The RAF Total Safety Magazine

Issue 37

AirClues

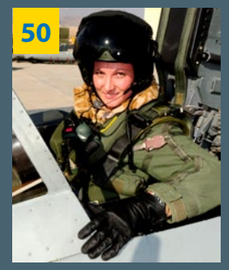
Fire Doors

In Action at Boulmer

How to Write Procedures

UK Space Command

ROYAL AIR FORCE Safety Centre



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Foreword

by the Inspector of Safety (RAF) Air Cdre Sam Sansome

Air Commodore Sam Sansome

Welcome to Issue 37 of Air Clues. This is my second attempt at writing this foreword – the first having been written just before Russian forces invaded Ukraine. I recognise that the lens through which you are viewing this edition is markedly different from the one you used to view the last magazine – and probably different from any we have used to view safety publications since the Cold War. A ground war on European soil has not been top of the worry list for any of us for the best part of 30 years, but the warning signs have been there more recently and what was unthinkable 10 years ago is our new reality; a challenge to world order and the international rule of law. The operational footing of the RAF has understandably changed as a result of this, but the role of safety in delivering operational capability has not. Context is of course everything, and I recognise that some of the articles in this edition may seem to have diminished relevance against this background but, if anything, the core message of the magazine is all the more important.

The raison d'être of a safety system, of safety regulation and policy is to protect people from injury and death wherever possible and in doing so allow them to 'fight another day' – in the case of personnel in our armed forces, quite literally. Safety is no less important during periods of high tension or readiness or even during operations – it is more so; safety done well is not a barrier to getting stuff done, it is a commander's aid to the best operational outcomes. Safety is also no different from most things – to get good at it you need to practice; muscle memory is the goal.

The RAF's safety journey over the last 10 years or more has increased our collective understanding of what 'good safety' looks like and most in the RAF and wider Whole Force understand the importance of Safety Culture, of reporting and they understand how Human Factors can and will impact the safety of our activities and how important it is to operate inside the box of standards, and regulations, whenever possible. Now is the time to let those safety muscle memories help, and if your subconscious is telling you that alarm bells should be ringing then listen to it, stop and take stock.

Whatever the context and wherever you are reading this, please enjoy the articles in this edition – and if you learn a safety lesson any time soon and want to share it then please get in contact as I suspect we will all be learning a lot in the coming months.

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

Flt Lt Chris McCann – RAF Leeming (100 Sqn) – Green Endorsement

Flight Lieutenant McCann was leading a pair of Hawk aircraft, configured for the 'Aggressor' role in support of a complex night affiliation mission from RAF Leeming. They were working with 2 Typhoon and 2 Cobham aircraft, against 8 Typhoon aircraft. The alternating current 1, alternating current 2, alternating current 3 and fuel pressure cockpit warning captions illuminated, followed shortly afterwards by the Generator caption. At this point, all cockpit and flight instrument lighting were lost. Without moonlight to assist and flying in and out of cloud - including thunderstorms - a generator failure was diagnosed. Using a finger torch, Flight Lieutenant McCann attempted to illuminate standby instruments but, despite several attempts, the torch only operated intermittently. Emergency cockpit lighting was manually turned on and, once safe separation was confirmed, he initiated the return to RAF Leeming using standby instruments.

After actioning Flight Reference Card drills, a generator reset was achieved but the main instruments remained unavailable, which also meant there were no navigational aids.

Recovery using the standby instruments and normal cockpit lighting was continued. A precautionary straight-in approach was carried out. However, on short-finals, a second generator failure impaired instrument availability at a critical stage. Emergency lighting was rapidly selected, a generator reset attempted and a further emergency declared. The reset was successful, although it energised instruments that had been dormant since the first failure, creating a significant dazzling effect. In spite of all these faults, Flight Lieutenant McCann achieved a successful landing.

Flt Lt Christopher Goodyer – Sheppard AFB Texas (ENJJPT) – Green Endorsement

Flight Lieutenant Goodyer is a QFI/Instructor Pilot with the Euro-NATO Joint Jet Pilot Training (ENJJPT) programme based at Sheppard Air Force Base in Texas, USA. On 3 May 2021, he was the instructor in the rear cockpit of a T-38C aircraft with a British student pilot on his 7th T-38 sortie, occupying the front seat. Approximately 10 minutes into the sortie, and still with a heavy fuel load, the aircraft was positioned for a practice single engine approach to Sheppard's Runway 33C. As the aircraft descended through 1300ft agl with the left engine set at 62% RPM to simulate the 'failed' engine, it flew through a flock of large birds. One of the birds entered the left intake, immediately causing a contained but catastrophic failure of the left engine which the crew confirmed by cockpit indications displaying a near instant drop in RPM, oil and hydraulic pressure and the illumination of associated generator and hydraulics warning captions. Flight Lieutenant Goodyer assumed control of the aircraft, reassured the student and methodically applied the single engine go-around immediate action drills to ensure maintenance of the appropriate final approach speed, and to confirm selection of the correct flap

setting. On completion of the drills, Flight Lieutenant Goodyer transmitted a 'Mayday' call just as the aircraft flew through yet another flock of large birds which, fortunately, missed the aircraft. At approximately 400ft agl he directed the student to disengage the throttle gate to complete the shutdown of the left engine before landing and selecting flaps to DOWN with the aircraft using aerodynamic braking in order to reduce the landing run.

SAC(T) Connor Read – RAF Odiham (7 Sqn) – Well Done

Senior Aircraftman (Technician) Read was conducting inspections on the Forward Main Rotor Head of a Chinook aircraft, as part of the After-Flight Servicing procedure. He noticed a score on a critical element measuring approximately 3 inches. The damage was in an obscure location and would have been very easy to overlook. If left undiscovered, it could have potentially caused a significant Air Safety occurrence.

Cpl Aden Turner – RAF Odiham (7 Sqn) – Well Done

Corporal Turner identified faults on two separate Chinook aircraft which, if left undiscovered, could have caused two significant Air Safety occurrences. In the first instance, during an aircraft servicing procedure, he noticed that the Infra-Red camera was not seated correctly on the mount and was loosely attached. The following day, on another aircraft, Corporal Turner discover that one of the aft Main Rotor Blade Droop Stop Shroud inspection panels was loose. He elected to carry out a thorough check of the component and identified that the panel hinge pin was missing and was therefore only secured at one end by a single quick release fastener.

SAC Liam Beckett – RAF Leuchars (GEF) – Well Done

Whilst driving around the perimeter track at Leuchars Diversion Airfield, Senior Aircraftman Liam Beckett observed a drone operating outside the airfield boundary fence in the vicinity of one of the Station's ASPs. He immediately reported his sighting to Air Traffic Control and a controller was dispatched to locate the drone or operator for further action. Aircraft in the vicinity were warned of the hazardous sighting. Senior Aircraftman Beckett worked in General Engineering Flight and is not normally associated directly with air traffic control tasks. However, he was air-aware enough to recognise that these flying objects can pose a threat to air operations.

Mr Brian Gale – RAFC Cranwell (Affinity Flying Services) – Well Done

Mr Brian Gale was acting as see-off crew for Prefect aircraft operations at RAFC Cranwell. During the strap-in procedure, he noticed that the student QFI in the left-hand seat had incorrectly strapped-in with respect to the metal loop being positioned on the right-hand side instead of the left.

Mr Mark Dammes – RAFC Cranwell (Affinity Flying Services) – Well Done

Mark Dammes was about to see off an aircraft at RAFC Cranwell that was part of a 3-ship formation. The student pilot climbed up onto the wing of a Prefect aircraft (A) which was parked next to another Prefect aircraft (B). The crew was assigned Prefect B. At this point the crew had not shown the yellow card which Mr Dammes noticed was on the seat of the aircraft. It is standard practice for crews to show the ground crew the card prior to crewing in to aid identification of the assigned aircraft. Identifying it to be the incorrect aircraft, Mr Dammes immediately raised the error to the crew who were both unaware of their mistake.

Flt Lt Giles Smith – RAFC Cranwell (3FTS) – Good Show

At RAF Barkston Heath, Flight Lieutenant Giles Smith had just crewed into his Prefect aircraft and, with the engine running, he noted an unusual vibration accompanied by a barely perceptible noise that did not seem familiar. He took time to diagnose the fault by switching ancillaries on and off and, convinced of the problem, then elected to shut down the aircraft and hand it back to the engineers for investigation. They found that the starter generator was worn and liable to fail. On 9 August 2021, he found himself in a similar position with intermittent vibration and noise while he sequenced the fuel pumps, so he cancelled the sortie and handed the aircraft back. Again, he was vindicated because the main pump was found to be unserviceable.

Mr Sam Craft – RAF Cranwell (Affinity Flying Services) – Well Done

Whilst carrying out a scheduled maintenance inspection on a Prefect aircraft at RAF Barkston Heath, Sam Craft was completing checks on the flap system. He noticed that the spring, forward of the flap motor, was not under tension which he deemed unusual. Other than that, everything looked normal. However, after moving the flaps down to the take-off position, thereby moving the flaps from their stops, significant forward and aft movement could be felt and observed on the flap drive screw jack. There were no other indications of a problem. As the flap drive unit was being lifted out of the aircraft it was discovered that the fault was that the screw jack had sheared.

Sgt Deejay Le Claire – RAF Marham (93 EA Sqn) – Commendation

Sergeant Le Claire was one of several 93(EA) instructors at RAF Marham, providing weapon preparation training to members of the Squadron, as well as personnel nominated for Individual Augmentee deployment. He identified, reported and directly influenced the resolution of a Meteor tooling control issue which potentially had Foreign Object Debris or Loose Article implications to Flight Safety and which would have presented on each and every subsequent loading of a Meteor missile to any Air System.

SAC(T) Kenny Hoare – RAF Odiham (CMF) – Well Done

SAC(T) Kenny Hoare was deployed overseas in support of a Chinook operational detachment from RAF Odiham. He was only a week into his deployment when conducting the inside section of an after-flight servicing. He observed what he thought was a crack in a cap on a main supporting frame above the ramp area. Only one or two millimetres of crack was visible as the surrounding area was thick with sand and grime making any fault extremely difficult to notice, even to those more experienced than himself. The crack was revealed to measure approximately 87 millimetres and required extensive repair by a specialist team from 1710 Naval Air Squadron.

SAC Curtis Wheeler – RAF Odiham (18 Sqn) – Well Done

Whilst deployed as part of 1310 Flt in support of UK Operations, SAC Curtis Wheeler was tasked to carry out a Before Flight servicing on a Chinook aircraft during a night shift in preparation for the next day's tasking. During his servicing he spotted a hairline crack in one of the Chinook Forward Main Rotor Blades, in an area that is mostly obscured by an oil transfer pipe. He was operating out of a Rapid Erection Shelter, with inadequate lighting due to an unforeseen technical fault with the site, in a very hot and humid environment. Thanks to this spot, the main rotor blade was quickly removed, repaired, and refitted with no loss of operation tempo.

SAC Sam Landon – RAF Odiham (7 Sqn) – Well Done

SAC Sam Landon was part of a team carrying out 'Before Flight' servicing on 3 Chinook aircraft for return to RAF Odiham at the end of a high tempo exercise. Although not stated in the maintenance guide to specifically check droop stop shields (an element of the rotor head assembly) on a B/F, SAC Landon carried out additional inspections of this area cognisant of a recent history of failures with this component. His attention to detail highlighted a fault with the aft red droop stop shield, observing debonding damage within that area. The fault could have been easily been overlooked due to the miniscule indication of the debonding and, if not found, could have easily resulted in an 'Article Falling Off Aircraft' and ensuing flight safety hazard.

Cpl Batchelor – RAF CAM) RAF Henlow – Commendation

A sustained period of intervention, proactivity, professionalism and a willingness to assist non-SMEs has resulted in a safer flying environment for RAF Henlow. Corporal Batchelor's work in ASIMS has delivered an efficient, streamlined and effective process for Aviation Medicine related DASORS. He was awarded a Royal Air Force Safety Centre Commendation.

British Forces South Atlantic MPC Local Air Safety Awards

SAC(T) Jessop-Crook

SAC(T) Rawles

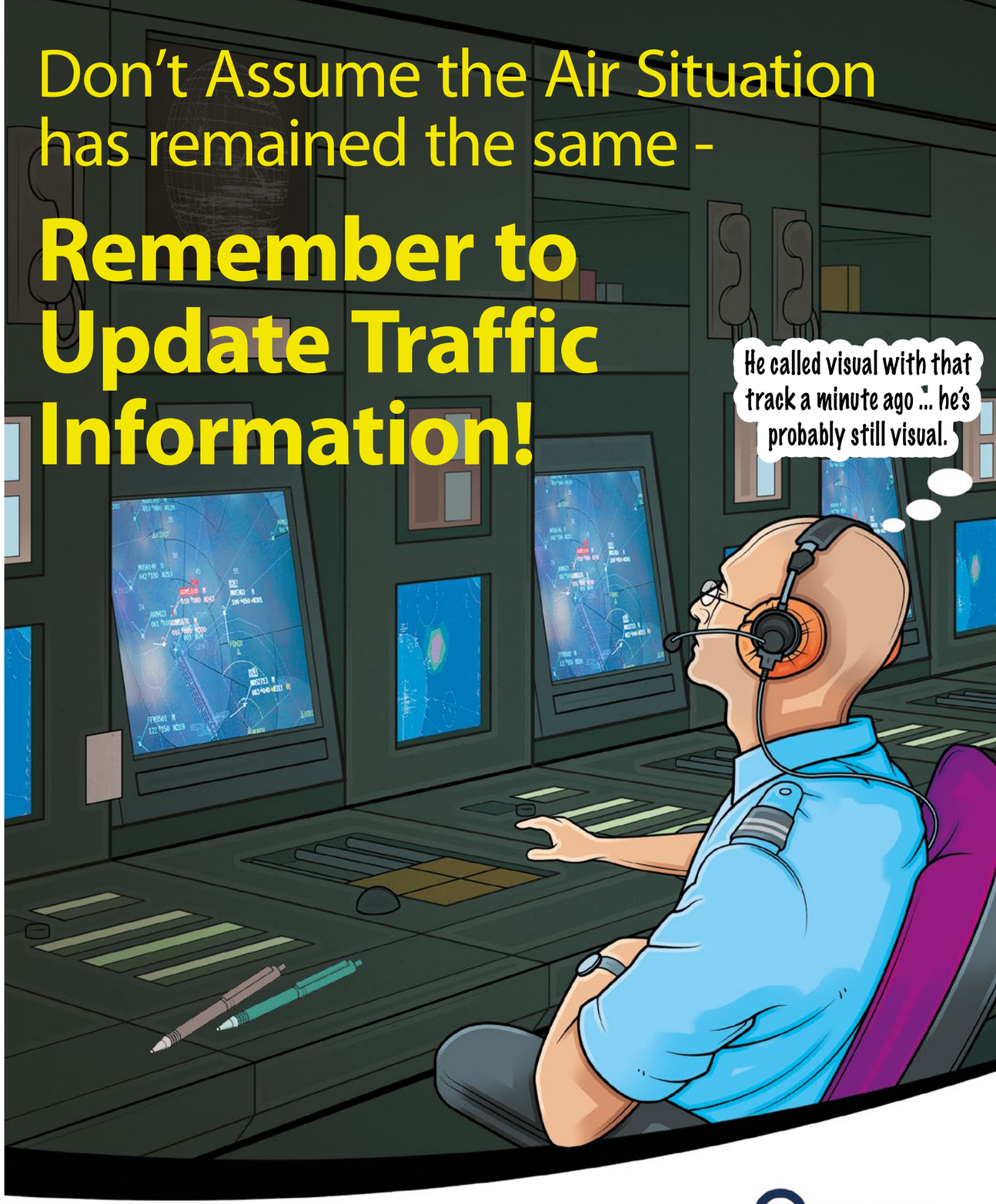
Cpl Madison

Cpl Molloy

Sgt Edwards

Don't Assume the Air Situation has remained the same -

Remember to Update Traffic Information!



