airfield and the Domestic Site on an opportune basis. Enhanced situational awareness provided by the Bird Detection System (BDS). Lethal force used to remove birds presenting air safety threat. Additional BCU operator during LOS flying window. BCU analysis of BDS Report Viewer included in contract.

ATC Procedures
DAM bird state protocols AW DDH orders.

Aircrew See and Avoid
Pilot and Co-pilot Look out Non-effective at night / Poor light.

Aircrew Briefing
Birdstrike risk discussed as part of the out-brief and considered in the operational risk matrix (ORM). P-8A SOPs. Typhoon does not use ORM.

Habitat Control
Long grass policy on airfield. Weed killing and reduction of food sources for small birds.

Reduce Food Source
LOS and local area (Pig farms). FOD plan to keep bins closed. Monthly BCU engagement with local farmers to coordinate feeding times. Grass and habitat policy on airfield.

Use of Lasers
Use of lasers by BCU to lift and disperse birds. Only effective at night. Only one laser available.

Geese

BCU Activity
BCU operators cover both the Airfield and the Domestic Site on an opportune basis. Enhanced situational awareness provided by the Bird Detection System (BDS). Lethal force used to remove birds presenting air safety threat. Additional BCU operator during LOS flying window. BCU analysis of BDS Report Viewer included in contract.

ATC Procedures
DAM bird state protocols AW DDH orders.

Aircrew See and Avoid
Pilot and Co-pilot Look out Non-effective at night / Poor light.

Aircrew Briefing
Birdstrike risk discussed as part of the out-brief and considered in the operational risk matrix (ORM). P-8A SOPs. Typhoon does not use ORM.

Deer

Perimiter Fencing
New station perimeter fence has proven effective to date in preventing ingress of deer onto the unit remaining deer population removed.

Aircrew See and Avoid
Pilot and Co-pilot Look out Non-effective at night / Poor light.

Defence Deer Management Activity
DDM team five year and one year plan to manage the population available to remove deer on request. Zero tolerance policy for deer on the airfield SNH license to shoot out of season day/ night.

BCU
Regular patrols and presence during flying activity.

ATC
Visual last look checks ATC Procedures (LOS FOB) Caravan Controller.

Rabbits/ Hares / Small Mammals

Perimiter Fencing
Frangible fence to rear of 10 R/W grants access /egress to airfield for mammals.

Aircrew See and Avoid
Pilot and Co-pilot Lookout Non-effective at night / poor light.

BCU
Regular patrols and presence during flying activity BCU out of season licenses to remove animals.

ATC
Visual last look checks ATC Procedures.

Habitat Control
Pest control on request for rabbit removal using ferrets for known Burrows and air rifle in the open.

12.2 Flying Operations in LOS AoR

Birdstrike or Wildlife Strike

Injury to Aircrew
DDH
TE 04 12

Fatality of Aircrew
SDH
TE 02 09

Author	
Sqn Ldr D Timms	
Revision No.	Revision Date
v 1.4	13/8/2024
Notes	
BowTie review conducted by BSWG on 13 Aug 24	

Tribute to the Passing of a Safety Legend
Professor James Reason CBE (1938-2025)

By RAF Safety Centre

Professor James T. Reason, the renowned British psychologist, sadly passed on 5 February 2025. He was widely regarded as one of the foremost experts in human error and safety management. His pioneering work in cognitive psychology and human factors significantly shaped the understanding of accidents, organisational safety, and risk management across various industries, with a particularly profound impact on aviation safety.

Professor Reason's most influential contribution was his development of the 'Swiss Cheese Model,' a framework that explained how multiple layers of defence within complex systems could fail, leading to accidents. The theory was widely adopted in a range of high consequence industries, but significantly for us, it had massive application in aviation. It was a practical and easily understandable theory which broadened attention from errors and supposed failings of individuals, to the design of the systems in which they operated. Believe it or not, the idea was inspired by a cat: Professor Reason told the story in his autobiography: 'A Life in Error'.

"One afternoon in the early 1970s, I was boiling a kettle for tea. The teapot (those were the days when tea leaves went into the pot rather than teabags) was waiting open-topped on the kitchen surface. At that moment, the cat – a very noisy Burmese – turned up at the nearby kitchen door, howling to be fed. I have to confess I was slightly nervous of this cat and his needs tended to get priority. I opened a tin of cat food, dug in a spoon and dolloped a large spoonful of cat food into the teapot."

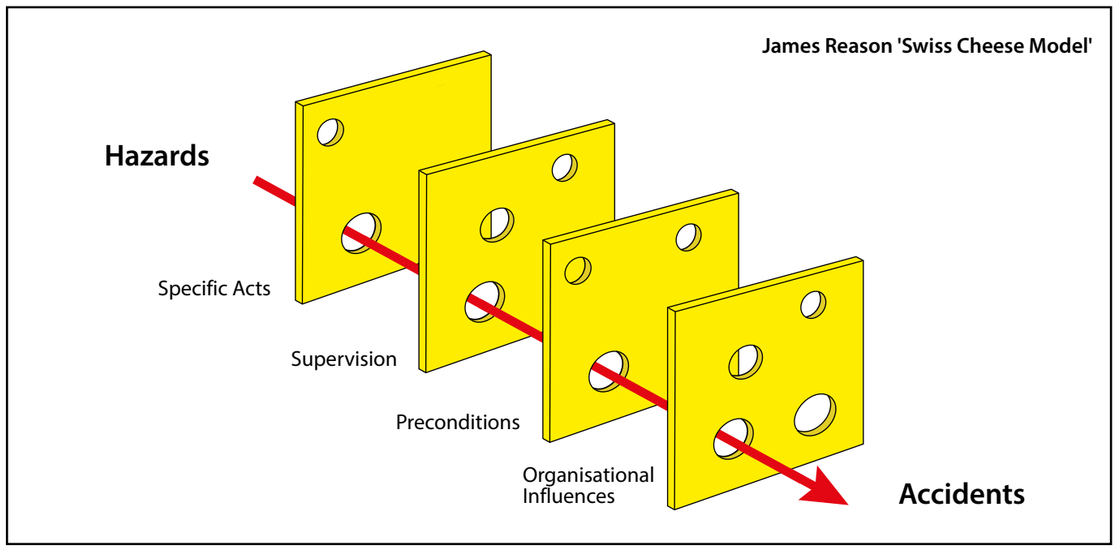
He thought deeply about what he called this 'behavioural spoonerism,' realising it was neither intentional nor random. From this insight evolved a theory of accident causation that examined the interaction between human actions, preconditions, and defences, or barriers. In the RAF, we adopted our 'BowTie' analysis of hazard mitigation as a direct result of this theory. Australian safety pioneer Rob Lee coined the term 'Swiss Cheese' to describe how the barriers in Professor Reason's theory contained metaphorical holes that opened, closed and moved. And Professor Reason loved the analogy because of its simplicity.

In aviation, this model was particularly groundbreaking. It emphasised that accidents rarely occurred from a single point of failure, but rather as a result of several contributing factors aligning, akin to slices of Swiss cheese with holes that could line up. This approach helped shift the focus from blaming individual human error to understanding the broader organisational and systemic issues that contributed to accidents.

Professor Reason's research provided critical insights into how human errors in cockpit operations, decision-making, and communication could be mitigated through better training, improved design, and more robust safety systems. His analysis of high-profile aviation accidents, such as the 1989 Kegworth air disaster, revealed how multiple small errors, often overlooked in isolation, could escalate into catastrophic events. This understanding led to a more holistic approach in accident investigation and risk management in the aviation industry, moving away from a singular focus on technical malfunctions or pilot error.

Equally important to our application, Professor Reason's research contributed to the development of a 'Just Culture' within aviation, where the focus shifted from punitive measures to learning from mistakes in a non-punitive environment. This culture promoted open reporting of safety concerns, ultimately improving overall safety outcomes.

As a prolific researcher, Professor Reason's studies on human error, particularly in high-stakes environments like aviation, were widely influential. His seminal work 'Human Error' (1990) became a foundational text in safety science and was frequently referenced in the development of training programmes for pilots, air traffic controllers, and safety management teams. His work helped shape both policy and practice in aviation safety, directly influencing safety regulations and procedures globally.



Dr James Reason has suggested that safety culture consists of five elements:

An informed culture | A reporting culture | A learning culture | A just culture | A flexible culture

In an **informed culture**, the organisation collects and analyses relevant data, and actively disseminates safety information.

A **reporting culture** means cultivating an atmosphere where people have confidence to report safety concerns without fear of blame. Employees must know that confidentiality will be maintained and that the information they submit will be acted upon, otherwise they will decide that there is no benefit in their reporting.

A **learning culture** means that an organisation is able to learn from its mistakes and make changes. It will also ensure that people understand the SMS processes at a personal level.

In a **just culture**, errors and unsafe acts will not be punished if the error was unintentional. However, those who act recklessly or take deliberate and unjustifiable risks will still be subject to disciplinary action.

A **flexible culture** is one where the organisation and the people in it are capable of adapting effectively to changing demands.

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I Learnt About **Supervision** From That...

By Sqn Ldr Jim Maginnis

Rob Schleiffert from Holland, CC BY-SA 2.0 <https://creativecommons.org/licenses/by-sa/2.0>, via Wikimedia Commons

It was a typical December night in 2000 when I was operating on the 'Wessex One' taskline out of Bessbrook Mill in south Armagh, supporting the Armagh Roulement Battalion (ARB) during Operation BANNER.

The tasking involved flying by day and night around the southern 'triangle of joy' - basically a 'ring route' bringing in supplies and pax, and 'taking out the trash' (and pax). Even though I was just (sic) a Nav, I was the 'senior man' on the crew: Sqn Exec; QHNI; and Aircrew Checking Officer. The pilot was a reasonably junior first tourist, but normally dependable and in possession of a 'good pair of hands', something always useful in a member of 'the Two-Winged Master Race'. The crewman was also an old ARB hand and was known for being steady and reliable.

The 'boy wonder' in the right-hand seat had coped well in the day tasking, and having spoken with his Flight Commander about his night flying before transiting to BBK I was content regarding his NVG abilities.

On this particular evening we were tasked for a series of 'greenfield' and 'regular HLS' drop offs, culminating with a pick up at a specific site. It was the archetypal 'dark and stormy' ARB night and we were all on night vision goggles.

So, we fired up 'Walter', the good old Wessex HC2, and 'lifted into the Luft'. The first serials, as I recall, went on rails, and, after SOP recces, aided by Nitesun, in and out we went. Yep, the boy was quite good, so I unclenched my buttocks and relaxed a little. Now the pickup was a tricky little site, situated as it was on the side of a hill, and it had started to snow, but I was still happy. However, in hindsight...

