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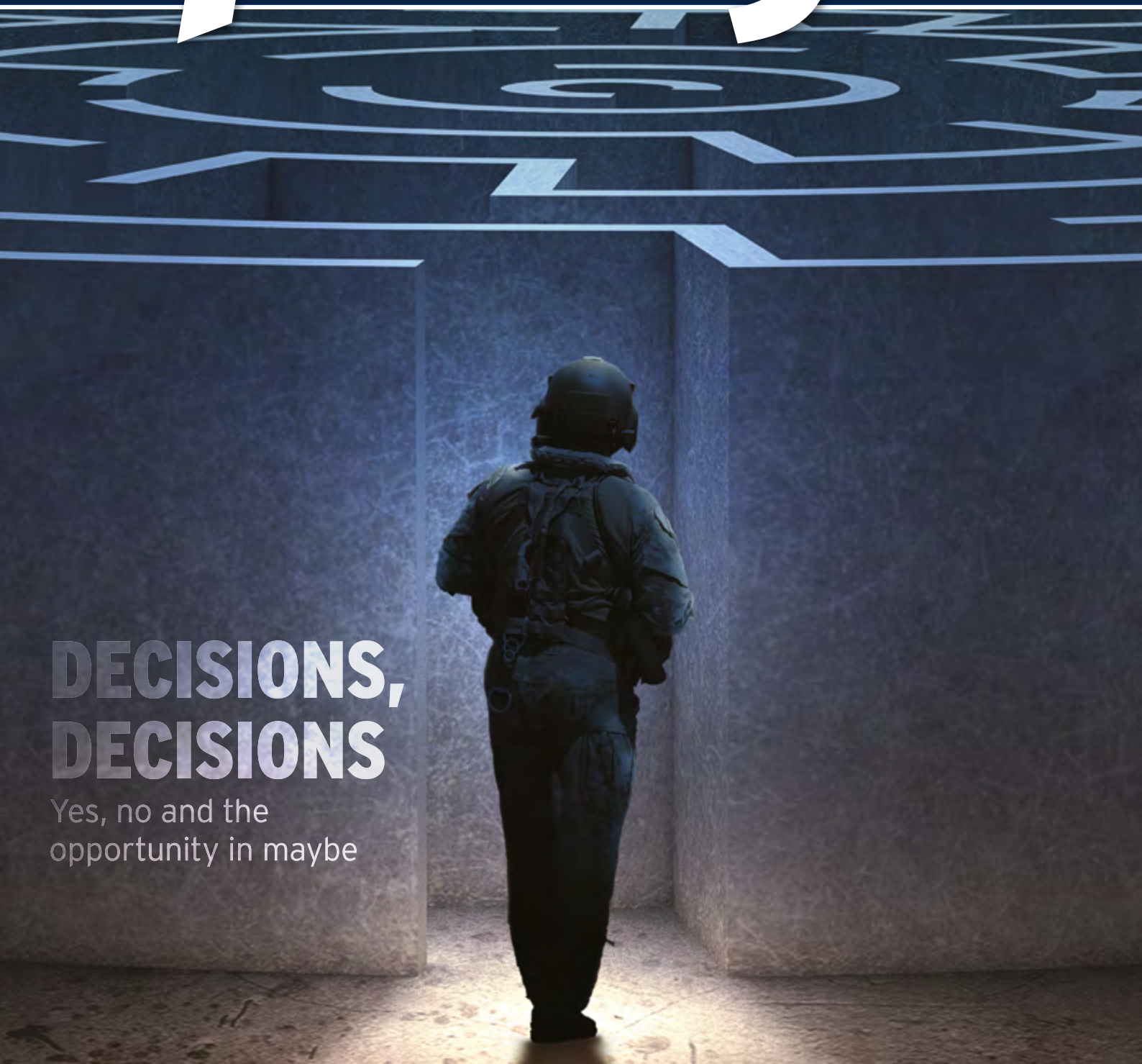
01 2024 EDITION

Spotlight



DECISIONS, DECISIONS

Yes, no and the opportunity in maybe

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RECYCLED CONTENT

May 2024

FOREWORD

WELCOME TO THE first edition of *Spotlight* for 2024, which provides valuable insights, discussion and learning as to the importance of education and training across Defence Aviation operations in topics such as Human Factors, Non-Technical Skills, Immediate Risk Management and Decision-making.

Defence Aviation operators are often required to conduct immediate risk-based decision-making to complete high-priority and time-critical tasks. However, the 'least worst' option resulting from immediate risk management decisions may still carry appreciable risk. Moral courage to cancel tasking as the 'best option', vice choosing the 'least worst' option, is a valuable safety attitude and behaviour of both operators and supervisors. Similarly, navigating high-pressure and complex situations with emotional awareness, self-regulation and empathetic communication significantly enhances decision-making.