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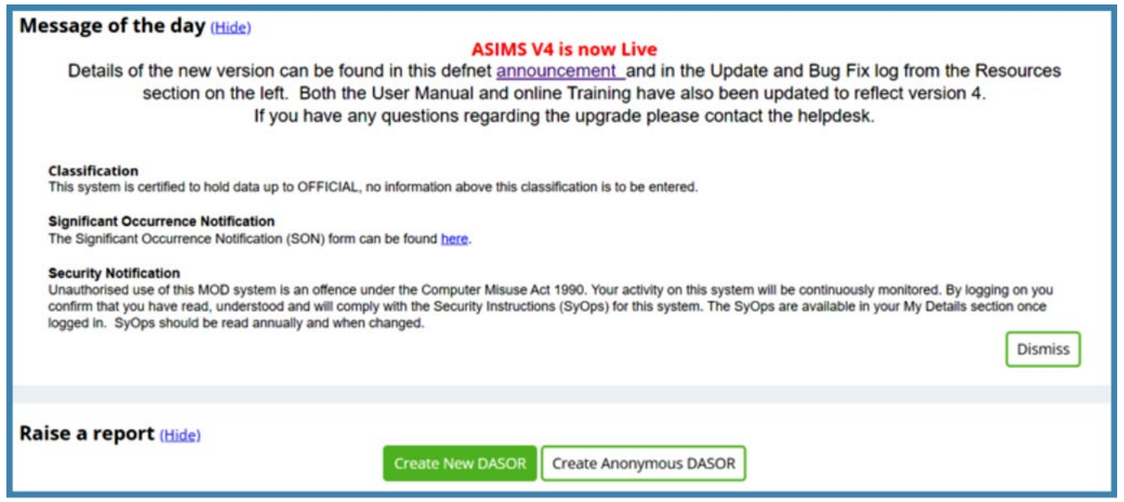
SC127
Produced by Air Media Centre, HQ Air Command.

ASIMS Software Upgrade - Version 4 - A More Powerful ASIMS

By Flt Lt Callum Clowes, OpAssure-KE2, MAA



WHAT: A software upgrade to modernise ASIMS and increase its user experience, availability and analytical power.
WHEN: It s already live!
WHAT YOU'LL SEE: Internet-facing, available on personal devices, modern interface, robust connectivity, better availability.
WHAT YOU NEED TO DO: Understand the key features and use the new url:

https://asims.ice.mod.gov.uk/

ASIMS (The Air Safety Information Management System) is used expansively across the Defence Air Environment. Military, Civil Service & industry users are able to openly conduct air safety occurrence reporting on ASIMS. This helps to identify trends and allows us to address hazards. A strong reporting culture is essential to enhance air safety. With a major system upgrade already available since February 2022, there are a number of key technological features on ASIMS that will vastly benefit the 10,000+ user community and its ability to manage Risk-to-Life in aviation.

The MAA has worked with Vistair Systems Ltd. to enrich the system's capability and improve the user experience. Working closely with industry, the MAA has identified numerous innovative improvements, which will take advantage of modern software technology, whilst also ensuring the system's longevity and addressing obsolescence issues. Below are some key upgrades for you to look out for from the next generation of air safety reporting.

Any reporting tool is only ever as good as the information that goes into it, hence ensuring the system has a wide-reach and is easily accessible is important for the richness of the air safety data. With this in mind, ASIMS is now established on MODCloud, an Amazon Web Services environment. This means the system is internet-facing and available from both MODNet and personal devices. Thanks to working with Defence Digital, this system should now have more robust connectivity and better accessibility, especially for those with limited ability to access MOD ICT and those working away from their Main Operating Base.

The user community rightly places a significant amount of trust in ASIMS, which is essential for open and honest reporting. Respecting this trust and in the interest of user anonymity, greater confidentiality and security measures have been established into ASIMS v4. From now on, only those involved in the management and investigation of a report will be able to see the reporter's details, and the ability for reporters to remain totally anonymous has been maintained even on the internet-facing platform.

Those who regularly use ASIMS will be well acquainted with the pastel colour scheme that the system currently employs. This dated look has been completely refurbished to bring a modernised user experience. Much like you would book a train ticket or shop Black Friday deals, users now navigate through tube-stops to submit a report in a more-digestible format. The user interface has been specially designed to be compatible with mobile web browsers and optimised for quicker performance, so there is little-to-no decrease in useability when using your mobile phone.

Presenting the data within ASIMS to help analysis has often been a challenge, requiring Air Safety Teams to get to grips with the technical wizardry to convert data into PowerBI. From May 2022, 'Vistair Intelligence' will be a brand-new system add-on that will provide the user community with a powerful analytical capability. Users will no longer need to download bulk data to their computer for conversion elsewhere, but instead have direct access to all of ASIMS' data through the embedded tool. Not only will this provide historical data trending analysis, but it will also use machine learning capabilities to conduct in-depth analysis and email-alert-subscribed users to identify spikes in data trends. All of these analytics are displayed in fully-customisable dashboards, with a plethora of graphical displays and a configurable downloaded report that can be automatically distributed on any defined periodicity. The aim is not to turn the user community into glossy-brochure producers, but rather to enable quick, simple, and accurate analysis of data within your organisation to support Aviation Duty Holders and alike to manage Risk-to-Life to ALARP and Tolerable.

We envisage this upgrade will specifically help to identify trends and hazards before they manifest as serious Risk-to-Life.

Thanks to a close partnership with Vistair, and the user community assisting in the user acceptance testing, ASIMS has transformed from a respected and capable, if slightly clunky reporting platform, to an innovative, modernised and secure reporting and analytics system with worldwide-reach and the ability to grow further thanks to the project's through-life support. This upgrade is a true showcase of how Defence can exploit the many technological advances in computer software, user experience, and machine learning. It will enhance Defence's air safety reporting culture, help to identify hazards early, and ultimately reduce Risk-to-Life.

Civil Insights from the UK Flight Safety Committee

by Air Cdre (Retd) Dai Whittingham, Chief Executive, UK Flight Safety Committee

News items observing that this year marks the 40th anniversary of the Falklands campaign reminded me of my own involvement in the theatre and the lessons it provided on fatigue, risk, and operating pressures, some lessons I was able to apply, and others I needed to learn several times. All are in play now in the world of commercial aviation.

The RAF has come a very long way since 1982, as most people will have been exposed to operational deployments. I wasn't part of the initial F4 deployment to Ascension but I know there were some 'interesting' hurdles to jump for those who did. For example, something as simple as rations for the non-stop UK to ASI leg: the bag meals offered were closed with staples (always popular in an FJ cockpit) and contained grated cheese sandwiches, an un-peeled orange and crisps (equally useful). On being asked if there was any drink to go with it, the Cpl chef disappeared into the kitchen and returned with a 2L bottle of Coke. He had no answer when asked how he thought they might get the drinks passed between the separate cockpits and to the other aircraft in the formation… Where is the parallel with commercial ops? First, the Coke is likely to stay in the bottle when opened, but it's mainly that you need more than a runway and fuel for success – this has sometimes been missed as operators have worked to different destinations or to those where Covid has helped dismantle prior arrangements.

I deployed to RAF Stanley less than a year after the surrender. It was then a 6000ft strip of AM2 matting with no approach lights (the area was still full of mines, UXOs etc.), and edge lighting that moved with the matting so wandered away from straight lines to help convince you the PAPIs were lying. We had a TACAN and PAR, unreliable weather and no diversions, and there was mine casualty on base in a supposedly cleared area while we were there. We carried a full war load on every trip and the ROE were on the remarkably permissive side of permissive! I still remember accepting an aircraft on which I would be holding RS30 one evening; it had a red line entry in the F700 that said: "FOD damage to right ECU out of limits, war sorties only."

The tented accommodation had just been replaced by Cosalt cabins which stopped the sleet and snow getting on our sleeping bags; there was no running water on the ops site and our toilet facilities were of the rudimentary expeditionary variety. The only fresh produce was apples and oranges, with everything else tinned, frozen or bottled despite the islands boasting the richest fishing grounds in the world and a ready supply of mutton and goose.
I believe such conditions are now referred to quaintly as 'austere'.

I mention the above because it was a contributor to something I came later to recognise as the main threat, which was not the Argentinians but straightforward fatigue. At the time, we had 9 aircraft and 10 crews to manage 2 @ RS10 plus 2 @ RS30 with the rest nominally at RS60. This meant a 10-day cycle during which everyone would complete 140 hrs of duty time including 48hrs @ RS10, around 60 hrs @ RS30 and 4-5 training sorties (some of which took place during RS30 periods). Every other night you would be in the accommodation barge, where was the prospect of a hot shower that did not rely on a petrol-fuelled splash plate boiler dangerous enough to warrant an immediate HSE Prohibition Notice.

The fatigue induced by this work cycle was both cumulative and immediate – even for new arrivals in theatre. The flying programme was fairly canned but one of the planned trips came on the back of 24 hrs as Q2, ie on RS10; that stint ended at shift change (0800L) and you then flew before standing down at lunchtime ahead of your 24-hour Q1 shift the next morning. It was on one such 'off Q2, go flying' slots that 2 of my friends died in a CFIT accident on Mt Usborne, 3 months or so into their tour. As the FSO, I had the happy task of impounding the F700, auth sheets, log books, training records, flying clothing docs, etc. before my nav and I launched as a singleton because the unit needed to stay operating. We were unusually careful.

A couple of weeks before, at our own 3-month point, we had recognised we were starting to make mistakes. That recognition came when, bimbling up the Choiseul Sound one morning, I asked my nav – one of the best I ever flew with - whether Onion Range was active. He told me he hadn't checked; I told him I hadn't either. We had stopped doing the basics because we were so tired, though there was probably some complacency too. Regardless, we instituted some additional checks to ensure we were thinking about, and doing, the right things.

And here is another parallel. We had drifted away from routines because we were tired (or complacent). Today, we are seeing some commercial pilots whose lack of regular flying means they have trouble accessing their normal cognitive routines. Or, put another way, they have trouble remembering what comes next. On the other side of the coin, there are some who are flying too regularly - there are a few operators now working their pilots so hard that cumulative fatigue has become a much more pressing issue than lack of currency.

To continue on the parallels theme, roll forwards 20 years from the Falklands to plans to deploy the E-3D to the Middle East as part of the early Afghanistan ops in response to 9/11. I lost the argument with my AOC (not an uncommon event…) about the duration of aircrew deployments. With the Falklands experience in mind, I wanted to see a 30-day roulement. Other voices were arguing for 4 months as this aligned with other operational deployments, would take some load of the logistics train, and would avoid any Army-related taunting about short-termism. We compromised on 2 months.

The Sentry crews would be flying every 3rd day as part of a plan-fly-recover routine. The missions would be at least 14 hours in duration (the longest was just over 18 hours, with 2 AAR brackets), not including the 2 hours pre-flight and the 1-2 hours post flight for crew and intelligence debriefing. So, long sorties but only every 3 days, which meant time to recover. The flight decks would not be augmented with a 3rd pilot, thus allowing us to spin up and deploy people without having to switch pilots regularly between crews, which in turn simplified the sustainment plot.
All very convenient.

Now let's throw the domestics into the mix again.
With strange echoes of the RAF Stanley arrangements, all the accommodation was tented, although there were no

mines or snowstorms to worry about; each crew of 17 shared an all-ranks unisex open-plan tent. The airfield was home to part of the host nation's FJ fleet and a USAF B-1B detachment, so there were inevitable noise impacts on sleep. Washing and shaving (pre-beard days!) was an open-air festivity, with head torches in use for the pre-dawn starts on flying days. Showers involved leaving a bag of water to be warmed in the sun, later to be dangled from an A-frame while you ran around underneath it, and toilet facilities were 'expeditionary' though better than Stanley's thunder boxes.

I took the first replacement crew down after 6 weeks with the aim of a tail-swap and bringing a crew home 2 weeks early to deconflict the roulement. During my 36 hours on the ground, I was persuaded by the detachment commander to let the crew come home under the command of their very capable and well-respected captain. I agreed on the basis that I would authorise the flight and would be the operating pilot in the left seat, not a problem as the Sentry fleet pilots seat-swapped routinely. I don't really know why I made that call, perhaps my sub-conscious had recognised that the odd 1000-yard stare meant people were tired even though they hadn't flown for a couple of days.

The 9:30 hour transit was uneventful bar a suspected hydraulic leak, for which there was a checklist that took ages to run, and some slight concerns about headwinds and our fuel state. The weather was perfect, so I flew a visual circuit when we arrived at Waddington. However, as we approached the runway, I realised the normal radalt calls from the other seat were not forthcoming. A glance across the flight deck told me our captain had fallen asleep in the short period since he made the finals call, and he woke up when I closed the throttles in the flare. I don't think he knew he had been asleep.

During the quiet period before we handed the aircraft back to the engineers, I asked him the question I should have asked before authorising the trip. He told me they had flown 225 hours on missions during their 6 weeks in theatre. Add 20 hours for the out and back transits, and small wonder he fell asleep!

When I phoned the AOC a short while later, he was as shocked as I had been by the accumulated hours, even though we both acknowledged that simple arithmetic should have removed any element of surprise. He quickly agreed the flying rate was not sustainable for long periods and that we ought to move to a 30-day plan. I followed up with the detachment commander, asking him to keep a close eye on the state of the remaining long-stint crews until we could get them replaced, and passing on the AOC's direction that if fatigue considerations meant dropping a mission, then that is what should happen.

With hindsight, it seems that we simply failed to give enough thought to the impact of living conditions and working patterns on our people. Every 3rd day was seen from a UK telescope as a perfectly acceptable flying rate but none of us had really stopped to think about very long sorties and cumulative fatigue. It was an own goal.

And here is the last parallel: whilst the civilian long-haul fleets have known for years about the effects of long flights and planned accordingly, the pandemic has led some operators into paying less attention to this knowledge than might otherwise be the case. One Gulf-based operator is now allegedly requiring its crews to sharp-pencil to reduce logged hours, for example insisting that augmentee pilots only count duty hours when they are in the seat, and not the time when in the air, which means it needs fewer pilots to operate its schedule. Commercial and operational pressures can have the same impact, which falls most directly on the people in the front line - something to think about when you plan or supervise your next operational deployment?

Simplifying Air Safety-

A JHC Perspective

Taken from a speech by AVM Nigel Colman OBE MA, RAF Commander Joint Helicopter Command delivered at the 2021 DSA Safety Conference.

Reducing the Complexity

"I would not give a fig for the simplicity on this side of complexity, but I would give my life for simplicity on the other side of complexity."
Oliver Wendell Holmes Jr, US Supreme Court

It's easy to make things safer – if you don't fly you can't crash, but that obviously misses the point. Safety in a military context is always about managing risk and of course this is where it gets complicated very quickly. To make the problem manageable, there are things we can do. However, to arrive at a point where a decision is easy, or the guidance we issue to our people is simple, requires an understanding of the complexities behind the problem. This allows us to take appropriate risks and not avoid them by simply reducing capability or not doing something.

Within Air Safety we have multiple tools to analyse our Air Safety Risks and ensure our resources are focussed in the right areas. The practical approach of breaking a problem down into its constituent parts allows us to improve our understanding. The use of Air System Safety Cases allows us to challenge assumptions and prove that a platform is acceptably safe. Tools such as BowTie (Risk Management Software), improves our understanding of the risks and, as a result, our management of them. Collectively they help us to understand the risks we face, and the detailed research can be done in advance and without operational pressures. However, we must turn this detail into information that is easy to understand and familiar to the people who interact with it.

We also try to drive coherence into all we do in JHC. It is a constant challenge, but it is the first step towards simplifying

the problems we face. 11 Air System Safety Cases, from across the Services, with input from multiple Delivery Teams and Release to Service Authorities, is an example of where it could be quite easy to lose coherence and be considering different things when actually looking at the same problem. So, where appropriate, we apply a common approach.

In terms of education, the Air Safety lexicon and principles are incorporated into our culture and the way we manage risks and make decisions. This improved understanding at all levels means an individual's baseline understanding of Safety and Risk Management is higher to start with so they can actively contribute to improving a situation rather than the processes being viewed as a restriction or inconvenience.

In our business we cannot always look to remove risk. Instead we seek to remove as much unnecessary risk as possible and reduce the necessary risks to achieve our aim as far as possible. Giving clear boundaries for activity based on the analysis of risk and experienced judgements helps to simplify the risks we take. Regulation and Flying Orders, or the preparation of capability certificates, can make things simpler for the user to take and manage the risks on a daily basis.

Our Safety Management System is a team or, to steal a phrase, a team of teams. As a 2* Risk Holder, I make the difficult decisions, but I certainly don't make decisions on my own. I rely on Subject Matter Experts who can look in detail at a smaller part of the problem and advise me on the risks – this should be mirrored at all the Duty Holder levels where people are empowered to make decisions.

Judgement is hard to quantify, but judgement is improved through education and experience. At every level we have selected people to make decisions within appropriate boundaries, backed up by the education we have given them and the experience they have gained. Balancing the imperative with the risks is something that by arming our people with the education, the analysis, the boundaries and as much understanding about what we can affect, then allows them to make decisions in situations that include areas we can't affect. This might mean that a decision might simply feel right, but that instinct is actually based on far more than just a wet finger in the air.

As with any complex problem there is a need to push through the complexity and arrive at a clear and simplified position. Improving understanding and breaking down the problem can contribute to simplification, and in turn, our ability to deal with an issue. However, I would argue that to get the most out of our resources, we will rarely be faced with simple problems; hence, we must do what we can to simplify and reduce the complexity.

"Simplicity is the ultimate sophistication"
Leonardo Da Vinci

I have already mentioned how a Safety Culture can contribute to simplicity, or at least can help achieve relative simplicity by improving the baseline understanding. I have seen some excellent examples that point to a positive Air Safety Culture in JHC. This is the result of years of education, engagement and senior people leading by example. But this takes constant re-enforcement, continued scrutiny and a solid foundation.