What happened next, I still haven't fathomed!
On approaching the pickup, instead of recceing the site in consultation with the crewman, and schneebling in at a sedate pace - we had no pax on board and a typically light south Armagh fuel load, so bags of power in hand – 'Biggles' pulled in a huge fistful of collective, stuffed the nose down, and charged straight towards the HLS!!!

Now, you know that scene in Star Wars when the Millennium Falcon jumps into hyperspace. No, don't be ridiculous, the mighty Wessex wasn't approaching warp speed...come on, at 100kts it almost shook itself to death...but the snow in the goggles reminded me of the stars in the film blurring into straight, converging lines. I glanced to my right and said 'boy wonder' was head down, oblivious to what he was doing, and on and on we charged, driving towards this wooded lump of granite.

One of the biggest aspects of supervision is knowing when to step in, so 'a little longer' I thought. But then, from behind and below, came the plaintiff cry 'Crewman's not happy', and this was quickly followed by 'And the Nav isn't happy either!!! Break off the bloody approach'!!

This seemed to snap the pilot out of whatever trance he had entered, and let's say his break away from the hillside was somewhat 'robust' causing even more expletives from the LHS and the Crewman...this manoeuvre possibly was more disconcerting than the initial charge towards the pickup site.

Consequently, a somewhat chastened Wessex One crew headed back to Bessbrook Mill; en route I called up the air tasking co-ordinator on secure to claim that 'the weather was unfit for further tasking' and unfortunately the pax would have to spend the night at the pickup site. A bit of a white lie – the weather was improving. But, there was no way that I was going to allow this particular pilot to fly again that night. By the time we'd shut down and refuelled, the snow shower had gone through, and it was a crisp, clear winter's evening.

On entering the aircrew hardened accommodation the top cover Army Air Corps Lynx 5 and 6 crews started the usual 'Oh yeah, the weather's unsuitable...for the RAF maybe!!' and 'What's wrong...is Coronation Street on?' However, they could see by the looks on our faces (and a few scattergun expletives from me) that all was not well in the state of Bessbrook. Those who, in the bygone days of yore, operated out of BBK will recall that the RAF accommodation was down the stairs, so down we trudged and made a brew...all in stony silence.

After a while I said to the other two, 'Right, we're not going flying again tonight...so let's sort this out', and consequently, a particularly robust debrief followed. But despite the crewman and I playing 'good cop, bad cop' the pilot could not explain his thought processes at all, and when asked when he was going to break off the approach to the pickup site he admitted that, but for the Crewman's and my interjection, he probably would have flown us straight into the hillside.

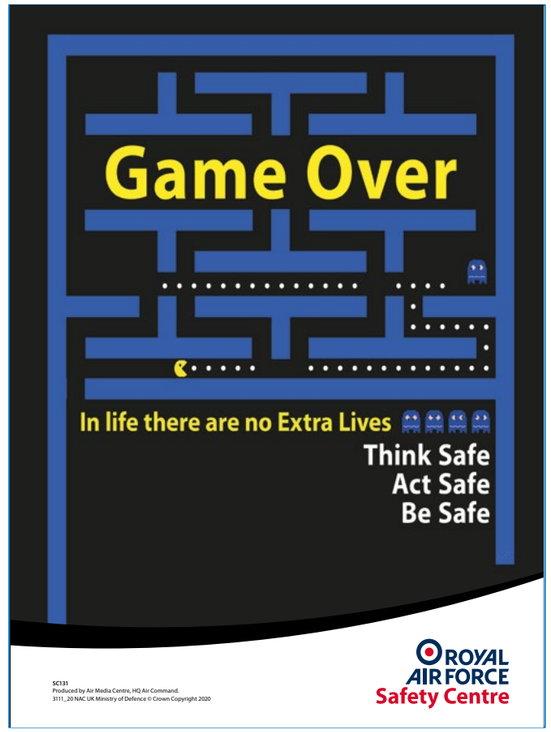
I later squared our lack of tasking with the air tasking coordinator and the Lynx crews...giving them a very edited version of events, but I did say that I would be happy for us to be 'crashed out' for any Priority One tasking (Casevacs, troops in contact etc). Fortunately, we weren't needed. The next day things remained tense, but I was content for us to transit back to Aldergrove when we were relieved by the oncoming cab and crew.

I discussed the matter with the pilot's Flight Commander and, said that whilst I thought that he should retain his Combat Ready status, I did recommend that he fly a few day and night sorties with a QHI in the LHS!! This he did successfully, and as far as I am aware this was his one and only 'brain fart'!

However, it was only during a daylight drop off at the same site when I was on Wessex One (yes, Squadron Execs did do their fair share of tasking) that I realised how close we had come to disaster that night!! Another ten or fifteen seconds after me telling the pilot to break off the approach may have been too late.

So, the message here when supervising, either on the ground, or in the air, is, 'if there's any doubt then there's no doubt'…knock it off early: rethink, reconsider, and rebrief. There's a fine line between 'learning from experience' and becoming a smoking hole on a south Armagh hillside, and we genuinely were close to disaster that night.

With that wonderful concept called hindsight, I should have reacted earlier, but, in the words of this article 'I learnt about supervision from that'.



‘A Knock at the Door’ – FOD Safety Video by RAF Valley

By FS John Evans, FS CAE (DDH), 4FTS RAF Valley

From Defence Air Safety Occurrence Reports (DASOR) and Maintenance Error Management System (MEM) analysis, it was evident through a very positive reporting culture that FOD incidents were becoming more prevalent across the Military Air Environment at RAF Valley.

There is always ongoing excellent work being carried out by the BAE Systems Air Safety Team, with Newsletters, Workshops and Toolbox Talks; however, further discussion between RAF and BAE Systems engineers was appropriate. All realised further work could be done, and it was agreed that a FOD Video would provide an excellent training resource for the Whole Force community.

I had a great storyline in mind, based on items of FOD reported in recent Unit DASORs, noting that similar occurrences have happened elsewhere in military aviation. The screenplay told a story of three instances, where FOD was introduced onto an aircraft and had very serious consequences. A flying control jammed, and the aircraft crashed, killing its occupant.

To amplify the message, the Station Padre and Casualty Notification Officer would ‘Knock at the Door’ of the home of the deceased pilot, ready to deliver the tragic news to their spouse. It was important to send a message of what could have happened if the created instances were not ‘course corrected’ at the time.

As the Project Leader, I was delighted with the buy-in from BAE Systems management, Babcock employees, and the RAF Visual Communications Section. Filming was completed over a six-month period. Special credit is deserved by Pt 145 actors Jen Cox, Andrew Williams and Alan Hughes, Padre Mike Hall, WO Kev Beattie, Hawk T2 Pilot Fg Off Phil McQuade; and the DDH, Gp Capt Andrew ‘Boomer’ Ward. Cpl Gareth McGarvie did an exceptional job of the videography, contributed some excellent ideas; and his efforts in the editing were outstanding. Without the support from across the enterprise, filming would not have been possible.

We had an excellent, believable, relevant product. A Premiere took place on 15 Nov 24 with the actors, Whole Force Air Safety Teams and Station executives, who enjoyed and applauded the film as VIP Guests. The film opened the Unit’s Air Safety Day programme on 6 Dec 24 and was very well received. The FOD video will now be used for Station Arrivals’ Briefs across the Whole Force community.

My aspiration is to distribute the film through both RAF and BAE Systems Flight Safety networks. I really hope you enjoy the film when you see it.

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Have you created a local flight safety initiative? Tell us about it by email :

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AirClues

Insights from the UK Flight Safety Committee

BEA Calls for a Delay to the Phase-Out of Ground-Based Precision Approach Aids

By Rob Holliday, CEO UKFSC

In recent years, advancements in aviation technology have transformed how pilots navigate and land aircraft. Satellite-based systems such as Performance-Based Navigation (PBN) and Required Navigation Performance (RNP) approaches have brought increased efficiency and precision. However, the reliance on these systems has introduced risks that must be addressed before the aviation industry can safely transition away from ground-based precision aids like the Instrument Landing System (ILS). The recent serious incident involving the Airbus A320, registered as 9H-EMU, on approach to Paris-Charles de Gaulle airport serves as a compelling case for why the phase-out of such systems should be reconsidered and postponed.

In the final report the Bureau D'enquêtes Et D'analyses (BEA) investigation found that the development of LPV capabilities is still in its infancy in commercial air transport. In the absence of the LPV capability, aircraft air operators will predominantly use Baro-VNAV approaches in a context where the exclusive use of PBN is imposed. They conclude that the continued phase out of ground-based ILS will, "in the absence of a clear change of direction in Europe, between now and 2030, will lead to a substantial decline in the level of safety on approach." They recommend the EU take appropriate measures to maintain the targeted level of safety of final approach operations in Europe in 2030. In other words, stop phasing out ILS, creating a reliance on Baro VNav approaches, until LPV approaches and associated onboard equipment are in place.

The Incident

On May 23, 2022, the Airbus A320 operated by Airhub Airlines was conducting a satellite-based approach using barometric vertical navigation (Baro-VNAV) due to the unavailability of the ILS for runway 27R at Charles de Gaulle airport. During this approach, a critical error occurred when air traffic controllers transmitted an incorrect altimeter setting (QNH) to the crew. The provided QNH was 1011 hPa instead of the correct 1001 hPa, causing the aircraft to descend approximately 280 feet below the published vertical profile.

The incident unfolded during adverse weather conditions, including heavy rain and low visibility. Despite the availability of terrain warning systems and multiple procedural safeguards, the error went undetected by both the flight crew and air traffic controllers. A ground-based Minimum Safe Altitude Warning (MSAW) was triggered when the aircraft reached a dangerously low altitude, but the subsequent controller warning was not clearly communicated to the pilots. This miscommunication, combined with the reliance on the altimeter setting for the approach vertical profile, nearly resulted in a Controlled Flight into Terrain (CFIT) accident.

The A320's crew initiated a go-around after reaching the minima without acquiring the necessary visual references. During the manoeuvre, the aircraft descended to six feet above the ground at a point less than one nautical mile from the runway threshold. While a successful landing was achieved on the second attempt, the incident underscores significant risks associated with the reliance on satellite-based approaches reliant on the altimeter barometric setting to determine the correct approach slope.

Dependence on Correct Altimeter Settings

The barometric vertical navigation used during RNP approaches is dependent on an accurate QNH setting. An incorrect QNH leads to an erroneous altitude display, which can cause an aircraft to deviate from the intended vertical profile. Unlike ground-based systems like ILS, which provide independent and precise glide path information, the Baro VNav approach relies on inputs that are prone to human error. The 9H-EMU incident demonstrated how a minor discrepancy in QNH can escalate into a major safety threat, particularly when compounded by adverse weather conditions and high workload on the flight crew.