Snapshot surveys continue to report 'burnout' resulting from workplace stressors and 'fatigue' due to job demands as systemic safety issues. Individuals under strain as a result of burnout and/or fatigue are more likely to make errors and may subconsciously violate standards and recommended practices to complete tasks through a perception of being efficient – often referred to as an 'organisational-optimising violation'. Individuals who are empowered by supervisors and managers to report being burnt out and/or fatigued demonstrate strength and moral courage.

Organisational-optimising violations also continue to arise as a result of prioritisation to meet performance goals and/or mission outcomes, or through the unintended consequences of new safety policy that lacks pragmatic risk controls for the context and significance of the activity. Identification of organisational pre-conditions that may contribute to errors and violations requires deliberate and considered management of time and effort throughout both deliberate and immediate risk management activities.

Human Factors education and training aims to promote the 'optimisation of relationships between the human operator and other elements of the system'. The proliferation of Uncrewed Aircraft Operations by Defence will require a significant investment in Human Factors education and training and the integration of skill-based Non-Technical Skills training that is tailored to UAS operations.

I encourage readers of this edition of *Spotlight* to reflect upon your organisation's approach to Human Factors and Risk Management education and training, and towards empowering commanders, managers, supervisors and individuals to display the strength and moral courage to say 'no' and to report personal issues such being burnt out or fatigued.

Very respectfully and kind regards,

Group Captain David Smith
Director DFSB

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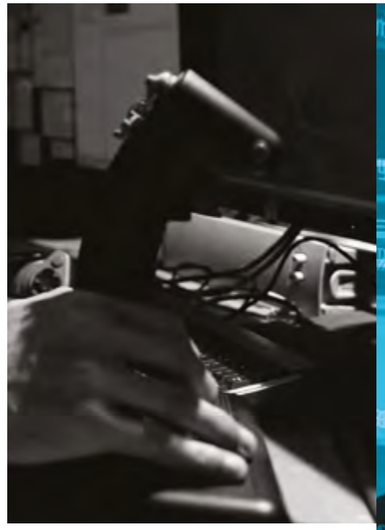
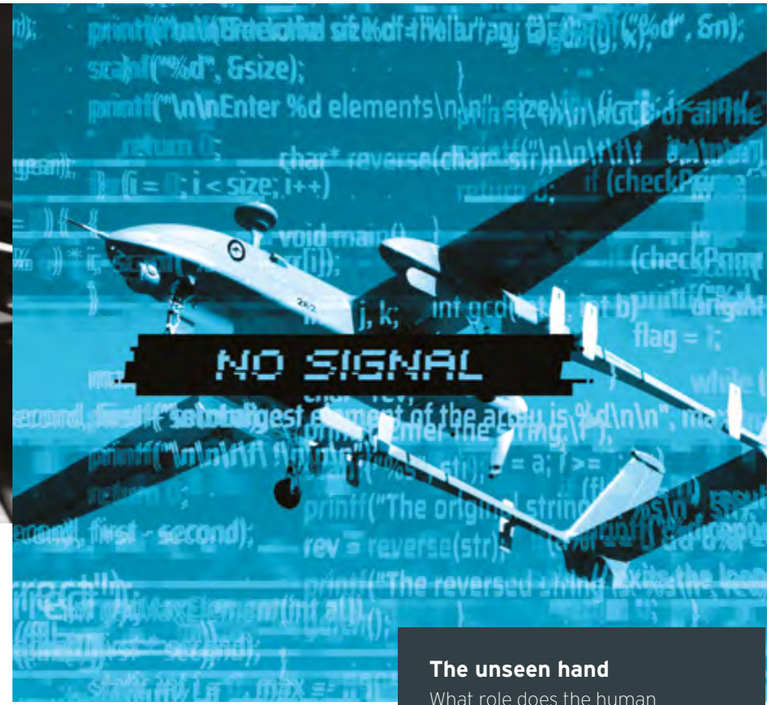




Name withheld

AVIATION SAFETY, RISK management and non-technical skills (NTS) are embedded within the Aircrew training system such that operators will often have a theoretical knowledge of aviation safety principles prior to being exposed to situations where they are applicable. This training proved useful to me earlier this year and it was personally reassuring to know that the application of these principles seemed ingrained in my decision-making, despite facing a unique situation.

Specifically, the use of the 'traffic-light system' or Rule of Three – admittedly I didn't remember it by this name at the time – assisted in a decision to terminate a sortie when conditions had changed and were affecting my ability to execute a task safely, though still were within limits. More importantly, without this training I potentially would have continued under a perceived pressure to 'get the job done', which ultimately may have led to an incident or accident.

In July this year I was approximately three months into a five-month Regional Presence Deployment, flying an MH-60R embarked on an Anzac Class frigate. I was the junior pilot on the Flight as 'P2', and this was my first sea time on a Flight. This event occurred in a climate where it was common for the temperature to sit above 30 °C well into the night at high humidity, with accompanying unstable weather, overdevelopment and ensuing thunderstorms.