Base level education through Human Factors training and unit Air Safety Days simply shift the focus for finite, albeit it regular, periods. Safety and Risk Management is ingrained in what we do, and having a regular drum beat of activities to analyse and manage risks is how we safely conduct aviation. Assessing and encouraging a positive AS Culture at all levels help us to improve our foundational understanding and reinforce good behaviour.

Unfortunately, in assessing culture, we cannot give a straightforward single metric for an Air Safety Culture and decide whether it is good or bad, improving or not, but we can infer from multiple inputs. And in this regard, the Air Safety Reporting system across defence is mature and can give us many useful clues when we look at the details. Applying targets to our reporting culture: the number of reports; how quickly we deal with report; are we actually identifying issues and making appropriate recommendations; and most importantly enacting change to prevent re-occurrence? Or, are we only reporting when things go wrong? What can we do to encourage observations that could lead to intervention before an incident or accident? These aren't perfect, but they are things that can be measured, turning subjective activity into objective data which when considered at a large enough scale, can help assess progress. And, our system is improving - future versions of ASIMS will be more accessible and include more ways for individuals to make a report.

Outside the formal occurrence reporting system, I have seen some very positive engagement through surveys. Anonymous reporting can help ensure feedback is honest and it is perhaps easier to reach conclusions when many people are saying the same thing or feel comfortable opening up.

Our Air Safety assurance system also includes open forums without the oversight of the Chain of Command (CoC). A party removed from the CoC discussing with a cohort of Junior Ranks, or any cohort for that matter, results in different conversations and generally much more positive engagement. I don't kid myself that different conversations don't occur when I am not in the room!

Another critical component of long-term culture development is feedback. Once we have identified change because of information from our people, we need to ensure that they see the results of their input. This can be at the level of an individual reporter from a single AS report, or at the organisational level from surveys. Following a survey we brief the key issues and what we are going to do about it, this is vital so that our people see their engagement is worthwhile and can lead to positive change.

Open and honest reporting of mistakes that have not necessarily led to incidents is how we progress to a predictive culture that can intervene before an incident rather than reacting to something that has happened. This takes courage on behalf of the reporter or the crew and I have asked my Air Safety Team to highlight good examples of what we call 3rd Age reports – Issues with me or us, to enable this best practice to be recognised.

Finally, I would like to highlight a simple, recent initiative that some of my units have enacted. Generally, a unit Air Safety Team will be experienced individuals, who can take that experience and use it to assess and manage safety. But these are individuals that are quite often removed from the squadron crew room or tea bar. Whereas Air Safety Champions at the Junior Rank level with a sound understanding of the system and how it can help us improve safety are different and can communicate with their peers in a relaxed environment can ensure that Air Safety is not just another thing that the CoC is pushing.

I see an improved Air Safety Culture as fundamental to the way we do business and as a key enabler in driving Safety improvements.

Balancing Operational Capability and Risk
It is rare that, operationally, I can consider Air Safety Risk on its own. Our raison-d'etre is to support Ground Forces and I am finding myself more and more considering risks to the Mission or risks to the Force as a whole, not just the Air System. It is very easy to view the risks we deal with as purely Aviation risks and strive for a solution that reduces the Risk to Life (RtL) to a minimum, and for day to day management we do that. But, by taking the safest course of action for an Air System we may inadvertently transfer this risk elsewhere or to someone else.

Some examples:
A helicopter full of troops is a big target, and in many scenarios, the loss is almost unthinkable – potentially a strategic failure. When delivering those troops to an assault it would be easy to plan to land a safer distance away from the target, minimising the threat to the aircraft and the troops as they disembark, but if that leads to a dangerous approach to the target and exposes the troops to risks on the Ground, IEDs for example, then I think we have missed the point and

reduced the advantage of helicopter manoeuvre. We need to understand each other's worlds.

Similarly, targeting is generally easier, and sensors work better the closer they are, but so do those of the enemy. If a Fires platform is there to support troops it must balance the risk to achieve the effect desired.

Finally, troops are increasingly utilising mini-RPAS for tactical ISR. Again, interoperability is key. Segregated airspace doesn't really help us here - to remove Situational Awareness from the Task Force, in order to allow a helicopter assault Force to land, removes a key tool in the overall Safety of the Task Force – we need to balance the totality of risk and be mindful of inadvertently transferring risk.

And of course, we are here to succeed on operations and balancing risk appropriately between the training and operational environments is important. I would hope that most would recognise that there are some areas we would take additional risks during operations – there is a greater imperative. But to only take risks when there is an operational imperative is perhaps to take a bigger risk when you do so. The right place to take risk might be in a training scenario, as lack of familiarity with the activity or a reduction in control or recovery measures when things do go wrong arguably increases the overall risk.

So how do we address this? We start with understanding our own risks before we include others. We simplify, cohere and understand our own SOPs across the Command help to give ourselves a baseline that we can work from. But at some point, an empowered Command must make an informed decision and take appropriate risk.

Context based simplification - Safety for Uncrewed Systems as an example

For uncrewed systems our approach to safety must again be risk based. A hand launched Remotely Piloted Air System (RPAS) requires a very different approach to a crewed aircraft. We can take different risks and apply different mitigations. The same governance and oversight, safety and risk management processes are used, but in their application, there is opportunity for simplification. There is no need to over-complicate.

RPAS are different – normal operation of the JHC governed RPAS is often within segregated airspace. This significantly reduces RtL associated with the operation to an almost negligible point. We also have an opportunity to reduce RtL by transferring risk to the equipment. This mainly manifests itself if things to go wrong, if a control link is lost and there is no way to recover the aircraft, pre-programming it to crash in a sanitised area or ditch in the sea can remove risk to life almost entirely.

It is also worth mentioning regulation. It is easy to reach the conclusion that our potential adversaries have stolen a march on us – we know that peer competitors are developing drone capabilities rapidly and many non-state groups have successfully weaponised small, cheap and readily available RPAS systems with reconnaissance and IED delivery systems. Indeed, DAESH's modification of simple systems bought on the internet has been revolutionary and shows what can be done. Collectively the pace of RPAS development, when unconstrained by regulation, presents a clear and present danger and I would argue that our principle challenge is that we need to be able to exploit a technological advantage rapidly, cheaply and decisively both when training in the UK and on overseas operations. A simplified route to regulatory compliance is critical.

In order to achieve this I would argue that maintaining a positive and proactive relationship with the regulator and contributing to regulatory development is key to allow the freedoms we need balanced against the risks we take. One of my key drives is enhancing our relationship with the regulators to take advantage of their remit to guide and mentor. As our collective understanding of the true risks involved improves, we can continue to regulate appropriately but at a greater pace to deliver capability at the speed of relevance.

Conclusion

- Before we can simplify, we must analyse, understand and cohere. To not do so would result in unreasonable risks being taken or would limit capability as we err on the side of caution.
- JHC is a complex organisation and we do lots to understand the risks we manage in order to simplify our process. Are we as simple as we could be? – No. But, are we as complicated as we could be? - No.
- As Risk Holders and Safety professionals within the military, we can do the analysis, we can bound the activity – we do what we can, but I would argue, it will rarely be simple.

Fire Safety

By Cpl Aaron Chaplin & WO Ciaran Dineen - Inspector of Fire Safety (RAF)

A Real Life Example of the Effectiveness of Fire Doors

In the early hours of Friday 19th November, a fire broke out within a Single Living Accommodation (SLA) block at RAF Boulmer. At the time of writing, the cause of the fire is still under investigation. What we do know however, is that the fire doors in the building contained the fire and prevented significant fire spread throughout the premises. The containment of the fire, along with the level of automatic fire detection giving early warning to the occupants, undoubtedly allowed the occupants to escape to safety and prevented serious injury and loss of life. The incident serves as a timely reminder to ensure that fire doors remain closed to allow them to work to optimum effectiveness.

Examples of how fire doors worked brilliantly in the Boulmer SLA fire

Fire doors work by sealing shut into the door frame, providing a physical barrier that will withstand fire for a specific length of time. Different constructions provide different protection depending on the risk of fire in the area where the door is installed, but most fire doors are typically designed to withstand fire for 30 minutes.

Any glazing or vents that are fitted in the doors need to conform to high standards so as not to compromise the fire rating of the door. There is a strip of material installed in the door or frame construction, known as an intumescent strip. When this material is exposed to heat from a fire it expands and prevents the door from opening through pressure changes, essentially sealing the door in the frame. Fittings, hinges, and the self-closing device are also tested and need to meet rigorous standards, a failure of any part of the door set would leave a weak spot for fire to break through. A well designed, correctly installed fire door will limit the spread of fire. A poorly designed or incorrectly installed door is not going to offer the same level of protection.

Across Defence there is a worrying practise of wedging open fire doors in workplaces and SLA alike, but this increases the risk to our personnel in the event of fire. A door that has been wedged open with a door wedge will not close automatically into the frame, making it impossible for it to provide that physical barrier. Fire will quickly spread to different areas of a building in this scenario; in the most extreme scenario this could lead to fatalities resulting from the incident. Monthly building custodian checks should look to remove items holding open fire doors, but all personnel have a duty of care to remove these items when found.

This image from the Boulmer SLA fire shows the effectiveness of fire doors. It shows the damage caused in the fire compartment contrasted against the lack of damage on the other side of the fire door. The image provides fantastic visual representation of the effectiveness of fire doors in our buildings - however, they only work when they remain closed. Please ensure that fire doors both in the workplace and in SLA remain closed at all times to limit the spread of any potential fire.

The extensive damage caused by the Boulmer SLA fire.

Lithium-Ion Batteries & Thermal Runaway

It is surprising just how many items we possess that utilise Lithium-Ion batteries. Mobile phones, tablets, e-bikes, e-scooters, laptops, power tools, electric toothbrushes etc etc. The extra charge they contain is appealing for items that are used on a regular or persistent basis. The fact that they can feel very hot to the touch when in use will explain why Li-ion batteries in particular worry fire safety experts. The concern arises during the charging process; when on charge the batteries can experience what is known as thermal runaway which can cause a small explosion followed by an intensely hot fire and a large volume of thick noxious smoke. Once ignited these fires are difficult to extinguish, and whilst ignition remains a relatively rare occurrence, it is vital that the risks are understood to ensure the safety of personnel. This becomes even more important as we see an increase in the popularity of products that use Li-ion batteries.

A quick internet search brings up a variety of articles from fire safety industry specialists and local authority fire services regarding safety concerns around the charging of items with Li-Ion batteries. Reports of numerous fires in the civilian world make for concerning reading, accounts of individuals barely escaping their accommodation due to the rapid intensity of a fire, persons reporting to hospital with serious injury or smoke inhalation, or repair bill estimates for damage to property, all as a result of fires started by Li-Ion gadgets. *There is a particular risk when purchasing cheaply made items from overseas.*

Tablets & Laptops

E-Scooters

E-Bikes

No, not this kind of drill…

This kind of drill

Photos: Pexel.com and Defence Image Library. CC0 Commons.)

Most local authority fire services have issued safety advice to local communities, hoping to educate people on the risks associated with these products and to urge for caution when using them. London Fire Brigade reported attending 25 fires involving e-bikes or e-scooters in the first half of 2021; some of these incidents were classed as significant and resulted in serious injury. LFB also reports attending an average of 24 fire each week where smaller Li-ion batteries such as mobile phones or laptops were involved.

If there was to be a fire along an escape route from a building, or in an area without sufficient automatic fire detection (AFD) it could pose a significant risk to personnel and to the infrastructure itself. The thickness of the smoke and intensity of the fire would make the escape route impassable; occupants would be reliant on an alternative means of escape being available. A fire in an unoccupied area without AFD is going to spread rapidly without being detected, possibly leading to extensive damage to infrastructure and affecting operational output. All AIR TLB stations have been requested to place a statement in their Unit fire safety policy reflecting the risks of charging Li-ion batteries along escape routes.

Although these accounts of apartment fires and serious injury sound like Li-ion batteries are unsafe for use, it s not all doom and gloom. Don t race away and discard your e-scooter, laptop, or feel the need to sell your electric bike. These batteries overall are safe to use but there are a few safety criteria that need to be followed to ensure that safety is maintained to the highest standard.

- Only charge Li-ion batteries in designated areas, preferably in rooms with AFD. Do not charge batteries along escape routes in workplaces, SLA or SFA.
- Allow batteries to cool between charges. Batteries are going to get warm during use and allowing them to cool before charging reduces the risk of overheating.
- Don t leave items on charge, once the battery is full turn the power supply to the charger off. Do not leave batteries charging overnight, including mobile phones.
- Do not use damaged batteries and prevent batteries from being damaged where possible. Don t allow batteries to get wet.
- Make sure you only use the charger intended for the gadget. Avoid unauthorised third-party sellers as these may not meet the relevant safety requirements and may increase the risk of overheating.

Photo: It can happen - a member of the public s (cheap) e-scooter on fire (still from video posted on Facebook – credit E-movement Ireland).

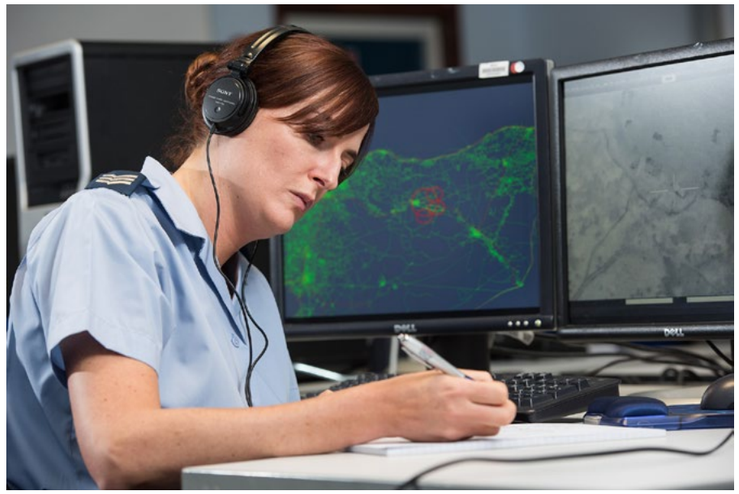
- Don t ignore the warning signs. If the product you re charging, or its charger, become excessively hot… stop charging immediately. If it s a service issue item, report it straight away and seek a replacement.

If you have any safety concerns or queries, please liaise with your Unit Fire Safety Advisers where possible. Where your Unit does not have an on-site Fire Safety Adviser, raise questions via the Capita fire safety helpdesk on firesafetyadvice@capita.com or by calling 0808 196 2636.

How to Write Procedures

By Antonio Javier Gaspar Marichal, courtesy of The Ergonomist

Good procedures support reliable performance in complex operating tasks critical to safety and asset integrity. The application of human factors principles can improve the usability and acceptability of procedures to support human performance in such tasks. Here, Antonio Javier Gaspar Marichal explains more and provides useful guidance.



Rule-based performance involves the conscious effort of recalling information about procedural steps stored in our memory. Procedures assist in recalling and aid operator decision making during the execution of complex tasks. Similarly, when we're fatigued or under stress, well-designed readily available procedures will support the achievement of task goals. Procedures are not problem-free though. Primarily, problems stem from neglecting people's needs, preferences, and physical and cognitive abilities when procedures are developed. The implications of this are under- or over-specified rule sets that slow work down.

Procedures that have been validated via an interactive design process will reflect the reality of work more accurately and support worker decisions and performance. They are also more likely to be 'owned' and followed by workers. This article provides practical advice on how consideration of human factors contributes to developing procedures that will support human performance.

What is a procedure?
A procedure is a communication tool that describes the most efficient and safer way of completing a task. Often, they include a combination of written instructions, checklists and flowcharts.

When is a procedure necessary?
As a general rule, if a task is safety-critical, a procedure will be a requirement. A safety-critical task is a task where poor human factors could cause or contribute to a major accident or fail to reduce the effects of one. These tasks require flawless performance. Tasks such as plant start-ups and shutdowns are examples where procedures are must haves. Maintenance tasks on key systems and processes such as fire suppression systems and shift handovers are good candidates too.
See the Health & Safety Executive's audit tool at www.hse.gov.uk/humanfactors/topics/procedures-audit-tool.pdf.

How do procedures support safe performance?
Fit for purpose procedures support human performance in several ways:

- Reducing memory workload which, in turn, increases our capacity to deal with unexpected events.
- Ensuring critical steps to safety and quality are carried out.
- Standardising 'good practices', so improving collective learning.
- Minimising the likelihood of 'rule-based' and 'knowledge-based' error types.
- Providing everyone with the same level of information about the task.

It's important to note that safety cannot rely upon procedures alone. Organisations must have other systems in place to control risks, that act as defences and safeguards. Therefore, procedures complement other barriers and controls, not substitute them.