Ground-based precision aids like ILS offer a level of redundancy that is not yet fully matched by RNP approaches. ILS operates independently of altimeter settings, providing a direct and reliable glide path for the aircraft to follow. In contrast, RNP approaches require accurate inputs from multiple systems, including barometric sensors, GPS, and air traffic control. This layered dependence increases the potential for cascading failures, as evidenced by the incident where the aircraft's instruments and procedural safeguards failed to detect the altitude deviation until it was nearly too late.

The incident revealed gaps in pilot training and air traffic controller procedures for managing such scenarios. The controller's tools were not equipped to detect the altitude error, and the subsequent MSAW alert was not handled effectively. This highlights the need for additional safeguards, such as automated systems capable of cross-verifying altimeter settings or alerting crews to discrepancies.

RNP, Baro VNav approaches can involve a higher cognitive workload for flight crews compared to ILS approaches. Pilots must continuously monitor altitude-distance cross-checks, ensure GPS accuracy, and manage complex flight management system inputs. In the 9H-EMU incident, the crew's situational awareness was impaired by the high workload associated with the approach in challenging weather conditions. The absence of visual cues further compounded the situation.

The incident also highlighted communication issues between air traffic controllers and pilots. The use of incorrect and unclear phraseology during critical moments contributed to the crew's failure to recognise the altimeter setting error. Effective communication is particularly vital during RNP approaches, where pilots rely on verbal instructions from controllers to ensure they have the correct altimeter barometric setting.

Localizer Performance with Vertical Guidance (LPV) approaches represent a satellite-based solution that can achieve a level of safety equivalent to ground-based aids like ILS. LPV approaches utilise satellite augmentation systems, such as the European Geostationary Navigation Overlay Service (EGNOS), to provide highly accurate lateral and vertical guidance. These systems are not dependent on barometric altimeter settings, thus avoiding the type of error seen in the 9H-EMU incident.

While LPV approaches offer significant safety advantages, the global fleet's current lack of widespread LPV-equipped aircraft limits their effectiveness as a replacement for ground-based systems. According to the BEA report, the adoption rate of LPV capability is insufficient to justify a full transition to satellite-based systems at this time. The report states: "The overall level of safety would be significantly reduced if the transition to Baro-VNAV approaches became the primary solution before the fleet is sufficiently

equipped for LPV operations." This observation underscores the need to maintain a mixed environment of ground-based and satellite-based aids until LPV technology is more universally available.

The European Commission's Implementing Regulation (EU) 2018/1048 mandates the transition to PBN operations by 2030, with the aim of enhancing airspace efficiency and reducing infrastructure costs. However, incidents like the 9H-EMU approach call into question the readiness of the aviation industry to fully transition away from ground-based aids. The following considerations support the need to postpone the phase-out.

Ground-based aids like ILS have a proven track record of reliability and independence from human input errors. Until equivalent levels of safety can be demonstrated for satellite-based systems, the phase-out of ILS and other ground-based aids should be delayed. This includes addressing gaps in training, procedures, and technology to mitigate risks like those highlighted in the 9H-EMU incident.

Investments are needed in ground and onboard systems capable of detecting and alerting crews to errors in altimeter settings or deviations from the intended flight path. For example, enhanced Terrain Awareness and Warning Systems (TAWS) could provide real-time alerts for altitude discrepancies. Ground-based monitoring tools should also be upgraded to detect and correct errors before they pose a threat to safety.

Both pilots and air traffic controllers require enhanced training to manage the unique challenges of satellite-based approaches. This includes familiarisation with the importance of QNH accuracy, as well as standardised phraseology and procedures for responding to alerts like MSAW. Controllers should also be equipped with better tools and training to recognise and address altitude anomalies.

The BEA report into the 9H-EMU incident recommends that until satellite-based systems can provide the same level of redundancy as ground-based aids, it is essential to maintain both systems in parallel. Dual systems would allow for seamless transitions during failures or discrepancies, ensuring continued safety and operational efficiency.

The timeline for the phase-out of ground-based aids should be reevaluated in light of incidents like the 9H-EMU approach. A phased transition, with periodic safety assessments and the option to delay further implementation, would allow the industry to address identified risks without compromising safety.

The 9H-EMU incident serves as a reminder of the risks associated with the premature phase-out of ground-based precision approach and landing aids. While satellite-based systems offer significant benefits, they also introduce vulnerabilities that must be carefully managed. Until these risks have been mitigated, the continued reliance on proven ground-based systems like ILS will maintain existing safety levels.

Postponing the phase-out of ground-based aids will provide the time needed to address these challenges through technological advancements, improved training, and the development of robust procedural safeguards. LPV approaches hold promise for the future, but their adoption must be accelerated to ensure fleet-wide compatibility. The ultimate goal must be a seamless and safe transition that upholds the highest standards of safety, ensuring that incidents like the 9H-EMU approach remain rare exceptions rather than cautionary tales.

Also published in 'Focus' Edition 128.

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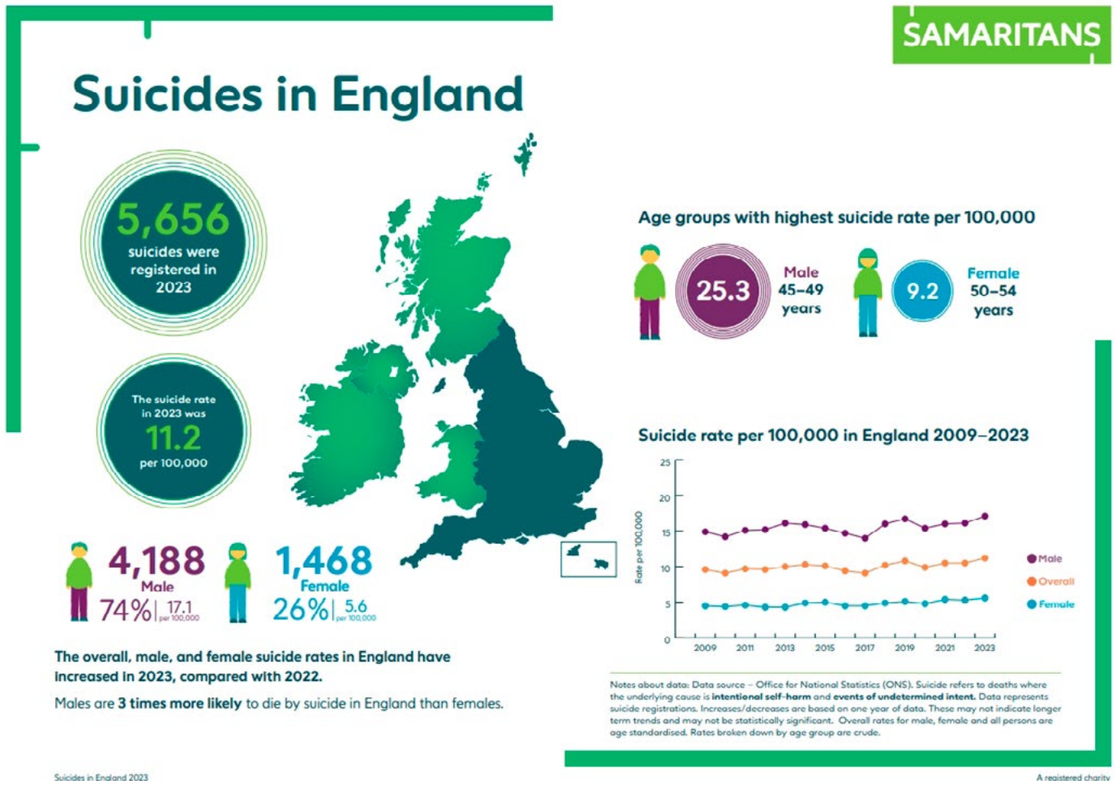
I Learnt About **Mental Health** From That...

By Lt Cdr J Harms RN (Retd)



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I am a survivor of suicide. It still feels strange making that statement. I went on the 'Care of the Trainee' course at RAF Cranwell, and no, that isn't why I attempted suicide! During the course one of the topics for discussion was suicide.

It was handled well by the military staff, who were clearly familiar with the briefing material, but I sensed a reticence from the other attendees to talk about it. Perhaps it's the stigma or the ignorance around the subject. Perhaps it's the social taboos surrounding the event.

Either way, I was shocked when one of the audience claimed that suicide was a selfish act. It made me angry, it made me question their right to be in attendance but it also made me question myself.

I personally don't talk about my suicide attempt a lot these days. I've reached the point where it feels like a lifetime ago. I didn't make a plan and I had no perspective of time during the event. It just 'was'. My depression wasn't the result of a life changing occurrence, it was the simple fact that my brain got poorly. It wasn't working properly. Everyday in the crewroom we moan about 'bad sinuses', 'man flu', 'sore ligaments', 'sprained ankles' etc. but we hardly ever talk about 'broken brains'. But thinking about the law of probabilities and considering that the brain is just another organ, why wouldn't it break, or get poorly, or be 'sprained'? Anyway, my brain was definitely non-operational.

No one could tell me why it was unserviceable which needless to say, was one of my biggest frustrations! The dichotomy of being an alpha male but also a modern man, means that while I can accept that others with Mental Health issues need support, I struggle to see myself as someone with 'Mental Health' issues.

Subjectively I can see how bizarre that is; especially considering that a physical health issue originating from a rugby injury would be considered a badge of respect. So why isn't a mental health injury a rite of passage too? I can promise you, it's a lot more gruelling to deal with! There were times during my depression when I felt very alone in my sadness and there were times when I felt lost and confused. The trouble with depression and suicide is that no one knows what to say, even the patient. No one knows how to react. So they smile and wave and attempt distraction ... but they never ever say the word. Once the medical teams have made their assessment, taken appropriate action and ensured support is in place, the survivors are often left to survive on their own. This isn't an indictment of the medical services. My experience of the support has been faultless. The loneliness comes from the silence.

I experienced endless waves of emotion in the days, weeks, months and even years living with this invisible black cloud. The "whys" kept me up at night, causing me to float through each day in a state of perpetual exhaustion. Why was my brain broken? Why had depression picked me? Why couldn't I just pull myself together?

Why couldn't I jump into a cockpit and help the squadron out? Why couldn't I function normally? Why me? Why do I feel so guilty and helpless and alone and worthless and angry and cold and scared and such a burden on everyone I touched? Sometimes, I cried, without reason.