Designing procedures people will actually use
A procedure can fail if it's badly presented to the end user. Success hinges on capturing the tacit knowledge of those doing the job. Follow this step-by-step approach to design procedures that are relevant, workable and accepted by the workforce.

1. Identify needs.
Is the task critical to ensure safety and performance? Analysis of accident records and requesting the views of workers will provide insights into operational issues and help develop a list of tasks likely to require a procedure.

2. Decide the level of procedural support.
How thorough does the procedure need to be? What degree of flexibility should it have? Consideration should be given to:

- Task complexity. Situational factors such as plant, people involved, the consequence of errors, communication channels and multi-tasking are factors that increase task complexity. The more complex the task is, the more it will benefit from a procedure.
- Human-machine interaction. A high degree of interaction with critical equipment or processes will generally require detailed procedures.
- Task demands. Tasks that place high cognitive load or high demands on memory or are subject to interruptions or performed concurrently or intermittently with other tasks will require accurate procedures.

3. Understand hazards and risks.
The aim is to foresee what and how things could go wrong. The technique used to generate a list of safety-critical tasks should fit the operational context (that is, complexity, criticality, industry sector), the resources available and the expertise of those involved.

All techniques have strengths and weaknesses so it's good practice to use more than one technique so that the limitations of one can be offset by the strong points of the others. For example, the insights provided by interviews help put a bowtie analysis into context and further refine it. Most hazard identification and risk analysis techniques are carried out with teams. This participative and multidisciplinary approach ensures that findings and recommendations are geared to the right audience and operational context.
The spin-off effect is the workforce ownership of the process.

4. Create user friendly procedures.
Aesthetics matters; the more visually appealing a procedure is, the greater the likelihood it will be used. The procedure needs to be relevant, concise and workable. Things to consider at this stage are:

Decide on the format
How workers interact with the procedure should determine its shape and format:

- Will it be accessed via electronic devices? Include interaction to enable the user to view the whole document on a small screen.
- Will it be printed off and taken to the location of the task? This works best if it includes visual aids such as pictures and flowcharts.

Decide on the structure
Typically, procedures have the following sections:

- Purpose. It answers the question: why is this procedure necessary and what is its goal?
- A list of all the hazards people are likely to be exposed to.
- Precautions and controls to prevent hazard realisation.
- Tools, equipment and protective gear necessary for the task.
- Pre-conditions to be met before the task begins.
- Steps to complete the task.
- Document control.
- In the case of a permit to work: the time it's valid for.
- Reviewer and approver's signatures.
- Reasons it can be withdrawn.

Technique	Main application
Brainstorming	To elicit views in workshops and focus groups
Task analysis	Using a walk-through talk-through of the task with the operators
Delphi technique	To elicit views or collect the judgment from subject matter experts
Bowtie analysis	To analyse and describe risk controls
Fishbone diagram	To analyse sources of risk
Classification taxonomies	To identify risk or controls
Interviews	To elicit views using structured, semi-structured, ono-to-one interviews

Less is more. Focus on must have information

- Keep the number of steps to the bare minimum.
- Don't let a single step straddle two pages.
- Avoid overkill. Don't expand unnecessarily on individual steps.
- Avoid cross-referencing other procedures. It should stand alone.

Use plain language

- Use terms that everyone can understand.
- Define acronyms in full. If there are many, include them in a glossary.
- Keep sentences short and simple with less than 15 words per sentence and no more than three syllables per word.
- Use lists, sequential numbering or bullet points.
- Add one action per step to avoid ambiguity.
- Use active verbs and active voice.

Make it inclusive

- Use a consistent font type and size, for example Arial, size 11 or larger, 1.5 line spacing.
- Use smart heading and subheadings to structure chunks of text.
- Use BLOCK CAPITALS and italics with caution. They can make sentences harder to read.
- Use background contrast conventions to improve readability. Avoid green on red, red on blue combinations. Black on white and black on yellow are easier on the eye.
- Use eye-catching symbols and colours to draw attention to critical steps.
- Use visual aids instead of text wherever possible.
- Get it proof-read by someone else.
- Aim for Flesch-Kincaid readability scores of 60-70 (see www.webfx.com/tools/read-able/flesch-kincaid.html)

5. Test it out before roll-out.
Request feedback from end-users, from both experienced and novice operators and run as many iterations as necessary until everyone is comfortable with it. Test the procedure in a 'real-life' or simulated environment. Do workers use it as intended? If not, establish what needs to be changed to make it work.

6. Train the workforce.
Identify training needs, training material, the facilitator and the means of delivery, for example, will it be classroom-based, on-site, used in a task briefing? Consider use of visuals and relevant scenarios. Collect feedback at the end of the session and at several intervals afterwards and act on the feedback at the review stage.

7. Launch it.
Emailing a copy of the procedure is not enough. This is where the benefits of having involved key people in the previous stages pays off. It makes implementation smoother but there are still a few things for consideration:

- Location of the procedure; make it accessible and readily available to people.
- Give it a logical, intuitive name.
- Maintain effective version control. It's not unusual for people to save copies on their personal computers which, over time, become uncontrolled and outdated. Document control software systems such as SharePoint can help here.
- Laminate hard copies for ease of cleaning.

Be generous. If the procedure works well, share it with others in your industry.

8. Continuously improve.
Nothing stays still. Review the procedure regularly; how often will depend on your specific circumstances and the criticality of the task the procedure supports. Some indicators suggesting you need to review the procedure before the next review date are:

- Complaints raised by staff about its workability, relevance and usability.
- Changes to the task context such as hardware, software or the environment it's used in.
- Findings of incident investigations that cite the procedure.

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Unit Flight Safety Officers Investigation and Airproxes
Your Responsibilities

By the RAF Safety Centre

Image: Artist impression

An Airprox is a situation in which, in the opinion of a pilot or air traffic services personnel, the distance between air systems, as well as their relative positions and speed, have been such that the safety of the air systems involved may have been compromised. If you are told you were involved in an Airprox, even if you believe it wasn't an Airprox, you need to submit a DASOR and complete the Airprox tab. This applies to both aircrew and ATC.

So… a DASOR lands in your inbox and it's an Airprox. What does that mean for you as a UFSO? AP8000 and RA1410 state that the Aircraft Operating Authority must carry out a suitable investigation into the Airprox to determine the cause, causal factors and to record any recommendations made. The UK Airprox Board (UKAB) procedures rely on the output of the RAF investigation to inform its deliberations and focus on identifying a cause and severity. Their procedures do not replace the requirement for ADHs / AMs to investigate and make recommendations for Airprox incidents as they are mandated to do for all other occurrences. Mid Air Collision (MAC) features highly as a top Risk to Life and the findings from your investigation could inform decisions made on MAC mitigations.

Before you start investigating, confirm that you have all accounts submitted via ASIMS with the Airprox tab completed. This includes all air system accounts and all ATC personnel involved (supervisor, controller etc). Remember, if you are told you were involved in an Airprox you need to submit a DASOR even if you believe it wasn't an Airprox or it wasn't declared at the time on frequency.

For most Airproxes, a Local Investigation (LI) will suffice, albeit most likely requiring a more thorough and detailed approach than a 'standard' LI (more information on when to convene an OSI can be found in Lflt 8111). Regardless of who completes the investigation- be it Sqn FSO, ATC FSO or the unit Air Safety Cell- it is imperative to capture the whole picture, both aircrew and ATC aspects, to allow comprehensive recommendations to be made which aim to prevent reoccurrence. SME advice on both sides will be required. The 'master' DASOR, where the investigation, findings and recommendations are recorded, is decided by local process.

Airprox investigation tips:

- Capture just the facts, and detail which facts came from evidence (proven data such as radar data) and which came from perception (memory).

- Avoid attempts to analyse or explain the data; unconscious bias is powerful and affects everyone, so interpretation of the facts should be predominantly left to the DDH review and Airprox Board process.

- Consider an OSI if the investigation is complex or contentious. This enables you to call in trained investigators from the Unit or the Air Command Air Safety Investigation Team (ASIT). Alternatively, the ASIT can provide remote support and mentoring to help local Safety Teams produce thorough HF-centric LIs.

Three good sources of data:

1. ATC Transmission tape transcripts – obtained via ATC.

2. Military Air System CVR / FDR / GPS data. Obtained via the air system type Safety Team. This needs to be done quickly in case the date is overwritten, and it should be considered 'Airprox First Aid' by air system captains and Safety Teams.

3. The Radar Analysis Cell (RAC) may be able to provide radar analysis and radar replay with air systems involved in ATC/ Airprox investigations. If you think this would add value to your investigation, you can access this capability through SO2 2Gp BM Safety A5 (email: Air-2GpSpBM-Safety A5 SO2); the RAC should not be contacted directly. Unlike the current provision, new Programme MARSHALL ATC equipment has this radar replay capability software installed, so if your Airprox occurred in proximity to a station that has the new kit, they may be able to assist.

You shouldn't underestimate the importance of data capture from these sources as they can often provide additional context behind the actions of the individuals involved.

If the other air system involved was civilian, and you are able to identify the operator and speak with them, then please do so. But remember the principles of safety investigation- your aim is to determine the cause to prevent reoccurrence, not apportion blame. Pitching any engagement to ensure there is no feeling of 'us and them' is key to ensuring a successful investigation with meaningful recommendations to improve safety.

Whilst you are busy investigating, the DASOR's comments page will be updated with a date for assessment by the UKAB. HQ Air Command / JHC / RN will review the investigation, findings and recommendations and make comment no later than 2 weeks prior to the UKAB date. The investigation, along with DDH comments, needs to be completed prior to this.

Now that the investigation has been completed, we can look at the UKAB…

The sole objective of the UKAB is to assess reported Airprox in the interests of enhancing air safety. It is not the purpose of the Board to apportion blame or liability. The Board meets on a monthly basis (except August) to discuss and categorise around 15-20 Airproxes that have occurred in the preceding months. Each airprox is categorised as follows against a definition in the table below; those that are risk bearing (A or B) will feature in detail in the UKAB Monthly Report.

The most immediate benefit of the process relates to those involved in each Airprox event. Pilots and controllers each receive their own full copy of the Board's final report which sets out what happened and why. Final reports are anonymised to encourage open and honest reporting and any reference to blame apportionment is avoided. Instead, straightforward statements are made on what took place with the emphasis placed on identifying lessons of benefit to all. Safety Recommendations are made where appropriate, aimed at reducing the risk of recurrence of a particular Airprox.

The UKAB website hosts a wealth of information from monthly and annual reports, analysis, trends identified, safety advice and topical articles. www.airproxboard.org.uk.

Information on the Airprox process from initial reporting, through investigation to UKAB assessment, can be found in AP8000, Lflt 8204 – AIRPROX

Airprox Risk Categories

A	Risk of Collision: aircraft proximity in which serious risk of collision has existed
B	Safety not assured: aircraft proximity in which the safety of the aircraft may have been compromised
C	No risk of collision: aircraft proximity in which no risk of collision has existed, or risk was averted.
D	Risk not determined: aircraft proximity in which insufficient information was available to determine the risk involved, or inconclusive or conflicting evidence precluded such determination
E	Met the criteria for reporting but, by analysis, it was determined that normal procedures, safety standards and parameters pertained

AirClues

UK Space Command

UK Space Command formally stood up on 29 July 2021. Although it is located at Air Command HQ at RAF High Wycombe, it is a Joint Command staffed by personnel from the Royal Navy, British Army, and Royal Air Force, as well exchange officers from other nations, civil servants, and commercial partners. It brings together three functions under a single 2-Star military commander (Air Vice-Marshal Paul Godfrey): Space operations; space workforce training and growth; and space capability (developing and delivering space equipment programmes).

Defence has recognised that Space is fundamental to military operations. Loss of, or disruption to, the space domain, impacts our ability to undertake the majority of Defence Tasks, and has the potential for significant effect on civilian, commercial and economic activity. The threat from adversaries in this rapidly evolving operational domain is real and it is here now. If we fail to understand how to operate in space, integrate space with all domains and integrate with Allies and Partners space capabilities, we lose our competitive edge. The establishment of a space command for Defence was a crucial step in the development of a coherent strategy to understand and operate in space to protect UK interests.

UK Space Command works alongside the Ministry of Defence Space Directorate, which is responsible for policy, strategy and cross-Government and international coordination. Direction from the National Space Council flows through the MOD Space Directorate to UK Space Command and other relevant elements of Defence. UK Space Command interacts with the UK Space Agency, when required, to deliver joint national space capability. UK Space Command has extremely close links to UK Strategic Command and Dstl, specifically in capability growth, enabling multi-domain integration and capitalising on the rich pedigree of research and development expertise that exists within UK Defence.

Collaboration with international partners is key in space, no nation can do it alone. UK Space Command is continuing the UK's commitment to the Combined Space Operations initiative, which comprises seven nations (Australia, Canada, France, Germany, New Zealand, UK and US). This initiative seeks to improve cooperation, coordination, and interoperability opportunities in space. Its main effort is to ensure a safe, secure and stable space domain. UK Space Command will also take command of the UK's participation in the US-led Space Coalition under Operation OLYMPIC DEFENDER and support the growth of the NATO space enterprise.

As it matures, UK Space Command will provide command and control of all of Defence's space capabilities, including the UK SpOC, RAF Fylingdales, SKYNET, and other enabling capabilities. It will have oversight of all spacebased capability development, ensuring that space-based capabilities are developed in a way that ensures they can be integrated coherently with other Defence capabilities (and other domains). This includes joint enabling capability sponsored and delivered by UK Strategic Command along with the Dstl Space S&T programme. It will also have responsibility for the training and development of Defence personnel working in the space domain.

Of course, Air Clues is particularly interested in how 'Safety will be managed in the Space environment. Operating procedures on the ground are relatively familiar, but considerations for actually operating in Space will likely give rise to novel considerations in respect to safety and liability.The new Command has promised to keep us updated with future developments.

Space Operator Badge

After the newly refurbished headquarters was officially opened, the Chief of the Air Staff, Air Chief Marshal Sir Mike Wigston, presented the new 'Space Operator' badge, which signifies the excellence of space professionals across defence.

Environment Matters – RAF Involvement in Curlew Project 'Head Start'

By Michael Tomlin, CESO (RAF) EP SO2, RAF Safety Centre

The distinctively long and slender bill of the Eurasian Curlew is sadly a rare sighting in UK wildlife, with only six nests being confirmed with fledglings in Southern England during 2018. The declining population means the Eurasian Curlew is now red listed as a Bird of Conservation Concern and a Priority Species, under Section 41 of the Natural Environment & Rural Communities Act 2006.

'Head Start'

In 2019, the RAF and its partners worked with Natural England (NE) and the Wildfowl and Wetland Trust (WWT) to trial an innovative 'Head Start' conservation project. This saw the successful relocation of 58 Eurasian Curlew eggs to the WWT's captive rearing facility at its Slimbridge Reserve. To control potential flight safety risks, Curlew eggs would normally be destroyed under NE licence by Aerodrome Wildlife Control Units (AWCUs). Airfields provide Curlews with an extremely favourable habitat, namely open grassland; unfortunately, they weigh up to 1kg and have a 1m wingspan, so they can pose a significant flight safety risk. Stakeholders knew that during 2018, the number of eggs destroyed under licence on our airfields significantly outnumbered those successfully bred in Southern England; the Head Start project aimed to redress this imbalance. Whilst the priority was always air safety, the RAF wanted to establish a practical conservation project to test whether Curlews could be supported within the air safety constraints. This required a collaborative approach between Air Command, the RAF's Chief Environment and Safety Officer (CESO (RAF)) Environmental Protection team, the Defence Infrastructure Organisation, Heads of Establishments, Grounds Maintenance staff (Amey), Station Air Traffic Control Officers (SATCOs), NE, the WWT and the AWCU staff.

Balancing Station Grass Policy

Maintaining grass length at a safe height is crucial to airfield management, and Grounds Maintenance personnel achieve this through two processes. The first is 'bottoming out' when the grass is cut to 20mm, with harrowing and raking being used to remove the insect habitat and improve grass uptake; the second process is 'topping off', which cuts the grass height down to 150mm. Both processes play a major part in helping to ensure safe airfields, but constant monitoring was necessary to identify nests. Curlews lay a clutch of 3 - 5 eggs, which can take place over a 5-day period. The ambition was to remove full clutches of eggs, as we wanted to avoid birds continuing to lay eggs, in an attempt to replace those that had been removed. Monitoring was a vitally important aspect of the project protocol developed by the stakeholders, initially to identify nests, but then to assess the threat to flight safety. This was carried out by the AWCU and SATCO teams; when necessary they ensured nests were managed under existing licence conditions, but if possible, monitoring continued and the eggs remained in situ until they could be removed by NE or WWT staff for transfer to Slimbridge. The coordination required to successfully transfer eggs was immense and obstacles were only resolved through constant dialogue between all stakeholders, in addition to their sheer hard work and enthusiasm.

Curlew images by Photographer: Keith Cowieson, Royal Ornithological Society – Reproduced by kind permission.

The result saw 18 clutches of eggs transferred to Slimbridge during a 23-day period (17th April - 9th May) and ultimately 50 fledged Curlew's were released into the wild. This remarkable achievement was generously recognised during the 2020 Sanctuary Awards, when the project received the Environmental Protection & Enhancement Award, an immensely proud moment for all stakeholders.

The 2019 trail provided the WWT aviculturists with a wonderful learning opportunity that was gratefully accepted. We knew clutches could be removed earlier than preferred from an ecological perspective, and we also knew Curlew eggs could hatch successfully after being transferred for periods of four to six hours in a battery-operated portable incubator.
The intention had been to utilise our experience to develop the project during 2020, but of course all plans were abandoned with the emergence of the COVID-19 (CV-19) pandemic. As the situation developed during 2020, it became apparent the project could possibly be resurrected during 2021, providing robust CV-19 procedures were devised. CESO (RAF) instigated a meeting for project stakeholders during November, when embryonic plans for 2021 were discussed. The ambition had always been to expand the project by involving additional airfields, but the limited capacity of the rearing facility at Slimbridge inhibited our plans. This was resolved when the Pensthorpe Conservation Trust (PCT) joined the project, utilising new purpose-built rearing facilities funded by the Department for Environment, Food and Rural Affairs. The PCT has a rich history of participating in captive breeding programmes with national conservation partnerships, so the experience it provided was a welcome addition to the project.

Numerous progress meetings were held, and it was clear all stakeholders were highly motivated to repeat the success of the 2019 trial. Fifteen airfields participated during the 2021 season, with eggs being collected during the period 18th April - 26th May. In total, 147 eggs were transferred from 8 locations to the Pensthorpe and Slimbridge rearing facilities, as follows:

Airfield	Eggs Licensed	Eggs Collected
RAF Barkston Heath	60	36
RAF Benson	16	
RAF Coningsby	12	
RAFC Cranwell	16	8
Doncaster / Sheffield Airport	15	
RAF Fairford	12	
Leeds / Bradford Airport	8	
RAF Leeming	16	
RAF Marham	40	23
RAF Scampton	60	48
Teesside Airport	16	4
RAF Topcliffe (Alanbrooke Barracks)	12	7
RAF Waddington	40	12
Wattisham Flying Station	12	
RAF Wittering	16	9
	Total	147

Chrissie Kelly, the Head of Species Management at Pensthorpe, reflected on a fantastic year during which twice as many eggs were received than anticipated. This resulted in an intense hatching period when young Curlew were transferred to the rearing pens. Mark Roberts, the Principal Conservation Breeding Officer at Slimbridge, explained how the 2021 season presented new challenges for the WWT, compared to the 2019 trial. This was primarily because the eggs were required to be transported twice, initially to the Slimbridge reserve for incubation, and then to the Duchy of Cornwall Estate for hatching. Ultimately, 112 birds were reared and released at three locations, the Duchy of Cornwall Estate, the Sandringham Estate and Wild Ken Hill, the base for the BBC Autumnwatch TV series. A breakdown is shown in the table below.

This was a phenomenal achievement that boosts our confidence in our ability to successfully rear and release Curlew from the project, however there is a lack of knowledge about what happens to the birds after their release; this is the next stage of the project. The British Trust for Ornithology colour marked birds to enable Headstarted Curlew to be identified by the tags on their legs. Radio tags were also fitted to some birds to enable local tracking, while a smaller proportion have had GPS tags fitted; this was a first with juvenile Curlew, so numbers have been restricted because of the experimental nature of the endeavour.
It is crucially important to learn how many birds from the project survive after release, with results from the first year's radio tracking suggesting similar survival rates to wild birds. In the longer term, it is hoped colour tag sightings and GPS tracking will help us to understand the locations of Curlew from the project when they reach breeding age. This is key to the project, as we don't know where the birds bred in captivity will eventually settle; perhaps they will nest in Scotland or the Pennines, or we may discover they interact with continental birds and ultimately breed elsewhere in Northern Europe. Monitoring is a long-term process, with four or five years of information required to fully understand what is happening, but we hope to have some breeding information from the surviving project birds during 2023. Potentially, we may discover birds from the project have dispersed far afield from their release sites, and therefore cannot make a major difference to the declining/ disappearing Curlew population across Central and Southern England, but this RAF initiative is still critical from an ethical perspective.

As we look ahead to the 2022 season, one of our ambitions is to increase the capacity of the rearing facility at Pensthorpe. NE had not anticipated the increased number of eggs found during 2021, so the intention is to extend the Pensthorpe facility; this will ensure it is prepared should similar numbers be identified in the future. The goal is not to substantially increase the number of birds being reared, but prevent the overcrowding seen during 2021 in the existing facilities. Discussions are also underway regarding the rationale of egg collection times; another example of valuable knowledge being gained by the aviculturists participating in the project. Experience has shown a 50% success rate with second clutch eggs; this is similar to the second clutch success rates achieved with other species when using artificial incubation, compared to wild birds who can successfully incubate second and even third clutch eggs. As the season progresses, the likelihood of successfully producing chicks in a hand reared setting from second clutch eggs diminishes, so the best solution may be to set a cut-off date, after which eggs are not collected. With artificial incubation, we are learning that removing eggs 3 - 10 days into natural incubation generally provides better results, particularly as the season progresses.

The Eurasian Curlew Head Start Project has been incredibly successful and achieved with minimal impact on military activity, but it is impossible to predict where eggs will appear during 2022. What is guaranteed is the commitment of all stakeholders to do everything in their power to recover Curlew eggs, that might otherwise be lost. Our enduring ambition is to ensure more of these iconic birds are raised in captivity and ultimately released into the wild, providing a major boost to the conservation of Curlews in Southern England and East Anglia.

	Eggs			**Release site**		
Location	Allocated	Hatched	Reared	Duchy of Cornwall Estate	Sandringham Estate	Wild Ken Hill
Pensthorpe	106	87	82		31	48
WWT	41	35	33	33		
Total	147	122	115			112

CESO – New Waste Campaign

By Ann Rosenhagen, SO2 Env 1, RAF Safety Centre

Get on board the Safety Centre's new waste campaign.
It consists of a video which is accompanied by some stickers like this:

STOP THINK CORRECT BIN?

The campaign is to aid in meeting new very challenging Greening Government Commitments Targets (GGCs) recently published by the Government. it focuses on recycling with a new target of 70% recycling of our overall waste. We will also have to reduce our waste by 15% - not an easy task.

Almost everything we do has a Carbon Footprint and waste is no different. Doing the right thing can be confusing with Married Quarters and SLA having different rules about waste segregation from those of the Parent Station. The reason for this is that Married Quarters/ SLA waste might be collected by the Local Council whereas the Station waste is collected by the dedicated Hestia contractor. This is why our new campaign encourages personnel to check the bin first and make sure it is indeed the correct bin for the item they are disposing. One piece of incorrect waste can contaminate a whole receptacle. The bin will then be refused by the contractor and not only won't the contents not be recycled but it will also cost the station extra money.

In the past emphasis has been on less than 10% to landfill but with the new targets the government is now focusing higher up the waste hierarchy also putting weight on overall waste reduction and recycling.

Some stations are still struggling with introducing segregation at source with contractors instead sorting the waste at their Material Recovery Facilities (MRFs). This means that recycling is indeed still taking place but evidence seem to suggest that a higher rate of recycling is achieved if recycling takes place at source and this is what we are now hoping for will happen.

In the meantime watch out for our sticker when you next approach a bin to dispose of what might not be simply waste but instead something that transformed back into something usable again.

See video at
https://modgovuk.sharepoint.com/teams/23116

Specialist Training School Courses Part 2

By Howie Wadsworth, Head of STS

In Issue 36 we showed you Part 1 of the STS training courses available to you. They covered Environmental Protection, Waste Management, Energy Management and Pollution courses. In Part 2, we can show you the Health & Safety and Quality Management training that is available.

RAF Health and Safety Training

CESO (RAF) is the Training Delivery Authority. STS is the Health and Safety Training Provider of approved IOSH training.

Health and Safety (H&S)

Health and Safety legislation impacts on all levels of the working place and the penalties can be severe for breaches of the legislation. The Health and Safety area provides courses to make delegates aware of Health and Safety legislation and their responsibilities under the Health and Safety at Work etc. Act 1974. The courses are available to RAF Personnel & CS staff and on a fill-up basis to other services, and civilian personnel employed in management positions or tasked to undertake Health and Safety duties.

Manual Handling Instructional Techniques

The MHIT course is held over 3 days and will allow the candidate to meet the requirements of Health and Safety (HSW) legislation that personnel at risk from Manual Handling Operations should receive training from properly qualified trainers, to reduce the risk of injury. This course is introduced to provide suitable training for Manual Handling trainers to comply with the law. The course is accredited by the Institution of Occupational Safety and Health (IOSH).

Course Details – This course provides the candidate with the recognised training qualification to deliver practical MH training such as workplace induction or mandatory training

- Health & Safety Legislation.
- Manual Handling Operations.
- Accident Prevention.
- Sites and Causes of Injury.
- Base Movement.
- Musculoskeletal System.
- Workstation Design.
- Mechanical Handling Equipment.
- Instructional Techniques (Not DTTT).

Assessment of Manual Handling Operations. At the end of the course there is a 20-minute written examination consisting of 25 multiple choice questions. Then a 10-minute practical assessed training session on a manual handling activity possibly associated with your work.

Certification. The course is approved by the Institution of Occupational Safety and Health (IOSH). Service personnel will also be awarded the annotation Q-HSW-MH (I).

Managing Safely

The Managing Safely course is held over 3.5 days and will make delegates aware of Health and Safety Legislation and their legal responsibilities under the Health and Safety at Work etc. Act 1974. The course is accredited by the Institution of Occupational Safety and Health (IOSH).

Course Details – The Managing Safely course will cover the following:

- Understanding your responsibilities.
- Health and Safety Legislation.
- Active and Reactive Monitoring.
- Risk Assessment and Risk Control.
- Identifying Common Hazards.
- Safety Management Systems.
- Control of Contractors.

Assessment. At the end of the course there is a 45-minute written examination consisting of mixed multiple choice and short answer questions. There is also a practical project lasting approximately 3 hours.

Certification. The course is approved by the Institution of Occupational Safety and Health (IOSH). Service personnel will also be awarded the annotation Q-HSW-MS.

Risk Assessors

The Risk Assessor course is held over 2 ½ days and provides Health and Safety Risk Assessment training for Unit/Section Safety Representatives/Risk Assessors. The course will enable Unit/Section Safety Representatives/Risk Assessors to carry out risk assessments in accordance with current legislation. The candidate should also be able to advise line management of the Health and Safety implications associated with specific risks identified through assessment. The course is approved by the Institutional of Occupational Safety and Health (IOSH).

Course Details – To meet the requirements of Health and Safety at Work legislation all Safety Representatives should receive training appropriate to their duties. This course will provide suitable training to enable them to carry out workplace risk assessments as required by the various statutory regulations, which are now in place.

- Overview of Legal Implications of Health and Safety Legislation.
- Application of Health and Safety Legislation and MOD Policy.
- Completion of General Risk Assessment.
- Control of Substances Hazardous to Health Regulations 2002 (COSHH) Assessment.
- Manual Handling Assessment, and Display Screen Assessment, in accordance with the relevant legislation - Management of Health and Safety at Work Regulations 1999 and Health and Safety (Display Screen Equipment) Regulations 1992.

Assessment. At the end of the course there is a 20-minute written examination consisting of 25 multiple choice questions and a 'Hazard Identification' and 'Risk Assessment' exercise.

Certification. The course is approved by the Institution of Occupational Safety and Health

Quality Management (QM) Training

Air COS Spt -A4 - DACOS Aw Pol Gov is the Training Requirement Authority. STS is the approved Training Provider. Quality Management is a key element of Governance, Assurance and Improvement, which provides maintenance and control of the business to raise performance at all levels of the organisation. It ensures controls are effective, including managing any associated risks, and enables consistent delivery of products and services that meet customer requirements and contributes to sustainable improvement. In meeting the MOD policy requirements for Quality Management.

Quality Management Systems Audit Skills

The QMS Audit Skills course is held over 4 ½ days and provides Pre-Employment Training for personnel identified as having specific auditing responsibilities in a Quality management system. It is also to provide the skills necessary to carry out audits against the requirements of AP 100C-10 on RAF and Joint Service units.

Course Details - The QMSAS course contains the following modules:

- Fundamentals of Quality.
- Quality Management System.
- ISO 9000/15 Series as foundation to MAA Quality and Policy.
- Process Management & Mapping.
- Continual Improvement and Measurement.
- Quality Audit.
- The Auditor.
- QOR Narrative Writing.
- Audit Checklists.
- Meetings and Reporting.

Assessment. There is a formal assessment for this course. There is an unmarked practical element and there is a 2 hr written exam (open book).

Certification. Following successful completion of the course delegates will be awarded the TQA Q GEN-QAS.

Quality Management Systems Self-Audit Skills

The Self-Audit course is a one-day course carried out as part of a 'suite of quality training' at unit, to provide Junior Ranks with the training and skills to conduct self-audits to support the unit and squadron Quality Management System (QMS) audit programme.

Course Details - The SA Course covers the following:

- Quality Fundamentals.
- Quality Audit.

- Self-Audit Practical. Discuss - Overview references of MAA Regulatory Articles, AP100C-10 CEQA Audit Criteria FTs, AP600, MAM-P, AESOs, UQM and the Squadron's own Quality Plan. QOR and SQAC coaching.

Assessment. There is no formal assessment for this course. Certification. Following successful completion of the course either at unit or on DLE, delegates will be awarded the TQA Q GEN-SA

Senior Management of Quality

The SMofQ course is a half day course carried out as part of a 'suite of quality training' at unit, to provide an awareness and understanding of the Unit Quality Management System (QMS) for senior officers identified as having responsibilities within the Unit QMS audit programme. This course is also available via DLE but less interactive.

Course Details - The SMoQ course covers the following:

- The Quality Management System and Policy.
- Quality Audits and the Auditor and Audit Documentation. MAA Regulatory Articles, AP100C-10 CEQA Audit Criteria FTs, AP600, MAM-P, AESOs, UQM and the Squadron's own Quality Plan.

Assessment. There is no assessment for this course. Certification. Following successful completion of the course either at unit or on DLE, delegates will be awarded the TQA Q GEN-SMOFQ.

Junior Management of Quality

The JMofQ course is a half day course carried out as part of a 'suite of quality training' at unit, to provide an awareness and understanding of the Unit Quality Management System (QMS) and the tools to assist in carrying out duties with regards to quality management for all junior managers identified as having specific responsibilities in a QMS.

Course Details -The JMoQ Course covers the following:

- Outline a QMS, Audits and the Auditor.
- Describe the stages in an Audit Process including Quality Occurrence Reports.

Assessment. There is a no formal assessment for this course. Certification. Following successful completion of the course either at unit or on DLE, delegates will be awarded the TQA Q GEN-MOFQJD.

Quality Awareness Appreciation Seminar

The QAAS is a half-day session at unit. Providing QMS and Audit awareness training for SNCOs and junior ranks that have not completed the QAS or SA courses. But is also open for anyone who requires quality awareness training. This course is also available via DLE but less interactive.

There is no assessment or rank eligibility to attend this course.