Sometimes, I sat perfectly still watching the waves crash down on Rhosneigr Beach, hoping for a sign that I was on the mend. Sometimes, I silently scolded myself for not seeing the warning signs. Sometimes, I bargained with God or anyone else who might be in charge up there. Let me get better.

Yes, I experienced a range of emotions before making peace with my lot, accepting the sadness and just being 'depressed'. But one thought that never ever (not even for one second) crossed my mind was this ill-informed opinion that suicide is selfish.

Suicide is a lot of things, but selfish isn't one of them. Suicide is a decision made out of desperation, hopelessness, isolation and loneliness. The black hole that is clinical depression is all-consuming. Feeling like a burden to loved ones, feeling like there is no way out, feeling trapped and feeling isolated are all common among people who suffer from depression.

People who say that suicide is selfish always reference the people left behind. It's selfish to leave children, spouses and other family members behind, so they say. They're not thinking about the survivors, or so they would have us believe. What they don't know is that those very loved ones are the reason many people hang on for just one more day. They do think about the survivors, probably up until the very last moment in many cases.

But the soul-crushing depression that envelops them leaves them feeling like there is no alternative. Like the only way to get out is to opt out. And that is a devastating thought to endure. In the same way a damaged liver can no longer play a central role in all metabolic processes in the body, the damaged brain struggles to fight suicidal thoughts.

Until you've stared down that level of depression, until you've lost your soul to a sea of emptiness and darkness ... you don't get to make those judgments. You might not understand it, and you are certainly entitled to your own feelings, but making those judgments and spreading that kind of negativity won't help the next person. In fact, it will only hurt others and potentially your own chance of survival in the future.

As the world mourned the loss of Robin Williams, people everywhere were left feeling helpless and confused. How could someone who appeared so happy in reality be so very depressed?

The truth is that many, many people face the very same struggle each and every day. Some will commit suicide. Some will attempt.

And some will hold on for dear life. Most won't be able to ask for the help that they need to overcome their mental illness.

You Can Help

Know the warning signs for suicide. 50-75% of people who attempt suicide will tell someone about their intention. Listen when people talk. Make eye contact. Convey empathy.

Check in on friends struggling with depression. Even if they don't answer the phone or come to the door, make an effort to let them know that you are there. Friendship isn't about saving lost souls; friendship is about listening and being present. Reach out to survivors of suicide. Practice using the words "suicide" and "depression" so that they roll off the tongue as easily as "starbucks" and "BowTie Management". Listen as they tell their stories. Hold their hands (well, maybe not in the crew room – awkward!). Be kind with their hearts.

Encourage help. Learn about the resources in your area so that you can help friends and loved ones in need. Don't be afraid to check in over and over again. Don't be afraid to convey your concern. One human connection can make a big difference in the life of someone struggling with mental illness and/or a survivor's guilt.

Men remain around three times more likely to take their own lives than women in the UK, but we must pay attention to the risks in both genders. In total there are on average 6,000 successful suicides per year in the UK; 30,000 in the USA. Will you start talking about suicide and depression? Will you help to smash the stigma?

Spry's Comment:

If you or someone you know have experienced or suffered from thoughts of suicide and you need to talk to someone about it, you can contact the Samaritans on their free-to-call number 116 123, email jo@samaritans.org or visit their website at www.samaritans.org ■

Data visuals replicated with permission and available from: Samaritans (2024)

https://www.samaritans.org/about-samaritans/research-policy/suicide-facts-and-figures/latest-suicide-data/

Data source: Office for National Statistics (ONS), released 29 August 2024, ONS website, statistical bulletin, Suicides in England and Wales: 2023 registrations.

https://www.samaritans.org/

ROYAL AIR FORCE Safety Centre

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Doc's Corner:
Aviation Dissociative Phenomena:
What Did Aircrew Say?

By Dr Vanesa Garnelo Rey, RAFCAM

Giant-Hand Phenomenon

Example of Giant-hand phenomenon in a Hawk T1:

"Night Sortie, low level, low ambient light levels. Weather was swirling snow in cloud. I was at about 6,000' when I experienced giant hand - the controls felt very stiff, and I was seemingly prevented from making any stick input. Lasted for about 20 secs. The conditions were very disorientating".

'Giant Hand' (Illustration by Paula Garnelo Rey, Copyright ©2025)

Break-Off Phenomenon

Example of Break-off phenomenon in a Jaguar:

"Early 1992, medium level behind AAR tanker flying towards Northern Iraq along Syrian Border on way to complete operational reconnaissance mission with 5 LL recce targets in N Iraq. I had a feeling of looking down on myself in the cockpit from above and a feeling of intense euphoria - so much so that I shouted yeeees to myself and pumped my fists! I believe that my feeling of elation was due to the fact that I had succeeded in my ambition to become an RAF fast jet pilot and that I was now on operations heading towards Iraq. This was not my first operational sortie, but the feeling was likely caused by me now becoming familiar and comfortable on operations and having a firm grasp on what I was doing....! I 'snapped' straight back into the cockpit when there was an R/T call over the radio and haven't experienced anything similar since.

'Break Off' (Illustration by Paula Garnelo Rey, Copyright ©2025)

Knife-Edge Phenomenon

Example of a Knife-edge phenomenon in a Chinook:

"I was demonstrating to a student a night fast roping approach procedure from the front door of the Chinook. I was explaining my actions whilst carrying out the procedure. It was effectively a fast speed reduction from 110 knots to a hover over a specific point all carried out at approx 50-100ft. Although it didn't detract from the demonstration, I had an over whelming feeling of being at risk of falling. I had never experienced the feeling despite having done this activity hundreds of times. I carried out the activity a few more times during the sortie but didn't get a repeat, it was most strange. It was a night sortie on NVG, I wasn't particularly tired and was experienced in night ops. I think I put it down to not scanning enough so as to be comfortable in my position."

'Knife-edge' (Illustration by Paula Garnelo Rey, Copyright ©2025)

A total of 676 responses were returned by the Spatial Disorientation Incident survey last year. Considering that there are approximately 2,000 aircrew in the RAF alone and the survey was rolled out across all Services, the response rate is very low.

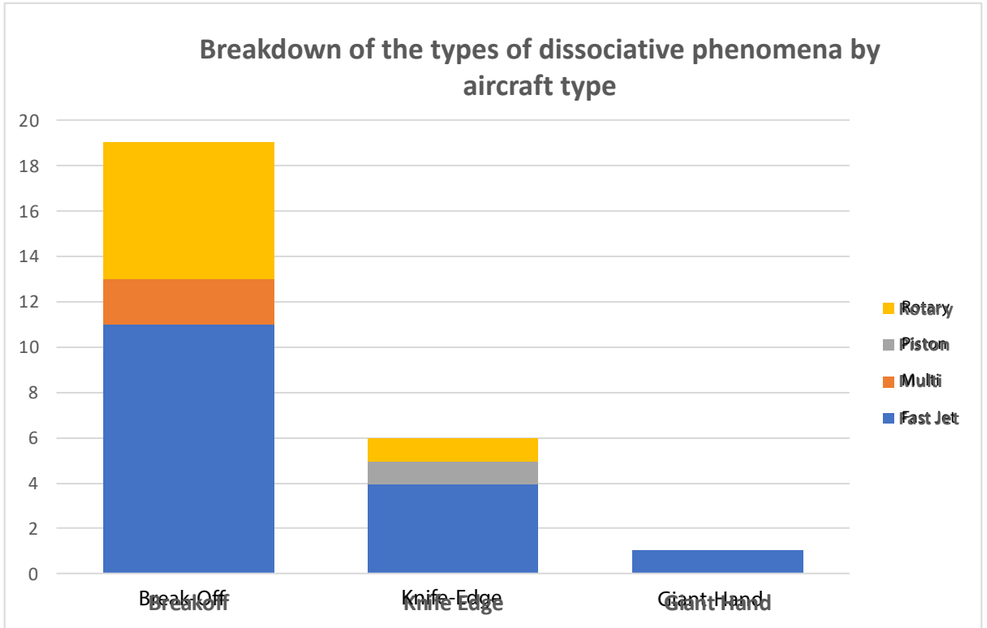
26 responses were identified as matching the definition of Aviation Dissociative Phenomena giving a career **incidence** of **4%.**

Are these experiences more common in certain crew roles?
- **85%** (22) of the responses were provided by pilots.
- **15%** (4) by other aircrew.

Are these experiences more common in certain platforms?
- **61%** (16) occurred in Fast Jet aircraft.
- **27%** (7) in Rotary Wing.
- **8%** (2) in Multi-engine aircraft.
- **4%** (1) in light-training (piston) aircraft.

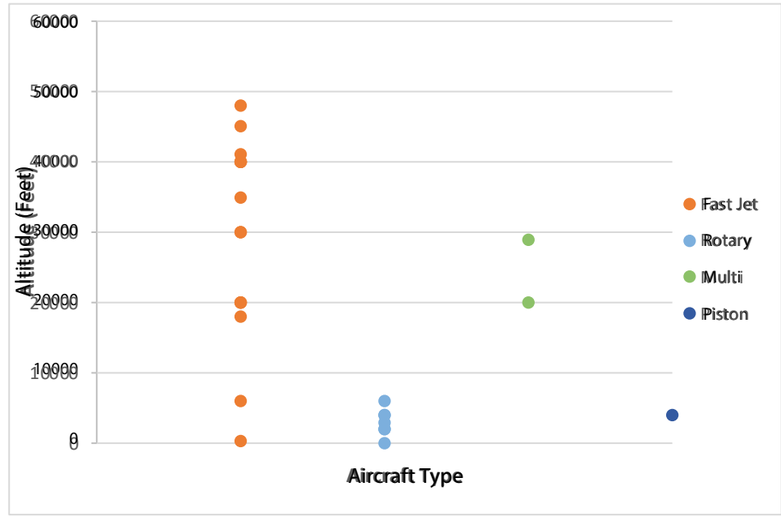
When have you experienced any of these episodes?
- **50%** reports are dated before 2005.
- **50%** reports are dated after 2005. Of these, 54% have occurred in the last 5 years.

What type of phenomenon?



What type of sortie were you flying?
- **35%** (9) were flying an operational sortie.
- **19%** (5) were flying a training sortie.
- **11%** (3) were flying a tasking sortie.
- **35%** (9) unknown.

Are these episodes exclusive to high altitudes?



Does sensory constancy increase the risk?
- **69%** (18) episodes described sensory constancy.
- **27%** (7) episodes did not describe it.
- **4%** (1) unknown.

Is fatigue a contributing factor?
- **27%** (7) episodes cited fatigue as a contributing factor.
- **73%** (19) episodes did not cite fatigue as a contributing factor.