Applying for STS Courses

Course dates can be found by going to the STS Sharepoint Site, this is linked on the RAF Safety Centre Home Page. https://modgovuk.sharepoint.com/teams/23116.

iosh
Approved training provider 876

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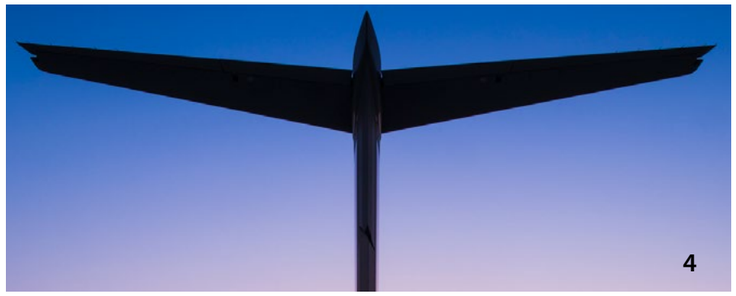
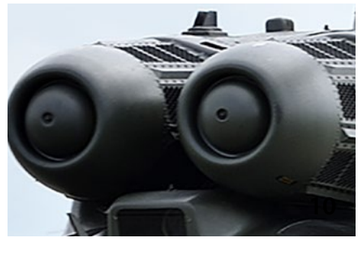
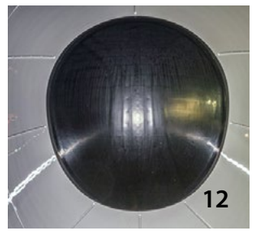
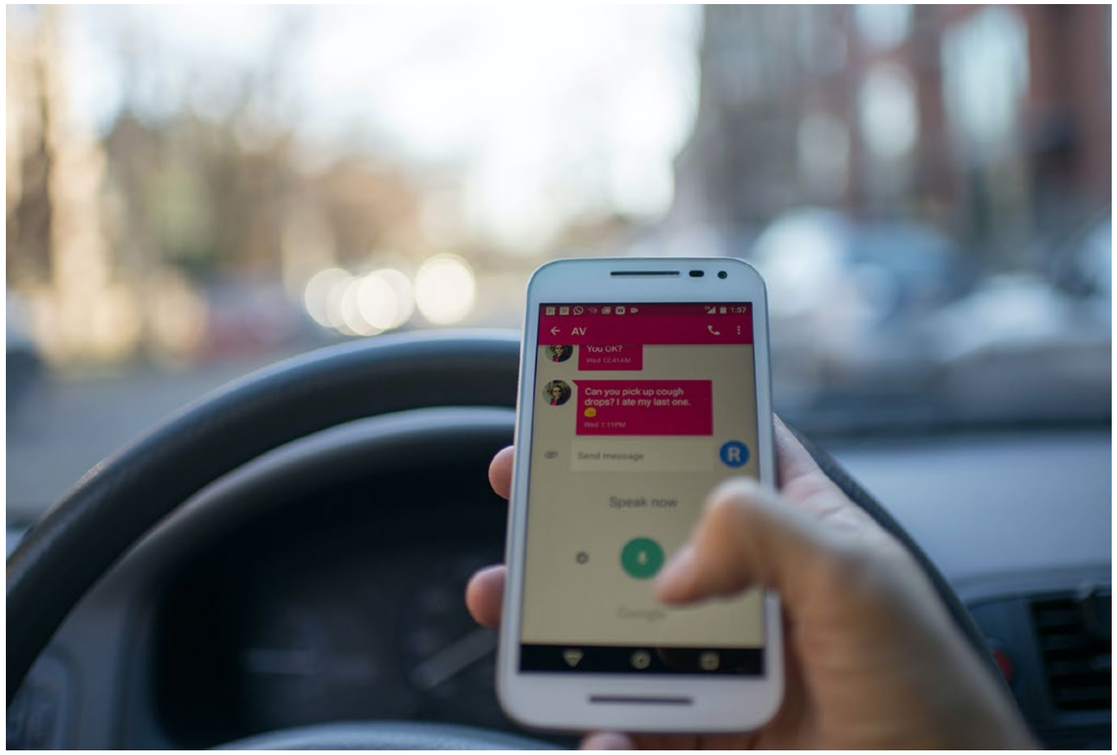


Answers on page 49







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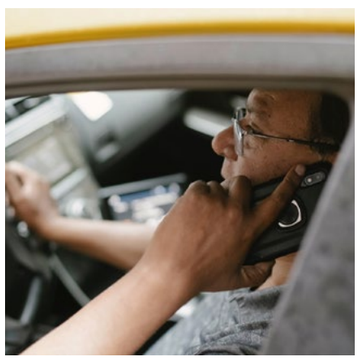
Don't Poke Me I'm Driving

By RAF Safety Centre

JSP 800 Vol 5 Ver 9.0

MOD personnel engaged in driving / operating / commanding vehicles or working in the vicinity of vehicles (transport workplace) are forbidden from wearing personal audio in ear or headphones equipment.

Hand held mobile phones must not be used whilst driving; hands free mobile phones shall not be operated whilst driving



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Being distracted whilst using a mobile phone, or other device such as a sat nav, or even just listening to music is not a defence in a collision. In fact, it provides grounds for prosecution for negligent driving, or worse.

Even if you are hands-free, you will be prosecuted if the Police can show that you were distracted. That is why it is in MT orders not to drive whilst using a mobile phone – even if hands free! If you ask anyone if they think using mobile phones and other devices is a distraction, they will give the textbook answer – yes. But, in reality, many of those people believe that they have the capacity to do both safely. Those same people would be incensed if a family member was seriously injured or killed and it was revealed that the offending driver was using their mobile phone at the time. It's time to stop the hypocrisy and pay attention to the evidence. Do the right thing. Don't be distracted.

Driver distraction

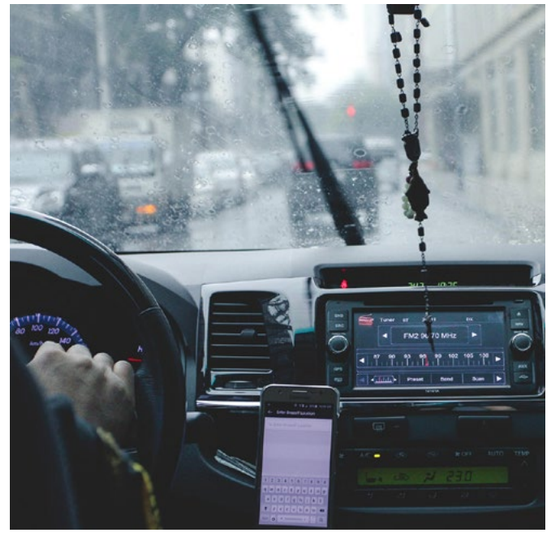
Driver distraction and, in particular, various activities carried out on mobile phones while driving, is a well-known safety problem. In one study, almost all drivers (92%) engaged in a non-driving-related task in at least one out of the 15 trips assessed, showing that distraction from the driving task is a common occurrence. Most distractions due to phones were a prolonged activity.

The risks of using a mobile phone hands-free were also found to be just the same as for hand-held use; reducing a driver's ability to detect hazards and the speed with which they react to them. A driver using a phone - hand-held or hands-free - is four times more likely to be involved in a collision. In 2017 there were 773 causalities in reported accidents where using a mobile phone was a contributory factor; of these causalities 43 were deaths although since 2018 this figure has decreased, perhaps due to stronger penalties.

Using a smartphone for social networking slows reaction times by 37.6%; texting slows reaction times by 37.4%; hands-free mobile phone conversation slows reaction times by 26.5%. By contrast, cannabis slows reaction times by 21%, alcohol at the legal limit slows reaction times by 12.5%.

Key Statistics

- In 2020 there were 516 causalities in reported accidents where using a mobile phone was a contributory factor.
- Driver distraction is a major factor in road accidents.
- Using any phone when driving makes someone four times more likely to be in a crash.
- Using a smartphone to text or browse social media slows reaction times by nearly 40%.
- Even hands-free smartphone slows reaction times by over a quarter.
- Talking on a mobile phone can slow reaction times of a 20-year-old to that of a 70-year-old.
- If people text while driving they are 23 times more likely to crash.



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Key Myths

- Driving is automatic, so talking on a mobile phone should not affect driving ability **– FALSE**
- Talking on a hands-free mobile is a safe alternative to talking on a hand-held device, as your hands are on the steering wheel **– FALSE**
- Using hands-free mobiles while driving is not illegal, so it must be safe **– FALSE**
- Talking on a hands-free mobile phone is no different from talking to a passenger or listening to the radio **– FALSE**

The Institute of Advanced Motorists believes that all drivers should be aware of the risks they are taking when using any mobile whilst driving. However, this is not a new subject. It is difficult to believe after all this time that people don't understand the risks. It is probably more likely that people ignore the risks and possess an 'indestructible' attitude. If this is you, you must rethink your outlook.

Do the Right Thing. Don't Be Distracted.

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Supervision, Lack of Parts, Frustration - Fatal F-16CM Crash at Shaw Air Force Base

By Sqn Ldr 'Ozzy' Osborne, RAF Safety Centre

Reference: USAF Aircraft Accident Investigation Report: F-16CM, T/N 94-0043 Shaw Air Force Base, South Carolina 30 June 2020.

Master Sgt. Andy Dunaway, Public domain, via Wikimedia Commons

On 30 June 2020, a trainee F-16CM pilot was fatally injured during an unsuccessful ejection after their aircraft departed the runway at Shaw Air Force Base, South Carolina. Like so many tragic accidents, the F-16CM departing the runway was only the tip of the iceberg; there were several contributory factors that led to the outcome, many of which could have been avoided.

The F-16 Viper is a multirole fighter jet constructed by Lockheed Martin Corp. The Viper's intrinsic manoeuvrability, advanced avionics and communication suites, and weapons diversity, allow it to operate a full spectrum of mission sets; from defensive counter-air to offensive missions. The Viper's versatility, low operating cost, and adaptability have kept it at the forefront of America's military power. It can reach speeds up to 1,500 miles per hour, with a ceiling of above 50,000 feet and has a range up to 2,000 miles.

The flight was planned as a 4-ship night training mission for suppression of enemy air defences (SEAD), with pre-strike air-to-air refuelling (AAR) from a KC-135 Stratotanker.
The 4-ship comprised the flight lead, wingman, element lead and the trainee pilot. The mission was the trainee pilot's first SEAD training sortie and first attempt to conduct AAR. USAF directives required that students did not execute events, such as AAR or SEAD, at night until they had 'demonstrated proficiency in similar events during the day'. The leadership was aware the trainee had not accomplished AAR before the sortie but was not aware of the restriction on night events, and the limitation was violated. The trainee had not accomplished any SEAD events, nor any events 'similar' to SEAD, prior to the mishap. Again, leadership was aware the trainee had not accomplished SEAD before the sortie but was not aware of the restriction on night events, and the limitation was violated.

U.S. Air Force photo/Tech. Sgt. Angelique Perez

The flight lead filled out a risk management worksheet, a decision-making process to systematically evaluate possible courses of action, identify risks and benefits, and determine the best courses of action for a given situation. The intent is to ensure that as risk levels increase, risk acceptance and associated Go or No-Go decisions are elevated to obtain appropriate commander or supervisory oversight and approval. The worksheet filled out by the flight lead found the risk to be in the moderate range due to a number of factors, including night AAR, thunderstorms in the area, a wet runway, and it being the first SEAD mission for the trainee and the wingman. Unfortunately, the flight lead miscalculated the level of risk for the mission, neglecting to include the risk values for landing after 2200L, Instrument Meteorological Conditions en route/in the working area, and 'greater than 5 Days since the last flight' for both the trainee and another pilot. These changes would have increased the Risk Management score considerably and would have required authorisation from the Operations Group Commander.

The 4-ship of F-16's departed Shaw AFB and joined with a KC-135 for AAR in the operating area. Refuelling was delayed while the KC-135 exited a dense layer of clouds and relocated to a different altitude block. The flight lead and the element lead refuelled without incident. The wingman, on his second-ever AAR attempt and first at night, was able to receive fuel but bobbled somewhat, required approximately ten minutes (twice the time of the flight lead and element lead).

However, the trainee's AAR attempt ended after being unable to meet the intense formation requirements to receive fuel, requiring the element lead and the trainee to return to Shaw AFB. Following his unsuccessful AAR attempt, the trainee is heard expressing frustration over the cockpit voice recorder. During the return, the trainee is heard once again expressing frustration at having to return to base early and struggles to maintain proper formation spacing and airspeed while trailing the element lead. Approximately 16 nm from Shaw AFB, the element lead communicated, in a light-hearted tone: "that was not the way to start your tanking experience" and then follows more sincerely with: "that was really challenging".
In response, the MP exhaled and said: "no excuse".

Due to the weather, both crews elected to fly the instrument landing system (ILS). After intercepting and descending on the glidepath, the trainee radioed that his gear was down, and Air Traffic Control (ATC) tower acknowledged and issued clearance to land. Two minutes after lowering the landing gear, at an altitude of 620 feet above and 1.8 nm from the runway, the trainee transitioned to visual cues. Along with other lighting elements on the runway, this system includes a line of green lights along the threshold of the runway and a line of white lights oriented the same direction, approximately 1000 feet prior to the threshold. On runway 22R, there is an array of antennas located 76ft in front of the 1000ft Light Bar (1,076ft before the runway threshold). The trainee began to steepen his descent in order to intercept a standard approach

using visual cues to land. This manoeuvre is typical, but a pilot should set their aimpoint on or just beyond the green threshold lights; the trainee erroneously set his aimpoint to land at the 1000ft Light Bar. As the trainee began to flare to land, still aiming 1,000ft before the threshold, the left and right main landing gear (MLG) impacted the two inner-most antennas while traveling at 165kts. The impact damaged the left MLG, rotated the wheel perpendicular to the direction of travel, split hydraulic lines creating a failure in one of the hydraulic systems. After impacting the antennas, the trainee initiated a go-around, but the briefly touched down in the underrun.

The trainee informed the element lead, who had gone around for another approach, that he had landed short and had a hydraulic failure and declared an inflight emergency to ATC. All three of the landing gear safe indications (3 Greens) went away and never returned, making it impossible to tell if the gear was down and locked in the cockpit. The element lead had also contacted the supervisor. While visually inspecting the damaged aircraft, the element lead reported that the left MLG was: "broken, and [was] hanging", but the right MLG and nose landing gear (NLG) appeared normal. Based on those observations, the crews and the supervisor started to read off the LANDING WITH LG UNSAFE/UP checklist. As the supervisor began the LANDING WITH LG UNSAFE/UP checklist, he stated the checklist directs the pilot to refer to EJECTION 'if conditions are not favourable' before proceeding to the rest of the checklist, which concludes with an approach-end cable arrestment. The checklist notes potential factors that may be considered favourable or unfavourable, such as the airfield facilities, hook engagement limits, the crosswind component, and the runway and overrun conditions; however, no factors were ever discussed. For any cable engagement, it is essential that the pilot engages the cable perpendicularly and as near to the centre as possible. Another source of advice for the F-16CM is the Lockheed Martin Aeronautics Company (LM), who are available for Inflight emergency technical assistance 24 hours a day. The F-16CM flight manual states: "Because of the number of possible malfunctions, specific procedures for every situation are not feasible. If time and conditions permit…technical assistance should be requested". This was not done; Flight Safety Engineers from LM explained, after the mishap, that the LANDING WITH LG UNSAFE/UP checklist only applies if a landing gear fails to extend normally, not when it is damaged or hanging. The engineers also stated there is no checklist in the F-16CM flight manual for this situation, and the outcome of an attempted cable arrestment would be unknown.

The aircraft touched down approximately 730ft prior to the approach-end cable with the hook lowered, throttle in idle, and approximately four degrees of left roll. The lower portion of the hook assembly, just prior to the hook itself, impacted the cable, but the engagement was unsuccessful. At 4.5 seconds after touchdown, after traveling approximately 1,108ft and at 138 kts ground speed, the aircraft rolled to 14° left bank, indicating the left main gear had failed to support the weight of the aircraft and the left wing had contacted the runway. The trainee commanded full right roll and momentarily commanded full nose up while increasing the throttle to afterburner. Soon after, the flight control inputs ceased as the pilot activated his ejection seat. The F-16 continued veering to the left, departed the runway into the grass infield, flipped nose-over-tail, and came to rest upside-down in a large parking apron area. The ejection sequence proceeded as expected until the seat left the aircraft, at which point a critical failure occurred of the system that works to stabilizes the seat, activates seat separation and deploys the parachute. This resulted in a failure to sequence or control all subsequent actions and meant that the pilot remained in the seat until it impacted the ground where he sustained fatal injuries.

If the pilot had executed a controlled ejection based on the locally developed controlled ejection procedures, which direct a controlled ejection between 2,000-3,000 feet, he would have had between 13.9 and 18.3 seconds to pull the manual separation handle, which drops the seat and releases the parachute manually. However, as the pilot ejected on the ground, this meant he only had 3.4 seconds to recognise a seat failure and pull the manual separation handle. When the investigation analysed the maintenance logs of the aircraft, they found that there were 2 outstanding actions with the ejection seat; the replacement of a part within a module responsible for the sequencing of the ejection profile and the shelf life of the module. The first opportunity to replace the part of the module was on 28 August 2017, nearly 3 years prior, but was not accomplished due to a lack of available parts. The requirement was automatically deferred to the next 36-month seat inspection, which was 28 August 2020. The second issue was the 10-year shelf life of the module, which expired as of 28 February 2019; however, the DRS received three temporary shelf/service life extensions due to lack of spare parts. The aircraft was set to have the module replaced on the 8 Jul 20, just over a week after the incident. Ejection seat engineers confirmed that earlier installation of the module should have prevented the critical failure, so the ejection seat would have functioned properly.

The President of the Accident Investigation Board stated: 'I find by a preponderance of evidence the cause of the mishap was the MP's failure to correctly interpret the airfield landing system and identify the runway threshold during his first landing attempt, which resulted in severely damaged landing gear. Additionally, I find by a preponderance of evidence two factors substantially contributed to the mishap: (a) the SOF chose not to consult the aircraft manufacturer, which resulted in the decision to attempt a cable arrestment in lieu of a controlled ejection and (b) a series of ejection seat malfunctions occurred, which resulted in the MP impacting the ground while still in the ejection seat'.

Image: Envato Elements

Wg Cdr Spry's Comments:

RAF Safety Centre comments in this article are based on the published USAF Accident Report and constitute opinion. They should not be considered as qualifying statements or conclusions pertinent to investigation.

This is a very unfortunate event that could have been so easily prevented at many different stages; from the programming of the sortie; the supervision, at all levels; to the maintenance of the ejection seat. There are many lessons within this incident that we can all learn from; I would like to touch on 3 that stand out to me:

Supervision: Being a supervisor, be it on the ground or as the formation leader, is an incredibly demanding and high-pressured job. It necessitates a great understanding of the regulations and the status of the currency and competency of the pilots. If the leadership had fully understood all the regulations attributed to night training missions and the limitations that are there to protect the student pilots, the mission would not have been allowed to go ahead.

Spare parts: This can be an issue on any Squadron and a source of frustration that many engineering teams have. If the ejection seat had the replacement, then the seat would have worked. It serves as sobering food for thought.

Frustration: Being frustrated with your performance to the point it clouds everything has a detrimental effect, as was shown in this incident. Being a student, with limited experience to fall back on, this serves as an interesting case study why it is important to focus on the main priority - flying the aircraft (save the self-deprivation for the crew room). As an instructor or a formation lead, it is important to recognise when this is happening and the effect it could have on the student's performance.

The Waiting Room–Puzzles

Chess

Easy – White to play – Mate in 2

Solution:
1. Qxa7+ Qxa7
2. Nxc7++

Medium - White to Play – Mate in 2

Solution:
1. Bc6+ Qxd4
2. E7++

Hard – White to Play – Mate in 2

Solution:
1. Bb4 h1 Q
2. B3++

Problems supplied by the UK Armed Forces Chess Association. Want to join? Look them up at this link: https://serviceschess.wixsite.com/home.

Sudoku

3		1	2		7			
9	7		3				4	
6	4				9	3	2	
4		7		9		5		
			7		2			
		3		8		7		1
	3	5	4				7	6
	2				6		5	3
			8		5	2		4

Easy

			8	3				9
	1	4						
	3	9			6			
		1			8	3	5	
			5	9	7			
	4	2	1			8		
			2			9	3	
						6	2	
2				1	9			

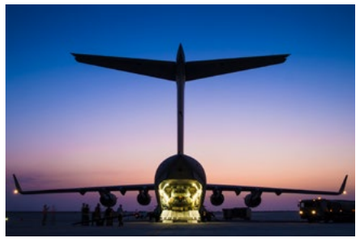
Hard

Aircraft Recognition-Results

1. Rivet Joint

2. Typhoon

3. Tutor



4. C-17

5. C-130

6. Hawk T1

7. Lightning

8. A400M

9. Chinook

10. Puma

11. Griffin

12. Poseidon

Doc's Corner: **Gender Issues** for Aircrew- Part 1

By Group Captain Gwynne Harper, CO RAFCAM / DACOS AvMed

This is the first in a series of articles by RAFCAM talking about gender issues for aircrew.

Complaints over equipment and uniform have probably existed for as long as these have been issued. Although there have been huge advances in recent years in the range, choice, quality and design of issued 'kit', Aircrew Equipment Assemblies (AEA) and anthropometric standards remain a bone of contention for all users. Reasons are multifactorial, but include the sheer range and complexity of garmets, the supported platforms and useage (eg every day comfort versus emergency performance). Furthermore, advances in materiels technology and procurement of new platforms, both designed and off the shelf, add further difficulties. Although these issues clearly affect all who work in the air, this article covers introduces specific reasons why the impact is disproportionately felt by females. Nevertheless, although causes and consequences are sometimes female-specific, many solutions will benefit all aircrew.

The publication of the House of Commons Defence Committee (HCDC) report Women in the Armed Forces was a watershed moment. This measured and thorough publication offered an extended viewpoint from recruitment to civilian life, covering all aspects of the lived experience for women in uniform. Although not specific to any profession or Service, comments on uniforms and equipment clearly described the practical difficulties for women, who all too frequently still make do with items that are clearly designed for men. However, the report also contained evidence that things were starting to change, as noted by COS Pers:

"The RAF is doing work to make crew equipment more appropriate for female personnel, including adapting ejection seat design, in-flight urination systems, breathing system design and protection systems."

The Data Gap

If you don't know that a problem exists then it is unlikely it will ever be fixed. As with any area of policy or service delivery, full and accurate data is therefore key. Unfortunately, there is a significant gender data gap that affects all aspects of society, as acknowledged by the UK Government:

"Currently, we have no data or poor quality data on issues that disproportionately affect women, which undermined the ability to understand the lives of women and girls and the constraints they face. (Dept for Digital, Culture, Media & Sport, Apr 19)."

It is a truism that, if we lack the right data on the right people and at the right time, then elements of the target population may be functionally invisible to decision makers. Despite an ever-increasing demand for gender-based data, the world is in many ways still designed for men, with consequences ranging from simple nuisance to an increased Risk to Life. Everyone will recognise the lengthy queues for women's toilets at public events; fewer will spot that the large size of modern smartphones reflects the upper limit of men's hand size. More worryingly, women are 17% more likely to die in a car crash due to gendered design decisions, and 50% more likely to be misdiagnosed after a heart attack (Criado Perez, 2019).

Against this background, it is hardly surprising that female aircrew are historically disadvantaged. There is perhaps no better example of a gender data gap than the fact that the sizing for Aircrew Equipment Assemblies (AEA) is based on a 1971 survey of 2,000 male aircrew. Change is overdue.

Workstrands and Actions

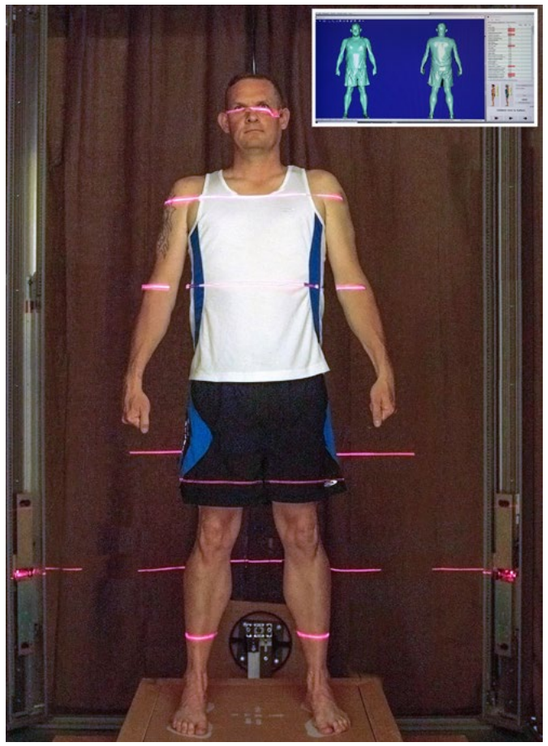
Although RAF CAM primarily provides specialist advice to risk owners and project or delivery teams, it also directly sponsors or undertakes primary research on a wide range of aviation medicine topics. As a result, through work on topics including anthropometry, equipment design, in-flight urination, education and policy RAF CAM has highlighted the gender disparity for many years. CAM therefore has multiple existing work strands relevant to, but independent from the Defence Committee report; however, that report has served to energise this issue as never before. With unequivocal and unanimous senior support, as 'quick wins' RAF CAM has formally established a lead for female issues in the air environment (Dr Erica Jackson, AEIG, RAFCAM) and undertaken a series of focussed female aircrew fora. These were facilitated by the aviation psychologists in a framework intended to objectively identify and quantify areas of common concern. Although the results could be aggregated into two areas, AEA and women's health, the two are inevitably interdependent.

Anthropometry and AEA

Many Defence vehicles and workplaces have anthropometric standards. For aircraft, these limits are set as part of the Release to Service process, and exist to underpin flight safety. For example, seats have minimum and maximum weight ranges to assure crash protection; the location of flight-critical switchgear dictates functional reach and the ejection pathway may limit leg length. However, implicit to these standards is then a requirement to know the size range of both the UK population and those currently serving. We recruit from the general population: narrow anthropometric standards will likely limit that recruitment pool. The same is also true for those already serving: the equipment should serve our people, not the other way around. Although a universal problem, women are disproportionately effected by this issue as, historically, equipment and anthropometric standards have been designed for men.

A solid understanding of the real world size range of Defence personnel is also vital if we are to have uniforms and equipment that fit, both for comfort and function. The most recent survey was undertaken in 2007; unfortunately insufficient numbers of aircrew (men and women) participated, which is why we still reply on 1970s data. DE&S have therefore commissioned a new, fully-inclusive Tri-Service anthropometric survey of all professions. The project lead, Dr Eluned Lewis, says:

"We are working with stakeholders across Defence and collaborating with Industry experts to conduct a new, tri-service anthropometry survey that is representative of the diverse make-up of our Armed Forces. We are targeting women to an extent that previous anthropometry surveys have not – recognising the increasingly diverse roles of women and we are committed to



3D Laser Body Scanner in action

Mobile Scanner

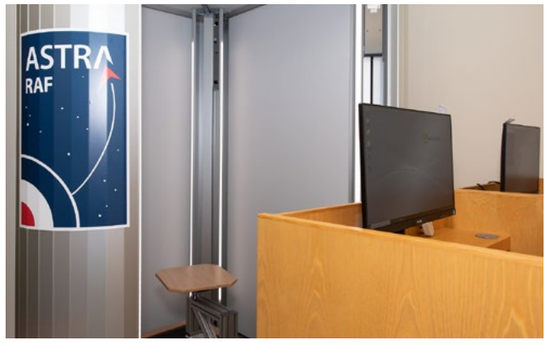
ensuring that all new systems and equipment are designed for women as well as men. Quite simply, we recognise that women are not just small men!"

Everyone is encouraged to take part, as as poor anthropometry and sizing clearly impacts on all ranks and professions. Nevertheless, AEA is historically designed for men, so once more females are disproportionately affected by poor fit. This important topic will therefore be covered by its own article in a future edition.The good news is that change is already underway: after a successful Astra initiative by Sgt Dale Jones RAF CAM now has two state of the art 3D laser body scanners. These will replace the superannuated 'Heath Robinson' anthropometric measurement system and are able to collect multiple data points with speed and precision.

3D Laser Body Scanner

As well as supporting future routine body measurements, this exciting new facitility was recently visited by the manufacturer of specialist fit AEA. As a result the order process has been streamlined and garments should be more accurately made. Early indiciations are positive, with a recent recipient saying that their special measure FACS overalls:

'…are a great fit … to have clothes that actually fit makes a big difference to how I feel, which cannot be underestimated.'



Exterior of Mobile Scanner

Women's health

The focus groups identified several concerns over women's health, covering issues including pregnancy, menstruation and contraception, urination and aviation medicine. Regarding pregnancy, there are many risks both to and from pregnancy in the air domain. Examples of the former include acceleration forces, turbulence, hypoxia, vibration, noise and cosmic radiation, whilst the latter includes dizziness, fainting, anaemia and nausea. Overall, there may be an increased risk of pregnancy loss in civil cabin crew (Magann, Chauhan et al). Nevertheless, the current rules grounding military aircrew are a known issue for female aircrew; there is therefore interest in revisiting the risk appetite.

Menstruation and issues surrounding urination were the subject of recent research sponsored by a CAS Fellowship. The complex relationship between human performance, hydration and options to facilitate urination will be covered by a future article; however, for all aircrew there is clear overlap with AEA and availability or suitability of technical solutions. CAM is currently undertaking ground and flight trials of one solution, but will explore all options in order to offer the broadest possible choice to all aircrew.

Alongside appropriate and targeted policy revision, medical education will underpin or reinforce these initiatives. CAM trains all Military Aviation Medical Medical Examiners (MAME), offering a unique opportunity to improve occupationally-aware service provision.

Other Populations

As above, although many issues are female-centric, AEA and anthrompometrics affect all aircrew. In parallel, aviation medicine policy for transgender aircrew will be considered by the Aircrew Medical Standards Steering Group in March 22: AEA, clothing and similar requirements of this population will be equitably included in future work strands. Simply put, although AEA and other equipment is designed around the male anatomy, the baseline 1971 data set is woefully out of date for all users, so modernisation will be for universal benefit.

Next steps

RAF CAM has already delivered some 'quick wins', including the aircrew fora and a significantly improved process for special fit AEA. However, as medical staff are rarely the risk owners we will now increasingly look to support others as action moves from a research footing to delivery. Next steps therefore include:

- Air Cap offer unswerving support, and are looking to coordinate, reprioritise and target resource to this important area. Other future stakeholders include DE&S and Dstl.

- CAM will review the evidence base underpinning anthropometric standards.

- All aircrew are strongly encouraged to participate in DE&S' forthcoming anthropometry study (2022/23). It is vital for Defence to have a validated and current data set to underpin future anthropometric standards, procurement decisions and equipment / uniform sizing.

- To expedite this process, CAM will explore the possibility of 3D scanning as many female aircrew as possible to build an evidence base for 'quick win' changes.

- RAF CAM will review the medical evidence base underpinning relevant policy, including that for transgender and pregnant aircrew.

- The annual aircrew medical is a unique opportunity to optimise occupationally-contextualised healthcare. RAF CAM will maintain engagement with DPHC and offer further support and education to station-based MAME.

- RAF CAM will liase closely with the wider RAF 'sprint' underway in response to the HCDC report, noting synergy in effort, data collection and policy across many of the above areas.

The point of contact for further information or to comment or participate in this important work strand is Dr Erica Jackson, Senior Medical Officer in the Aircrew Equipment Integration Group at RAF CAM (Erica.Jackson105@mod.gov.uk).

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Airprox Highlights

With Comments from Wg Cdr Spry

12 Apr 21
Report No 2021023
C-17 vs DA40

The C-17 Pilot reported that they were in the Brize instrument pattern, receiving radar vectors in the Brize Class D airspace. ATC advised of co-ordinated VFR traffic 500ft below routing north to south. They were not visual with the traffic, but ATC's prompt directed their visual scan to the approximate area, however they could not yet see the traffic. The internal TCAS display showed the ATC called traffic as climbing, which was not the co-ordination they were expecting. At this point the TCAS gave a Traffic Advisory – none of the three pilots on the flight deck had a visual identification on the traffic. The traffic was indicating on TCAS as the same level and on entering the 4000ft lateral displacement (directly ahead) the pilot elected to break left to avoid the traffic, transmitting their actions on the radio to ATC as they did so (noting they were under a radar service). They thought that although the ATC coordination should have been suitable and sufficient, the other aircraft had not followed its clearance from ATC and posed a risk to their aircraft. After changing heading by approximately 30° they rolled wings level to try again to visually identify the aircraft, which they did, and it was sufficiently close that they elected to break left again to ensure sufficient lateral displacement as the other aircraft was at the same height. The pilot noted that having had a TCAS RA in the visual circuit only 15min prior they suspected they may have been more twitchy than they would normally have been to other traffic. This may have aided or hindered in the situation.

The DA40 Pilot reported that they were on the second leg of a solo navigational flight. After arriving at Chipping Norton, the first turning point, they called Brize Radar to request a zone transit and Basic Service. One hold was made outside controlled airspace whilst waiting for the clearance to enter. Clearance was given shortly after entering the orbit to fly VFR direct track to Faringdon not below 2300ft VMC. Shortly after passing Brize Norton airfield, ATC informed them about traffic which had departed and was to remain in the circuit. The aircraft was a C-17 which they saw visually. At this point they were at 2400ft as cleared on track to Faringdon under a Radar Control Service. As they saw the aircraft on downwind, visually it seemed that the aircraft was at a similar altitude and that they were converging. This aircraft was at no point heard on the frequency. The pilot felt they had 4 options to avoid a collision.

1. Turn left: they did not opt for this as it would not have solved the conflict since it was coming from the right-hand side.
2. Turn right: The other traffic was to remain in the circuit, had they turned right for avoidance and it turned left to join base from downwind they would have ended up with the same problem, only for it to be on base leg this time.
3. Descend: Clearance was not below 2300ft, so not an option.
4. Climb: Apply best rate of climb to get away from the conflicting traffic.

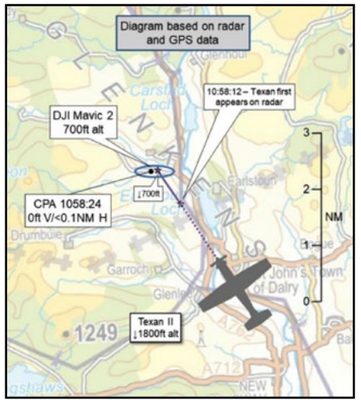
At the time, the best option seemed to be climb, so they applied full power and entered a best rate of climb. Once they entered the best rate of climb, it was clear that they would be rather close, however nothing else could be done from once they decided to enter the climb. The C-17 pilot then sighted them and entered a left bank to resolve the conflict. After 1-2 minutes ATC called with a message stating that in "Class D airspace you are meant to maintain own separation". The controller continued to state that the C-17 had to take avoiding action because otherwise they would have collided. The pilot acknowledged their valid point and apologised for the error and continued along their route.