How did the episode resolve? Examples described by aircrew:

"Feeling passes when descending into thicker air and lower altitudes <FL300."

"I 'snapped' straight back into the cockpit when there was an R/T call over the radio and haven't experienced anything similar since."

"The effect lasted for about 30 secs and I stopped it by looking inside the cockpit and concentrating on the instruments for a bit. I wasn't fatigued and I didn't feel ill."

"I shook my head and started to talk to my nav and that seemed to snap me out of it and got me back in the jet."

"Resolved by getting more external visual and auditory inputs."

"I took it as a sign that I was tired after the deployment and got up to stretch my legs and make the crew a coffee which resolved the event. I have had no re-occurrence of the incident since."

"As I became aware of it, I made a deliberate point of talking to the crew to break out of the trance, confirm I was awake and to ensure that the other crew members were still alert."

Was flight safety compromised?
- **65%** (17) episodes were described as minor.
- **0%** episodes were described as significant.
- **35%** (9) episodes were described as severe.

- o **Minor** — "Trivial", flight safety was not at risk.
- o **Significant** — "Could have been nasty", flight safety was not at risk but could have been jeopardised in different circumstances.
- o **Severe** — "Lucky to get away with it", flight safety was at risk.

Examples of *severe* episodes:

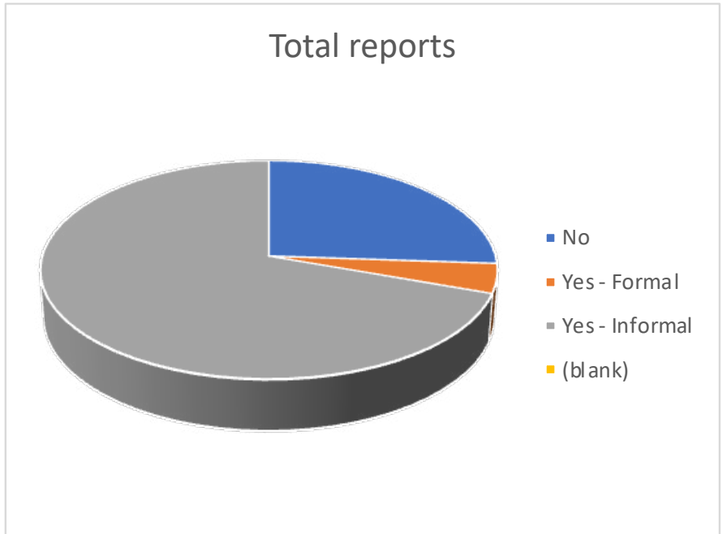
"This occurred towards the end of a singleton night HI LO HI sortie with the aircraft at FL180 en-route to base with the autopilot engaged. Before disengaging the autopilot to commence descent for recovery I felt anxious about taking control and 'disconnected' from the aircraft. The low-level element of the sortie had been relatively high workload and successful. By contrast, the medium-level transit was dull and arousal levels were low. This was made worse by poor weather reducing visual cues and little radio traffic. I began to question whether I was capable of carrying out an accurate descent and recovery. However, I disconnected the autopilot as planned and the feeling of uneasiness slowly receded as the workload increased. Nothing further untoward occurred but I didn't feel completely 'back in the groove' until approaching level off to enter the instrument pattern."

"Not one event. I always felt unwell and detached when climbing out from low-level into a high-level transit. I began to avoid situations where I had to fly at high-level- i.e. Atlantic crossings. I engineered a posting to the training unit, which only flew at low-level."

Did you report it and share the experience with anyone else?

- **12%** (3) no response.
- **23%** (6) did not report or share the experience.
- **65%** (17) shared their experience, of which:

- o **6%** (1) formal through official pathways.
- o **94%** (16) informal with peers, family, and friends.



Did you have previous awareness of these phenomena?

61% (16) had previous awareness, of which were:

- **88%** (14) through Aviation Medicine training (RAF CAM and RAF North Luffenham).
- **12%** (2) through Air Safety publications, crewroom chat, and previous Spatial Disorientation Incident Surveys.
- **39%** (10) did not have previous awareness.

What Have We Learnt from Aircrew Experiences?

- These phenomena are not exclusive to fast jet aircrew flying high altitude transits. They do occur to aircrew across all platforms and at a wide range of altitudes.
- "Break-off" appears to be the most common experience yet other forms such as "Knife edge" and "Giant hand" have been described.
- No link was found between these episodes and type of sortie flown.
- Sensory constancy or sensation of "nothing new happening" is a significant contributing factor in increasing the risk but in 27% of the reports this was not the case, challenging previous assumptions of these episodes only occurring in low-arousal states.
- Fatigue did not appear to play a significant role as it was only described in 27% of the reports.
- No other form of spatial disorientation was described in any of the episodes reported demonstrating that these phenomena can take place on their own.
- Coping strategies vary widely. Engaging in flying tasks, radio calls, descending to lower altitudes, regaining visual and auditory inputs, or engaging in conversation with other crew members have been reported.
- 35% reports described flight safety as severely compromised and this requires further careful consideration.
- Aviation dissociative phenomena are not a new feature. Half of the reports are dated before 2005. Of the latter reports, half have occurred in the last 5 years.
- The lack of reporting through official pathways may have led the scientific community and the wider organisation to believe that these phenomena are not happening.

Doc's advice:

- Fostering corporate knowledge and promoting reporting can help us understand not only the true incidence of these phenomena but also raise further awareness of the fact that these episodes have been and are still happening and they are not necessarily pathological.

- The biggest factor in successful outcomes is early reporting so the loss of valuable and highly trained personnel can be averted.

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‘Hell Hath No FURY’…
But We Do

Article originally published in Cockpit Magazine – Reproduced by kind permission.

By Lt Cdr Jim Cobbett, DCFSO, Royal Navy Flight Safety

In writing this article, I am in extreme danger of stealing my own sandwiches, in that I use the FURY mnemonic (that’s easy for you to say) in many of the teachings that we do at the Flight Safety Centre…although when thinking about that, as it is used for many courses, why not print it in Cockpit to widen the audience as it does give a good baseline to ALL for what is required from them personally in terms of Flight Safety, and, if I am going to run another marathon next year I could probably do without the sandwiches…

The mnemonic stems from my time as Lt Cdr Flying in HMS QUEEN ELIZABETH where I found myself a few years ago when the Ship was in build (only just in the water), the Ship’s Company totalled less than 100 of which a grand total of 4 were Air Department, one of whom was on permanent loan to the Damage Control Officer and it seemed that it would be a decade or two before we set sail. LOTS of activity in every part of the Ship, but in tandem with the ethos, FLOAT, MOVE, FIGHT, aviation was at the rearguard of that activity being that it was the FIGHT bit, and the other two priorities, well…had priority.

Move on a year or so, which was not quite the couple of decades that it seemed at the start, and we were going to set sail, and we would be doing aviation on Day 1…which would appear not to be CRAWL, WALK, RUN to some.
But it was an aircraft carrier which has a sole reason to exist (aviation in case you can’t guess), the Air Department had grown to almost 100, boat transfers to move kit, spares, tins of NAAFI pop and personnel would be tricky to say the least and much more straightforward by aviation, and we had PLENTY of time in the lead up to do our best to ensure that things would go ok. However, almost 700 of those things were the rest of the Ship’s Company who were not directly in the business of aviation and had, quite rightly, focussed on making sure that their parts of ship were up to standard. How do you ensure that these people are not placed in danger, or are the cause of danger to others, and are aware that if they become either of those to tell someone about it? FURY was the solution, a simple mnemonic with only 4 things to take away…here they are.

Illustration: Credit ‘Steev’; Royal Navy Copyright ©2024

FOD – don’t put it there in the first place and pick it up if you see it. Most importantly, don’t put it there in the first place…am I repeating myself? Us aviation folk have a good handle on FOD and know the dire consequences of getting it wrong. We needed to impress that on everyone so that we didn’t realise dire consequences as a result of FOD, a tall order being that the Ship had literally been a building site for many years. Unfortunately, there are many examples of the dire consequences out there, so we used some of those.
Most important lesson…don’t put it there in the first place!

Upper-deck Access – don’t go through doors and hatches that are “Closed for Flying Stations”. Noise, heat, F-35 jet-wash, spilt fuel, crashed aircraft debris are just some of the hazards that catwalk goofers would be exposed to if they were in the wrong place at the wrong time. Quite a hard message to sell when in range for mobile phone connectivity, but a message that must be sold, nonetheless. Yes, it is their own necks that they are risking, but it doesn’t half create a load of paperwork!

Reporting – if it looks wrong, it probably is, so report it. Even if it is just to your oppo. You can’t guarantee that anything will be done as a result of your report, but you can guarantee that NOTHING will be done if you don’t report it! We did talk about ASIMS and the Flight Safety Log (a well-used document in QNLZ) but majored on telling someone, if only to get a second opinion, but more likely, confirmation that there is an issue, or potential for one, and a prod to do something about it.

You – do your job in accordance with the rules and regulations that pertain to it. I spin a yarn on courses to relate this aspect of FURY to ANY branch, trade, rank, service, role etc. Imagine a chef who ignores health and hygiene regulations and does some shoddy food prep leading to loads of people coming down with D&V. What is forefront in your mind if you have D&V? I think you would agree that worrying about where the nearest set of heads (toilets in non-Jackspeak) are and how long it would take to get there in an potential poop emergency is quite distracting. So, imagine an engineer (any branch) swinging spanners or a soldering iron who has to make a sharp exit halfway through a maintenance procedure do a lavatorial performance at the rush, returns to the job somewhat lighter, but also distracted, and doesn’t pick up where they left off, so leaving the job is incomplete.
The next day, right at a critical moment when aviation is reliant on that incorrectly maintained piece of kit which then fails, all the holes in the proverbial cheese line up, and we have a Flight Safety occurrence as a result, all of which can be traced back to a chef taking a shortcut… Do you see how important it is to do YOUR job in accordance with the rules and regulations that apply to it? And moreover, I would even go as far as to say that I think this aspect of FURY is probably well over 90% of an individual’s input to Flight Safety…should be easy then?

When I finished in QNLZ I took up the Air Safety Officer post at RNAS Yeovilton, and on the premise of create once, use many times, adapted FURY and replaced upper-deck access with “Airfield access” as we had an issue with people driving through red lights on the perimeter track. This gave me a new mnemonic for people to take-away - **F**OD, **Ai**rfield Access, **R**eporting, **Y**ou - to use at new joiners’ briefings.

Hopefully **FURY** gives an easy framework to use to get the Flight Safety message over to anyone, we certainly use it at the Flight Safety Centre and take it with us when we are on the road, especially to ships. So, if you read this and it comes up on a course that you attend, you now have the material to soar to the top of the class, especially if you tell us that you have used FURY in anger. Enjoy my sandwiches!

Vertical Obstruction Data Assurance

By Mark Darlow, Defence Geographic Centre

What is DVOF?
Defence Geographic Centre's (DGC) Geospatial Air Information Team (GAIT) is responsible for the maintenance and provision of Vertical Obstruction and Powerline Air Information (AI) to Defence through the Digital Vertical Obstructions File (DVOF). The AI data GAIT maintains supports all DGC and No 1 AIDU charting, plus Partners Across Government (PAG) requirements and is supplied free of charge for download via No 1 AIDU's MilFLIP website in-line with the 28-day AIRAC cycle. It is available in several formats to support the Defence Mission and Flight Planning Systems, in-cockpit navigation, and tablet devices you use.

DGC's DVOF dataset covering the UK is the National dataset and is provided to the Civil Aviation Authority (CAA) for publication in the UK Air Information Publication (AIP) en-route section and supports the provision of the United Kingdom's Air Information Service charts and products through the CAA and NATS in accordance with European and International Civil Aviation Organisation legislation.

Worldwide, DVOF is a United States National Geospatial-Intelligence Agency (NGA) dataset currently containing twenty-five million active points which DGC co-produce with our allies. We routinely exchange data with NGA and collect worldwide obstruction data 150 ft above ground level (agl) and above for inclusion in DVOF to support worldwide Defence requirements such as the Carrier Strike Force deployments, disaster relief, Exercises and Operations. In many areas data is held at a lower level too, but the question we are often asked is how is DVOF maintained and importantly, can DVOF be regarded as assured AI data? In short, the answer is no, but…..

In pure AI terms, DVOF should be considered as unassured data as it is derived primarily from open-source research and is not routinely verified by physical ground survey. Despite the limitations, the completeness of DVOF is viewed favourably by other national geospatial agencies (including the NGA), and users frequently comment that UK DVOF is superior to other countries in which they have operated. When tested, World DVOF has also compared favourably to other commercially available datasets, which like DVOF, must also be considered as unassured. So, although DVOF can never be fully assured in AI terms, it is the authorised dataset that's accredited for Defence use.

DGC is regularly audited by the RAF Safety Centre for our processes and culture and were again awarded Full Assurance in our January 2024 visit. DGC also have three fully qualified Air Safety Officers.

So how do we maintain DVOF to the best standards possible?

Across the UK, the base general requirement is to collect all obstructions 150 ft agl and above and 80 ft agl and above in Tactical Training Areas (TTAs). But we know that your everyday requirement can be lower, so we also aim to capture 80 ft agl and above data in areas covered by DGC's GSGS 5737 Low Flying 1:50,000 series and in Northern Ireland. In reality we currently add all acquired, researched, and reported UK points to DVOF, going as low as 10 ft agl for data acquired from received airfield surveys, although the lower you get the less comprehensive the cover, especially in urban areas. But if users identify low level threats DGC will always add them to DVOF even if they don't ultimately appear on a chart due to specification limitations. It is important to remember that the DVOF data you use in mission planning, digital in-cockpit or tablet systems such as GECO, CSAT or in future CASA, will include everything in our database and isn't limited to a chart specification if you wish to display it. The need to report also includes Hazardous Cable Locations as detailed in AirClues Edition 44, so please use MAA ASIMS DASOR and dvof@mod.gov.uk to get those hazardous cable and uncharted obstruction reports in as soon as possible along with your locally held lists of hazards.

My team of four GAIT staff actively monitor UK Wind Farm and other developments and conduct Imagery and Internet research programmes to improve the UK dataset quality and content. Our dvof@mod.gov.uk multiuser account also brings in data directly from a range of commercial companies. We have access to all civilian and military airfield surveys, work with DIO safeguarding, MAMC low flying Ops, the CAA, Utility, Windfarm and Mast Companies and the UK Coastguard to ensure we cover as many bases as possible. As a result, UK DVOF has increased from 38,000 in 2008 to today's 191,000 points.

In 2017 the Ordnance Survey (OS) conducted an independent assessment of our UK data which concluded that UK DVOF was over 94% accurate in recording 300 ft + agl obstacles, exceeding European 90% minimum certainty legislative accuracy requirements. That was subsequently improved to 97% by additional work on cranes. 2021 mandatory 328 ft + reporting legislation is improving that further still in addition to our own research projects such as recently using Ordnance Survey data to add over 7,000 churches. But we know we have more to do, particularly at lower levels, hence user reporting via DASOR and dvof@mod.gov.uk are key.

Conclusions and Further Information
As you can see, maintaining DVOF is not as simple as you might assume. But despite huge efforts with regards to obstructions, DVOF is unlikely to ever hold 100% of the Powerlines and Obstructions that you are likely to encounter and must be considered as unassured data in the pure AI context. However, whilst unassured, it is the only authorised and accredited obstacle database for Defence use. Therefore, your accurate reporting of Uncharted Obstructions, Powerlines and Hazardous Cable Locations is key in improving our datasets for you, because only between us can we make a safer sky for all.

For further information or to arrange a Station visit and expanded presentation of the above, please contact DGC via dvof@mod.gov.uk

The Role of Leadership in the Royal Air Force's Safety Culture

By Gp Capt Emma Keith, Tedder Academy

I must confess to not always being as interested as I should be in the raft of IBN's that are published across the organisation (don't tell Chief of the Air Staff…) but one IBN issued in November 24 caught my eye, it was about My Safety, the replacement for FSIMS. It wasn't so much the system itself that captured my attention, but the language used to announce its transformation. There was a sentence that said, 'this task should not be the sole responsibility of the Station Health and Safety Advisor and their team'. This phrase instantly reminded me of how we use the phrase, Leadership at all levels, within AP7001, the RAF Leadership Doctrine. High performance requires every team member to be active, engaged and committed to achieving successful outcomes. No matter how brilliant, or experienced, one individual is, they will never be as effective as a collective of diverse individuals fully contributing and delivering. As Head of RAF Leadership, it would be remiss of me not to point out that effective leadership is at the very core of energising a team to deliver, indeed, the RAF's definition of leadership is that: 'Leadership is the projection of character, principles and behaviours that inspire people to succeed'.

The other statement in the IBN that stood out for me was by Emma Austen, Director of Defence Safety when commenting on the My Safety Tool, she said, "utilise it, and learn from it. And let's continue to build a culture of transparency and learning across defence safety". Her comments underline that a culture is not static, it is dynamic, it changes, and it is owned by everyone. We must also be honest and acknowledge that culture can evolve both negatively and positively and that it is the role of leaders at all levels to safeguard the culture we want and need. Culture is what happens in the corners of an organisation when no one is watching. It is how things are done on a day-to-day basis and the behaviours that are accepted. We must never forget that the standard we walk by is the standard that we accept.

It is imperative that the RAF has a strong Safety Culture, not just connected to aircraft but Safety across all activity within our organisation. The reasons are obvious, but such is their importance it is worth restating. Morally, we must ensure that the highest levels of safety are applied to our people and to the public whom we have committed to defend. Life will never be without risk but there is a huge difference between

genuine accidents that could not be foreseen and negligence of failing to take the appropriate care. Out with our moral responsibility to protect life, it is also a legal requirement, specifically as a military organisation, it is operationally essential that we protect our people, equipment, and infrastructure from accidental damage. The RAF does not have limitless supplies of resource and to ensure we our able to fly and fight to defend the interests of the United Kingdom we must protect our capability.

At the heart of culture is effective leadership, the role of leadership in maintaining and promoting safety cannot be overstated, leadership set the tone, create the standards, and ensures that a culture of safety permeates every level of the organisation. So, what can you do to link your leadership to the Safety Culture?

1. Setting the Example
Leaders must lead by example, demonstrating a strong commitment to safety in their own actions. Whether it is adhering to safety protocols, conducting thorough risk assessments, or engaging in after-action reviews, leaders who prioritise safety signal to their teams that it is a non-negotiable part of the job. Their behaviour influences the attitudes of their personnel, encouraging them to adopt the same high standards.

2. Promoting Open Communication
A key aspect of safety culture is the ability of personnel to raise concerns, report unsafe conditions, and suggest improvements without fear of reprisal. Effective leaders foster a climate where individuals at all levels feel empowered to speak up. This openness is crucial in identifying potential hazards before they lead to incidents and ensuring lessons are learned from mistakes.

3. Risk Management and Decision Making
In the fast-paced and high-stakes environment of the RAF, leaders are often faced with difficult decisions that balance operational effectiveness with safety concerns. Effective leadership in this context involves careful risk engagement and mitigation strategies. Leaders must be able to identify when risks are acceptable and when they are not, always keeping safety at the forefront of decision-making processes. This approach reduces accidents and fosters confidence in the organisation's commitment to protecting its people and assets.

4. Encouraging Continuous Improvement
A Safety Culture is not fixed, it requires constant evaluation and improvement. Leaders are responsible for driving this process by encouraging personnel to reflect on their practices and consider how they can be improved. They ensure that

feedback loops are in place so that lessons learned from incidents and near misses are shared and implemented across the organisation. This fosters a culture of learning where safety is constantly evolving in response to new challenges and insights.

5. Training and Mentorship

One of the key responsibilities of RAF leaders is to ensure that personnel are adequately trained in safety procedures and how to engage with risk. Leadership is not only about oversight but also about mentorship. Leaders must take an active role in guiding and developing their teams, particularly junior personnel. By integrating safety into every stage of training and professional development, leaders help build the next generation of safety-conscious aviators.

Impact of Leadership on Safety Outcomes

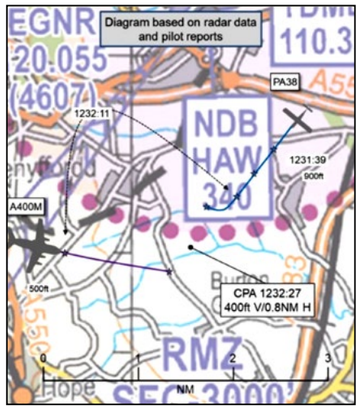
Leadership is the cornerstone of the Royal Air Force's Safety Culture, and it is vital that it is understood that leaders operate at all rank levels. In high-pressure environments where risks are inherent, a well-established Safety Culture reduces the likelihood of accidents and enhances the overall performance of the unit. When personnel know that their leaders prioritise their well-being and operational safety, it builds trust and cohesion, which are critical for successful mission outcomes.