The Brize Norton Controller reported that they were the Approach, Zone and Director controller. They were under training as an Approach controller. The DA40 pilot called on the Zone frequency requesting a zone transit routing from north of RAF Brize Norton through to Faringdon VFR. At this time there were two aircraft in the visual circuit, a PA28 (1300ft in the visual circuit) and a C-17 (1800ft in the visual circuit). They were then notified by the ADC that the C-17 had requested a radar vectored approach after their next circuit. With the visual circuit traffic in mind, the controller cleared [DA40 C/S] on a VFR transit routing direct Faringdon not below altitude 2300ft. They immediately warned the DA40 pilot about the C-17 which was at this point 2NM to the east of Brize on approach. They informed [DA40 C/S] that the C-17 would shortly be climbing out to altitude 2800ft and to report visual with the aircraft. [DA40 C/S] entered the control zone and reported visual with the C17. The C-17 climbed out to altitude 2800ft and contacted them on the Director frequency 133.750. The C-17 was turned to the South-East to position for an approach to RW25. As [DA40 C/S] passed through the BZN overhead the controller asked if they were still visual with the C-17, they replied no. The controller called the location of the C-17 again to [DA40 pilot] and they confirmed they were visual. They then informed the C-17 pilot about [the DA40] and that they were visual. At this time [the DA40] was indicating 500ft below on Mode C. Having taken steps to ensure [DA40 C/S] had situational awareness of the C-17, they believed the pilot would take visual separation as a VFR transit under Class D rules. Despite this, [DA40 C/S] climbed through the level of the C-17, crossing ahead from north to south. The C-17 reported [DA40 C/S] as being within close proximity and took an avoiding action turn to the north to ensure separation was maintained. [DA40 C/S] departed the zone to the south and the C-17 was then vectored for a PAR approach for RW25.

For full details of this report see AIRPROX REPORT No 2021023 on the Airprox Board website.

Spry's Comment:

The DA40 pilot should be commended for providing such an open and honest report explaining their thought process and how the situation developed. Ultimately, the decision to climb was not the best course of action; however, the pilot felt that they were doing the right thing to avoid conflict. With the C17 being an extremely large aircraft and with only 4-500ft separation between the 2 aircraft, it could look a lot closer and potentially co-altitude to a pilot in a small aircraft. To account for this, issuing a greater height delta to the DA40 may have been a better course of action. It was due to the TCAS alert that the C-17 crew elected to fly a manoeuvre to avoid any conflict and it was this action that stopped the distances from getting any closer. Even though you may feel protected within the aerodrome airspace, it highlights the importance of maintaining good lookout, coupled with a scan of the collision warning system. Always expect the unexpected at any stage of flight! ■



24 May 21
Report No 2021057
DJI Mavic 2 vs Texan II

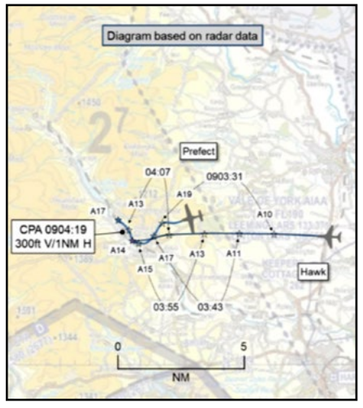
The DJI MAVIC 2 Operator reported operating a DJI Mavic 2 Enterprise Advanced Drone on a mapping tasking at an altitude of 100m. Weather conditions were good. They had a DJI 'AirSense' Alert of a manned aircraft in the vicinity. They descended at high speed, with the Texan T1 passing at lowlevel from their 6 o'clock. The Mavic is a small drone and no avoiding action was taken by the aircraft.

The Texan II Pilot reported that a land-away sortie to Prestwick was planned and flown on 24th May, departing at approximately 0940. All NOTAMs were checked and updated and presented on printed charts. Late warnings, CADS, PINS and gliders were checked during the out-brief process in operations. The sortie was flown and completed safely without incident. Using details supplied by Swanwick(Mil) they confirmed using their mission recordings that they were executing a simulated strafe manoeuvre at the time and the position of the initial report. Neither they nor the captain saw a drone, and being a DJI Mavic 2 (which is a very compact machine) it would be very difficult to acquire visually with any time to react at 240kts. Running the HUD recording did not display any images including a drone, though the resolution is poor. No avoiding action was taken as they were unaware of the proximity of the drone; they wondered if perhaps the drone pilot may have perceived their pitch up for the simulated strafe attack as an avoiding action. The drone being exceptionally dense, the potential damage if a collision took place at that speed would no doubt be significant.

For full details see Airprox No 2021057 on the Airprox Board website.

Spry's Comments:

DJI Mavic 2 vs Texan 2 Spry's Comments: It is encouraging to see a drone operator not only equipped with equipment giving them SA on aviation in the vicinity, but also filing an Airprox post event. There are various means for increasing awareness to both military crews and civilian drone operators of each other's activity, yet none of this is mandated and we are dependent on individual drone operators to make good use of them. Drone regulation has tightened in recent years requiring registration of drones above 250g and the award of a Flyer ID on completion of a competency test based on the Drone and Model Aircraft Code. This highlights, among other things, operating limits on heights and location. Where You Can Fly, Point 3 states: 'Fly below 120m (400ft). Flying below the legal height limit of 120m (400ft) will reduce the risk of coming across other aircraft, which normally fly higher than this. Always look and listen out for other aircraft that may be flying below 120m (400ft), such as air ambulances and police helicopters'. Following this Airprox, the UKAB has recommended that the Drone and Model Aircraft Code be updated to highlight the prevalence of military flying below 400ft. As drone use continues to increase, regulation, such as mandated electronic conspicuity, will continue to evolve to enable crewed and uncrewed aircraft to share the air safely. Watch this space! ☐

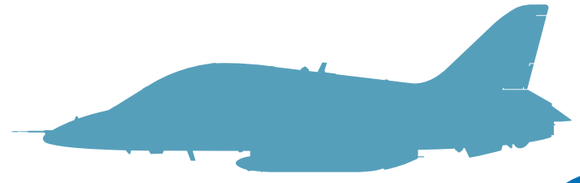


9 Jun 21
Report No 2021076
Prefect vs Hawk TMk1

The Prefect Instructor reported being towards the end of a busy low-level navigation exercise from [departure airfield] to Leeming which had been challenging for the student. The aircraft was being flown by the Instructor following a simulated diversion immediately prior to recovery into Leeming. Approaching the final turn-point at 500ft MSD and 180kt groundspeed, the aircraft was flown into a shallow but defined valley orientated approximately north, leading to Grimwith reservoir. A call on the VHF low level frequency had been made two legs prior, in the vicinity of Malton. Leeming Approach was providing a Traffic Service, reduced due to proximity of terrain. Prior to entering, a good lookout up and down the valley was carried out. The TAS was checked with no conflicting traffic, although it did show returns from a pair of Hawks recovering to Leeming. At 500ft MSD the aircraft was approximately level with the terrain at the top of the valley sides, travelling north. Shortly after entering the valley, Leeming Approach called traffic in the 6 o'clock at three miles, similar heading, same height. The Instructor assessed that a co-height, co-heading aircraft was likely being flown up the same valley. Given the traffic density up to that point and the proximity to Leeming, it was assessed as likely to be a fast-jet. Immediately after the traffic call, a TAS alert sounded with pop-up traffic at very close range behind the aircraft and co-altitude. The Instructor elected to carry out a low-level abort, in order to rapidly change height and maximise the planform visibility of the aircraft. A call of "Climbing" was made on Leeming Approach to provide SA to the conflicting aircraft should its pilot be monitoring the frequency. The aircraft was rolled in an attempt to induce a wing-flash reflection from the sun, and to provide better lookout back into the valley. The other traffic was not seen at any point and, once the aircraft was re-established straight and level, the TAS contact was seen to continue north at high speed. Had the aircraft been any lower, they would likely not have been detected by the Leeming radar, and TAS would have been the only warning of the traffic, providing a vital warning, albeit much less detail than had been passed by the controller. CADS had been used to check for conflictions prior to the sortie, and while traffic out of Leeming had been noted, no conflicting traffic was seen in the vicinity of the Airprox. The Instructor noted that high temperature in the cockpit was a factor.

The Hawk Pilot reported having planned a low-level training and circuit flying sortie for the morning of 9 Jun 21. Low-level was booked and a CADS route input with no conflictions evident at the outbrief in the area of the reported Airprox. The pilot took off 5min later than planned. The initial portion of the route was flown in LFA 11 and two position reports were made on the VHF LL Common Frequency. Approaching the boundary of LFA 17, the Hawk pilot called "[C/S], single Hawk, south of Topcliffe heading west at low level towards Grimwith reservoir." They did not hear the Prefect's position report near Malton but suspected they were only just airborne at the time and working Leeming Approach. Approaching Pateley Bridge, heading west, they saw a single Prefect heading north, up Gouthwaite reservoir some 3NM away. Shortly after seeing the Prefect they observed a wings level climb and that an estimated lateral separation of 2-3NM was maintained, increasing rapidly due to headings diverging by 90°. They did not consider that there was any risk of collision and carried on with the rest of the sortie. Of interest, whilst reviewing the CADS bookings to ensure that they had not missed a confliction, it was noticed that Prefect traffic was due in the area about 20min later than the time of the reported Airprox.

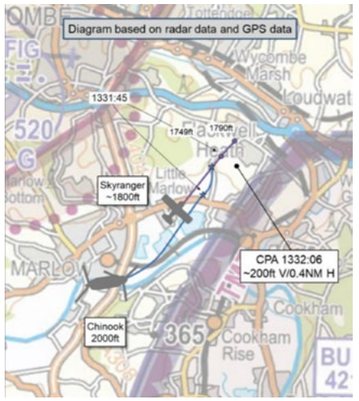
The Leeming Approach Controller reported providing a Traffic Service to the Prefect. The aircraft was booked into Leeming but was carrying out a navigation exercise prior to recovery. The aircraft was General Handling approximately 15 miles to the southwest of Leeming when the incident happened. The controller's attention was solely on this aircraft with no others on frequency. Pop-up traffic appeared on the radar screen, displayed in SSR only, moving rapidly towards the Prefect. They believe the traffic was called as "traffic 6 o'clock, 2 miles, similar heading indicating 300ft below". The Prefect's Mode C was indicating 014 and the conflictor's Mode C was indicating 011, as far as they recalled. The controller felt that the Prefect had detected the conflictor on TAS, because the pilot replied with, "yes we are in the climb". The Prefect climbed and turned to the north to resolve the confliction.



For full details see Airprox No 2021076 on the Airprox Board website.

Spry's Comments:

It was good to see that the Hawk was visual with the Prefect throughout. Without knowing that the Hawk was visual, the QFI of the Prefect was right not to assume anything and to manoeuvre out of any conflict in addition to increasing the profile to help visual acquisition. CADS was used by both pilots; however, the Prefect got airborne 20 minutes earlier than planned with no update to the timings on CADS. This would explain why the Hawk's route wasn't visible, vice versa with the Prefect. CADS can be a great awareness tool but is largely historical unless it is updated. The UK Military Low Flying Handbook, Section 5 has 'best practice' advice: "Authoriser may continue to monitor CADS prior to ac departure to identify potential conflicts and if possible, inform the crew." This would require the authoriser to update of timings where possible; this helps both the crews SA who are departing and all the other CADS users, where the route could pop up and highlight a possible conflict. ☐



14 Jun 21
Report No 2021081
Chinook vs Skyranger

The Chinook Pilot reported that the aircraft was in the vicinity of Marlow, speaking to Heathrow Radar under Basic Service after being handed over by RAF Benson. They had instructed the aircraft to hold clear of controlled airspace, awaiting coordination with Heathrow Tower in order to clear the aircraft to cross the airfield. The aircraft was holding NE of Marlow between Wycombe Air Park and London CTZ. The aircraft was in a level 20° AOB turn to the left, having just been cleared to enter controlled airspace. The angle of bank was increased to 30° whilst passing through north. The No2 Crewman became visual with a light aircraft on the left approximately 0.5NM and 200ft below heading north. The track of the fixed wing aircraft was likely to have been directly underneath their aircraft and was previously unsighted to the crew. They described the aircraft as a small white fixed wing, possibly a Cessna, but were unable to see the registration number. No other member of the crew saw the aircraft. TAS was on and selected to 7NM, but no contact was displayed. Due to the high workload of the controller, the Airprox was reported after the Heathrow crossing had been completed.

The Skyranger Pilot reported that they were in the vicinity of Marlow at the time of the reported Airprox, but were completely unaware that the Airprox had occurred and did not see the Chinook.

The Heathrow SVFR Controller reported that the Chinook was holding at Marlow and receiving a Basic Service. The pilot reported that another aircraft had passed below. The incident took place at 1330, although it was not reported until 1345.

For full details see Airprox No 2021081 on the Airprox Board website.

Spry's Comments:

Whilst this airprox was assigned Risk Category E (normal procedures, safety standards and parameters pertained) by the UKAB, the crew were absolutely correct in reporting this and it highlights a number of key learning points. When planning to enter Controlled Airspace, particularly the Helilanes, crews should expect to be held off before being granted permission to enter. The area over Marlow is a notorious pinch point, hemmed in by Controlled Airspace above and to the east as well as the Wycombe and Waltham ATZs; orbiting in such an area will increase your exposure to other air traffic who are also transiting with the same airspace constraints. Having a plan to account for a hold, coupled with a detailed brief of the risks, could help mitigate this risk. Whilst Traffic Advisory / Alerting Systems are a very useful tool in increasing SA with regards to other airspace users, always be conscious that they may not alert when expected. This emphasises that electronic conspicuity is not a panacea for avoidance of MAC and that it exists solely as a complement to existing MAC mitigations, the most important of which is see-and-avoid. ■

Safety Contacts:

Group / Station / Unit	Flight Safety Officers	Health, Safety & Environmental Protection Advisors
1Gp	01494 495454	-
2Gp	01494 495049	-
11 Gp	TBC	-
22 (Trg) Gp	030 6798 0101	-
38 Gp	01494 497923	-
BM	95760 3230	
JHC	01264 381526	-
Test & Evaluation (ASWC)	01522 727743	-
1ACC	01522 603359	-
2FTS	01400 264522	-
3FTS	01400 267536	-
4 FTS	01407 762241 6666	-
6FTS	01400 266944	-
Air Cadets (RAFAC)	-	01400 0267817
Boulmer	01665 607325	01665 607282 / 7289
Benson	01491 837766 6666 / 7525	01491 827109 / 7254
MOD Boscombe Down	01980 662087	01980 662312
Brize Norton	01993 895764 / 6666	01993 895525 / 7062
Coningsby	01526 346575	01526 347256 / 7196
Cosford	01902 704037	01903 37472 / 237
Cranwell	01400 266666	01400 267469 / 7498
Defence Geographic Centre	0208 8182816	94641 4816
Fylingdales	-	01751 467216
Halton	01296 656666	01296 657640
Henlow	01462 851515 6150	01462 857604
High Wycombe	01494 494454	01494 496489 / 5094
Honington	01359 236069	01359 237782 / 7516
Swanwick	01489 612082	-
Leeming	01677 456666	01677 457637 / 7231
Leuchars	01334 856666	-
Linton-on-Ouse	01347 848261 6666	01347 847422 / 7617
Lossiemouth	01343 816666 / 7714	01343 817796 / 7697
Lynham	-	01189 763532
Marham	01760 337261 6666	01760 337595 / 7199
No1 AIDU	02082 105344	-
Northolt	020 8833 8571	02088 338319 / 38521
Odiham	01256 702134 6666 / 6724	01256 702134 7650 / 7733
Scampton	01522 733053	01522 733325 / 3137
Shawbury	01939 250351 6666	01939 250351 7529 / 7559
Spadeadam	-	01697 749204
St Athan	01446 798394	01446 797426 / 8250
St Mawgan	-	01637 857264 / 7858
Syerston	01400 264522	-
Tactical Supply Wing	95461 7177	-
Valley	01407 762241 6666	01407 767800 / 7685
Waddington	01522 726666	01522 727652 / 7783
Wittering	01780 416377	01780 417611
Wyton	01480 52451 7554 / 7146	-

Overseas Flight Safety Contacts	Telephone	Email
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Ascension	00247 63307	BFSAI-ASCOpsOC@mod.uk
Akrotiri	94120 6666	Leigh.Robertson677@mod.gov.uk
83 EAG	9250 060 451 3050	83EAG-AIROPSFSO@mod.gov.uk
Gibraltar	9231 98531 3365	GIB-RAF-ASM@mod.uk
MPA	00500 75490 or 94130 5490	BFSAI-AirOpsWg-ASM@mod.gov.uk
Tactical Leadership	0034 967 598527	aa3@tlp-info.org
Naval Air Station Jacksonville	001 904 542 4738	-

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