Moreover, leaders who are visibly engaged in promoting safety help to minimise complacency - a significant threat in any military organisation. In routine operations, complacency

can easily set in, with personnel becoming overly comfortable with their tasks. Leadership that consistently reinforce the importance of vigilance and continuous improvement ensures that safety remains a priority, even in the most routine tasks. By embedding safety into the fabric of daily operations, leaders not only protect their personnel but also enhance the overall effectiveness and resilience of the RAF. In an organisation where the margin for error is often slim, leadership's role in cultivating a Safety Culture is essential to both mission success and the preservation of life and resources.

Airprox Highlights

With Comments from Wg Cdr Spry



6 June 2024
PA38 v Atlas A400M
Airprox No. 2024113

The PA38 Pilot reported that they had been conducting a training flight teaching a circuit detail with a student. During this time, they had heard an aircraft call Tower with the Atlas callsign stating that they would be transiting south of the airfield. The PA38 pilot reported that they had not caught what altitude or direction they had been flying but had assumed they would be transiting a reasonable distance from the airfield. During the downwind leg the PA38 pilot recalls that they had been instructed to report final number 2 to a light-aircraft that had been on the ILS at around 5NM final. After checks were completed the pilot reports that the main task had been to look for number 1 and then decide what to do if they had not become visual - either request to extend downwind or orbit left.

It had been at this point that they had been startled to see the Atlas ahead and below passing right-to-left about to pass under their left wing. As the PA38 pilot had not known their exact intentions, and being such a large aircraft below them, especially as the PA38 had been only at 1,000ft, they were forced to make a right turn to base leg to avoid, bearing in mind that the PA38 pilot had still not been visual with the aircraft on final approach. The PA38 pilot reports that 'luckily enough they had become visual once they had rolled level, though a bit closer than they had wished'. The PA38 pilot reported to ATC the position of the Atlas and the received response had been that it was remaining outside the ATZ. The PA38 pilot does not recall ATC passing any Traffic Information about it.

The Atlas Pilot reported that, during a military low-flying [task], they had routed north in the low ground from Corwen to Ruthin, attempting contact with Hawarden. In the vicinity of Ruthin, a turn onto approximately 090° was made whilst continuing to attempt contact with Hawarden Tower. It had been assumed that, due to their low height, radio contact was being blocked by terrain. Once crossing the high ground, contact was established with position, callsign and aircraft type and they were instructed to contact Hawarden Radar. A light-aircraft was observed to the left of their aircraft (approximately 10 o'clock position) on approach with TCAS contact having been achieved previously. A further light aircraft was seen higher and further away, also to the left, as the cruise had continued. No avoiding action was deemed necessary and no TCAS TA was received. The pilot reports having initially chosen the frequency listed on the military 1:500,000 Low-Flying Chart (LFC), which had been Hawarden Tower. Once contact had been achieved, a switch to Hawarden Radar had been instructed.

The Atlas Pilot later added that, on 6th June 24, they had been the captain of an Atlas tasked with a low-flying training sortie. The route of the low-level flight at 250ft MSD had been through Wales, north up the Ruthin Valley (west of the Clwydian Range) to then cross east to the Midlands via the area of Class G airspace to the south of Hawarden Airfield, using the bidirectional west-to-east flow arrow to the south of Hawarden which, in the direction being flown, required users to be not above 500ft MSD. It was noted that Hawarden had an RMZ area associated with it and contact had been planned using the frequency published on the Day LFC, 124.955MHz.

Contact had been attempted several times while in the Ruthin Valley to no avail (potentially due to the Atlas' low height). Contact had finally been achieved when cresting the Clwydian Range. At this point, following the passing of the details of their flight, the Atlas pilot had been instructed

to change to Hawarden Radar on frequency 120.055MHz.
Once this frequency change had been effected, the Atlas flight details were communicated. TCAS on the Atlas flight deck indicated two contacts in the vicinity of Hawarden and visual contact had been established with them. It had been assessed by the handling pilot that no avoiding action had been required to maintain safe separation with this traffic and a TA had not been triggered at any stage. There had been both a lateral (~1nm) and vertical (~300ft) deconfliction reported by TCAS. The flight had been continued eastbound, complying with the requirements of the flow system and an en-route frequency change carried out.

On landing, the Atlas crew had been requested to contact Hawarden ATC and the crew was informed that an Airprox had been submitted by one of the aircraft in the circuit.
The online Airprox response had been submitted as soon as it was received on 23rd June 24. No Airprox report was submitted by the crew of the Atlas because they did not assess that an Airprox had occurred due to the visual deconfliction that was maintained at all times, backed up by the lack of TCAS TA.

The Hawarden Controller reported that an Atlas had free-called Hawarden Tower at 1230 reporting 6NM southwest transiting eastbound low-level squawking 7001. The ADI ATCO passed Traffic Information on an uninvolved aircraft inbound on an instrument approach to RW04 and instructed the Atlas pilot to free-call Hawarden Radar as per the correct procedure. On contact with APS ATCO, the Atlas pilot reported visual with the instrument traffic (uninvolved with the Airprox) in their 12 o'clock at 1NM. The Atlas then routed 3NM south of Hawarden and had been passed Traffic Information on the right-hand circuit to RW04 active with 2 light-aircraft, the pilot reported indicating 600ft on the QNH. The PA38 had been late downwind in the circuit and had taken a sharp right turn to avoid the Atlas and the pilot [had noted that they] would be filing an Airprox against the Atlas.

For the full report, see Airprox No. 2024113 on the Airprox Board Website.

Spry's Comment:

Although this Airprox was given a risk category E (normal safety standards pertained), the main learning event from this incident is the RMZ (Radio Mandatory Zone) infringement. On the half-mil and quarter-mil charts at the time, the Hawarden Tower frequency was annotated; the A400 pilot contacted Hawarden on this frequency and believed they had fulfilled the appropriate requirements for RMZ entry. However, this was the incorrect frequency for the RMZ entry procedure and delayed an entry clearance whilst the Atlas was still track progressing within the RMZ. Details for the full procedure are found in the Hawarden entry in the Civ AIP, Part 3, Section AD 2. It is important to remember that the Civ AIP remains the master document for this information and it is the responsibility for the captain to ensure that the pre-flight planning has been completed. The UKMLFHB often only has the summary information, which isn't subject to a regular amendment process, and duplication of Civ AIP details in this document is therefore undesirable. The low-flying charts have since been amended to display the Radar frequency and Frequency Monitoring Code (FMC) for the RMZ entry. ☐

8 May 2024
Prefect v PA28
Airprox No. 2024085

The Prefect Pilot reported that they were on a student solo circuits sortie flying from RAF Barkston Heath (BKH). After completing 4 circuits, they departed the circuit to re-join via initial for RW06RH. Approximately three-quarters of the way round the turn towards the initial, they noticed a light-aircraft (type believed to be a PA28) cross their flightpath from left-to-right (north to south) above the canopy. The minimum separation was judged to be approximately 500ft. They continued the level turn at 1,000ft QFE and judged there was no longer any risk of collision as the aircraft was now flying away from them to the south. Barkston Tower then advised them of traffic 600ft above, to which they called 'Traffic in sight'. They believed the separation of the aircraft compromised the safety of the flight. They opined, given the traffic location, it was uncertain whether the other aircraft infringed the Barkston Heath ATZ, though it was certainly well within the stub of the Barkston MATZ. They re-joined the circuit via initial and continued the sortie without further incident.

The PA28 Pilot reported that Waddington Zone had provided a Basic Service from Gainsborough VRP. A Barkston Heath MATZ clearance for a track from Hougham microlight site direct to the destination had been requested from Waddington Zone and a MATZ clearance was advised just prior to reaching Hougham. Just prior to entering the MATZ, the Waddington controller instructed a 20° turn to the right and then within seconds instructed a heading of 180° to avoid entering the Barkston Heath ATZ. Waddington did not advise the vicinity of any other aircraft or aircraft in the Barkston Heath circuit. After the MATZ was exited Waddington notified them of an aircraft below, similar heading, at low-level and climbing. They were visual with this aircraft and there were no proximity issues. Waddington provided a service throughout, and they were not instructed to call either Cranwell or Barkston Heath. It is assumed that the other aircraft involved was at a lower level and flying a heading such that it was hidden under either the port or starboard wing.

The Barkston Heath Tower Controller/Supervisor reported that RW06RH was in use. They were the Air controller with Ground Movement Controller (GMC) positioned manned, working two solo trainees in the visual circuit with another [aircraft] inbound on an SRA to land.

The reporting aircraft [Prefect] pilot called downwind to touch and go, and the controller stated that there was one ahead on radar and they elected to depart out to rejoin via initials, which was passed to Cranwell Approach at the Terminal Air Traffic Control Centre (TATCC). Simultaneously, the Cranwell Supervisor at TATCC called the GMC to impose a circuit restriction of 1,500ft on the Barkston Heath QFE against traffic 3NM northwest of Barkston Heath, squawking Mode A 3605, and Mode S [PA28 callsign] heading towards the airfield. The Cranwell Supervisor stated that the aircraft was supposed to be routeing to Grantham and was now just turning away from the ATZ.
They imposed the circuit restriction of not above height 1,500ft stating 'due to MATZ crosser west by 2 and a half miles'. At this point the Prefect was just outside the ATZ tracking 240° and the PA28 was in their 2 o'clock, at 1nm, indicating 600ft above. As the Prefect turned right to initials, they provided specific Traffic Information to them on the PA28 and the Prefect pilot reported visual.

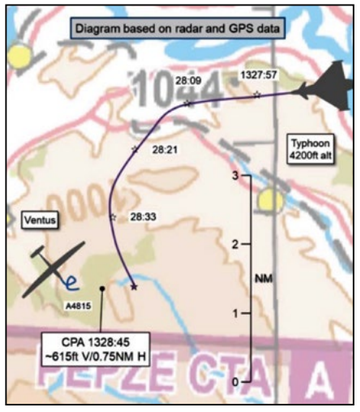
The track of the Prefect took it well ahead of the PA28 then, as they turned right towards initials, they routed behind the PA28. The closest distance between the aircraft was with the Prefect tracking 060° and the PA28 in their one o'clock position at 0.1nm with 600ft vertical separation indicated.

The Waddington LARS Controller reported that they were monitoring multiple frequencies and working a few tracks at the time. They took the position and were told that the PA28 was routeing towards their destination and was given a Stub crossing of Barkston at 1,600ft under a Basic Service. The aircraft was routeing via the Barkston stub when the controller called for a MATZ crossing on a different aircraft. During the handover they heard a call from the PA28 pilot whom they believed had said they were entering the MATZ (but meaning the Stub part only as been cleared earlier from a different controller), so they acknowledged this call. They completed the handover and then noticed the PA28 had turned more directly to its destination via the Barkston overhead; they told the pilot to turn right 20° to avoid. The aircraft was still routeing towards the Barkston overhead so they gave the PA28 pilot a turn right heading 180° instruction to avoid and called traffic which was in the Barkston overhead indicating 600ft below.
The PA28 pilot took the turn and routed via the Stub. The PA28 did enter the Barkston MATZ by a mile but remained clear of the ATZ.

(For the full report see Airprox No. 2024085 on the Airprox Board website.)

Spry's Comment:

Although a MATZ is marked on civilian VFR aeronautical charts, the regulations do not require a civilian pilot to seek permission to gain entry to a MATZ and neither are they required to avoid it if contact with the controlling authority can't be made. Clearly, we prefer that they do and it is also a wise airmanship decision. But as military pilots, it is important to understand that the MATZ does not afford us the protection we may think it does. In this incident the PA28 did request a MATZ stub crossing but it is believed this was interpreted by the PA28 pilot as an ATZ crossing also. The controller did a good job in picking up the PA28's flight path and steered them south to avoid the ATZ. This event reaffirms the requirement for clarity in understanding of routeing agreements between ATC and aircrew. From the Prefect pilot's perspective: maintain SA as best you can and lookout. See and Avoid remains the primary MAC avoidance principle in Class G. ☐



16 April 2024
Airprox No. 2024060
Ventus Glider v Typhoon

The Ventus Pilot reported soaring near Hay-on-Wye. Some mountain wave activity allowed them to climb just above cloud base, but well clear of cloud. They saw the jet just after it missed them and their paths were diverging. They radioed other gliders at the club to warn them of traffic.

They had discussed the NOTAM area extending 8NM around Pontrilas at the pre-flight briefing and were avoiding that. The military aircraft was obviously heading into that area for its exercise. There was no communication between the RAF and the club.

The Typhoon Pilot reported conducting Close Air Support training [as No 2 of a pair of Typhoons] and had negotiated a block with Swanwick Mil from 3,000-12,000ft on the RPS. During the timeframe notified, they established at 4,000ft in 'a wheel' to the north of Hereford. They reviewed the period, noted they were approximately 2-3nm east of Hay-on-Wye at 1327 and maintained 4,000ft throughout. Given the 'reporting aircraft' was a glider it was unsurprising that there were no radar contacts displayed to the pilot in the vicinity of Hay-on-Wye during the time period. Both Typhoon pilots were maintaining a listening watch with Swanwick Military on a discrete frequency for Traffic Information, but from what they could tell from the recorded R/T, received no Traffic Information referring to the glider.

The Swanwick Mil Controller reported that the Typhoon pair was on frequency operating on an exercise ivo EGD147, between 3,000ft and 12,000ft on QNH 1008hPa and were remaining outside controlled airspace. Traffic Information was passed to the Airprox Typhoon, that was being operated in the lower portion of the block, although nothing was seen on radar at the time of the Airprox. No Airprox was reported on frequency by either pilot. The Typhoons remained on task and appeared unaffected. No primary-only tracks appeared on radar and all known traffic to affect was called to aircraft on frequency. The controller noted that a possible mitigation could be for a local Terminal Radar Unit to provide the aircraft with a service with a less filtered radar, in this case Cardiff Radar.

For the full report see Airprox No. 2024060 on the Airprox Board website.

Spry's Comments:

Whilst there was no risk of collision here, some important principles can be identified. NOTAMs work.
The glider pilots were aware of the CAS exercise and planned to avoid the nominated NOTAM warning radius; the Airprox occurred just outside it. As a participant in a NOTAM, consider how you might fulfil your obligation to 'see and avoid' not just inside the NOTAM radius, but also outside the area you've 'warned' other airspace users about. A radar service is only as good as the associated capabilities, in this case below the base of Swanwick coverage and outside the range of Cardiff LARS. Not all aircraft show up on ATC radar and many operate without transponders or compatible electronic conspicuity. Visual lookout is one of the most effective MAC barriers in these situations. Consider how you might mitigate the reduced radar coverage, such as delegating some lookout responsibilities to another formation member, if you need to go 'heads-in' for a prolonged cockpit task. Reaching out to the other aircraft operator by phone is another coordination measure all parties should consider. Whilst not always practical to discuss your flight with everyone, NOTAMs often include a phone number for that purpose..

24 April 2024
Atlas A400M v Prefect
Airprox No. 2024062

The Atlas Pilot reported that, approaching HULBU, a point on the RNP approach for RW02 at Waddington, they were at 4,800ft Waddington QNH taking vectors for the approach.
A TCAS contact, not under control of Waddington ATC, emerged 3nm ahead (north) of them, below and climbing towards them. They were VMC, with solid cloud below and ahead, tops approximately 4,000-4,500ft. They were cleared descent to 3,800ft in the direction of the traffic. At 4,600ft they elected to level off, with the traffic now indicating 300ft below and 2NM north, still closing. Waddington Radar informed them that the traffic was GAT not under their control. As TCAS gave them a Traffic Advisory, the PF took control as per SOP. At 1nm and 300ft vertical separation (and still closing towards them) they initiated a sharp right turn to avoid a conflict. Once clear of the contact they informed ATC and carried on with vectors for the approach.
They did not make visual contact with the TCAS contact. They opined that the other aircraft was almost certainly in cloud; 4 personnel on their flight deck were looking out for the other aircraft as they descended towards cloud, but no-one saw it. Avoiding action was taken in order to maintain safe separation before a TCAS RA occurred, especially as they were unsure of the manoeuvres being carried out by the other aircraft.

The Prefect Pilot reported that, during an IF sortie with a trainee, on a MID 6 departure with a Traffic Service and having taken-off from Barkston Heath RW28, the controller made two traffic calls regarding an Atlas on instrument approach to Waddington, which was not seen. They were in VMC (and stayed VMC at all times) but the cloud distribution was such that the Atlas could not be seen. It became clear that their tracks were converging as the MID departure went on. At FL42 the Instructor took control and levelled-off and opened to the right at the same time, to then descend. A few seconds after they took control, the TAS alerted and, after a few seconds, they reversed the turn to the left. The Atlas was never seen. The sortie was then continued.
The pilot noted that they were surprised that ATC did not give any instructions to maintain separation of two IFR tracks, regardless of being under a Traffic Service.

The Waddington Director reported that they were the Unit Examiner conducting an Endorsement Check on a first tourist candidate in the Waddington Director position. The Atlas, under a Traffic Service, was handed over by Swanwick Mil, with traffic around 5 miles away and 1,000ft below already being called. The aircraft came on frequency and a turn was offered to avoid the conflicting traffic, which the pilot accepted, and a descent was given to FL50. The pilot wanted an RNP approach, and the candidate opted to route the aircraft via HULBU and gave the pilot own navigation to HULBU. A descent was given to 3,800ft Waddington QNH 1017hPa. A Barkston Heath MATZ crossing was requested but was denied by Cranwell Approach due to outbound traffic from Barkston.
The candidate, due to exam conditions, was initially hesitant and did not change the RNP waypoint or the aircraft's heading and confirmed what the outbound traffic was climbing to.
The traffic was then called, before 5 miles, to the Atlas pilot. As the traffic was getting nearer, the candidate asked the pilot if they wanted to stop the descent, which the pilot opted to do, and reported stopping descent at 4,700ft QNH. The traffic was approaching 2 and a half miles, and the candidate called the traffic again and told the pilot to turn right 20° to avoid the conflicting traffic. The examiner believed that the two aircraft did not come closer than 2nm to each other. They did not intervene as the traffic was called by the candidate and called a second time and with an instruction to avoid. At no point did they feel that the two aircraft would collide. After the session they debriefed the scenario and discussed what could have been better in terms of positive control and to call Cranwell earlier and, if a Barkston MATZ crossing is denied, a turn to northwest and to route via EDPAZ should be the normal procedure and would have probably avoided this scenario.

The Cranwell Departures Controller reported that, at the time of the occurrence, they were providing a Traffic Service to 3 aircraft: a Phenom conducting GH in the vicinity of Wittering (WIT) between FL080-FL120, a Prefect released from Barkston Heath (BKH) with no restriction to general handling in sector 1 (which is NW of BKH), and a formation was concurrently released from Cranwell. While the Phenom was general handling above WIT at FL100 they provided the pilot with a traffic call notifying them of an Atlas at FL110 that was south by approximately 8 miles, tracking north, the type was ascertained by verbally asking Waddington prior to the traffic call. At this point they did not ask for the intentions of the Atlas; at that moment they believed it was a transit and were not expecting the Atlas to fly a profile towards the BKH stub. They then had a Prefect that had departed BKH on a MID 6 departure; they had provided the Prefect pilot with a traffic call on the position of the Atlas, it had been delivered with sufficient time, but the pilot was not visual. At this point the Atlas was continuing a descent towards the Prefect; as the Atlas tracked closer while continually descending, they called it again. During this time, they had a formation calling on climb-out on a separate VHF frequency which they identified. The Prefect pilot then requested own navigation, they instructed the pilot to maintain runway track until the Atlas had passed behind the Prefect. At this point, they thought this was a suitable course of action as they did not want to introduce a turn into the path of the Atlas. The Atlas subsequently turned away to the east clear of confliction whilst the Prefect turned to west under its own navigation with no further incident.

For the full report see Airprox No. 2023249 on the Airprox Board website.

Spry's Comments:

This occurrence is a great reminder of who owns collision avoidance responsibilities when flying IFR in Class G; the pilot! It's great to see that both crews understood this and took actions to avoid each other, aided by electronic conspicuity. The investigation identified that ATC could have done a better job of coordinating the two aircraft, but errors are sometimes made, particularly when under training. It's not intuitive for a pilot to avoid other traffic when flying an instrument procedure, so a deconfliction service is a good way of offloading that task, but remember, collision avoidance is still the pilot's responsibility. In most cases, ATC will try and clear a path for published procedures to go unhindered. It's good practice as a pilot to avoid known instrument procedures for similar reasons. A MATZ offers you some protection during instrument procedures, as military aircraft require ATC permission for MATZ entry. This does not apply to civilian aircraft, despite efforts to encourage them, such as 'feathers' on VFR charts. Instrument procedures frequently go further than the MATZ boundary too. Keep a good lookout, or delegate to another crew member if forced to fly with sole reference to the instruments. ■

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1 ACC	01522 603359	-
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3 FTS	01400 267536	-
4 FTS	01407 762241 6666	-
6 FTS	01400 266944	-
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Brize Norton	01993 895764 / 6666	01993 895525 / 7062
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Leeming	01677 456666	01677 457637 / 7231
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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	-
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Waddington	01522 726666	03001684954
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