That day I had flown a day sortie, conducting a rotors-turning refuel on deck and crew-change out of the Aviation Warfare Officer and Aircrewman, before launching again for a night sortie. The intent was to conduct deck landings to progress the training of the deck marshaller, Landing Safety Officer (LSO) and helicopter control officer who all required night decks to gain their qualifications. Unfortunately, up until that point, night deck sorties had proven difficult to come by for a variety of operational reasons. The training of the deck team was also a priority for us to alleviate personnel-manning issues moving forward on the deployment.

We conducted deck-landing procedures following sunset using white-phosphorous (white phos) night vision goggles (NVGs), and it was evidently a dark night with low illumination, cloud cover and nil cultural lighting. We took the time to adjust the ship's deck lighting through the LSO after subsequent landings. Balancing having enough light to see 'under the goggles' and not too much light to 'bloom out' the goggles was difficult on low-light nights.

We also noticed thunderstorms had developed in the distance with occasional lightning strikes, although at a distance that was not a concern to our operations.

By way of background, our 'white phos' goggles had recently replaced the 'green phos' goggles we were using just prior to deploying and empirically we assessed their low-light visual acuity performance as roughly 20–30 per cent superior to their green predecessors.

The automatic brightness correction (ABC) on the goggles automatically adjusted the amount of photon light energy the goggles allow in: in other words, less light, higher sensitivity. At very low light, the goggles have very high sensitivity and spurious photons can appear as 'scintillation' in the goggles, which we had on that night.

As the sortie progressed, the frequency of the lightning strikes increased.

In these low-light conditions, when a sudden bright light appears, such as lightning, the goggles appeared to 'bloom out' more significantly than in higher-light conditions, before the ABC can re-correct for the new light levels. This appears in the goggles as a white flash, then black, then back to normal for the operator.

As the sortie progressed, the frequency of the lightning strikes increased, but as crew I remember being focused on circuit efficiency and the number and type of decks left we needed to train the deck crew. I felt continuing the decks was manageable, but in hindsight my capacity and situational awareness was reducing, and the accuracy of my landings was degrading. I tried de-goggling on the downwind leg of the circuit but found the flashes maybe more disorienting unaided than aided, and elected to continue aided.

After a miss-trap (missed landing the aircraft probe into the 'trap' on deck) and subsequent re-landing I remember sitting on the deck realising a number of things: the frequency of the lightning strikes was creating an almost strobe effect in the goggles; that I had been using almost 95–100 per cent of my capacity just to land accurately on the deck; and that my grip was vice-like on the controls and I was sweating profusely. I realised I had tunnel vision getting the training done and potentially a combination of fatigue, distraction and inexperience had meant my situational awareness was significantly degraded.

Although I wanted to continue to get the training done, and was tempted by the thought that the lightning frequency may subside, I felt we were experiencing a number of 'ambers' in the traffic-light system, which I verbalised at the time.

After discussion with my crew and then our flying control officer over the radio, I elected to cancel the sortie and shut down on deck. I believe that the report into the MH-60R Controlled Flight Into Terrain in the Philippine Sea also weighed on the Flight and instilled a heightened respect for embarked night flying in all members, which helped my concerns to be well received by all and my decision supported.

This decision seems obvious in retrospect but the desire to achieve mission success as an individual, Flight and ship, coupled with fatigue and inexperience made it less obvious at the time. I believe my awareness of the traffic-light system through NTS training, a culture on the flight where I felt enabled to prioritise safety over training objectives, and an awareness of how latent failures in risk controls can combine to cause an accident, may have been the difference in electing not to continue the sortie and accept deteriorating safety margins.

I also think reviewing and learning from relevant DFSB reports assisted our Flight in making more informed risk-based decisions. In my opinion, this is a good example of why aviation safety training and awareness is important, even though you may not realise it at the time or have the experience to fully understand its utility.

Navigating the skies

A tale of quick decisions and skilled immediate risk management

By CMDR Christopher Smith

IN THE EVER-EVOLVING theatre of military operations, safety is not just a priority – it's a strategic imperative. This article unfolds the gripping narrative of immediate risk management within military teams, especially those navigating complex environments. We'll explore the nuanced art of risk mitigation, highlighting the crucial role of checklist adherence and drawing on academic insights into the benefits of aviation risk management, particularly in a military context.

The crew, faced with a dilemma due to the failed stabilator, executed the checklist and engaged in immediate AVRM.

Engaging incident scenario

Let's dive into an incident involving MH-60R Boomerang during a Japanese-led multi-nation exercise. Picture this: operating 100 nm from HMAS *Stalwart*, Boomerang encounters stabilator auto mode failure. The crew had always planned for a refuel on USS *Kidd*, however, they now faced a stabilator failure without enough fuel to head straight home. The crew, well-versed in the 'Stabilator Auto Mode Failure Emergency Checklist', faced a scenario with no popped circuit breakers and a stabilator limited to 10 degrees trailing edge down at 100 kts.

Details

The sortie profile for Boomerang was to depart HMAS *Stalwart*, conduct an RMP (Recognised Maritime Picture), while operating approximately 100 nm from *Stalwart*, transit to *Kidd* to refuel and return to *Stalwart* after last light for a night-aided recovery.

On arrival and after orbiting for approximately 10 minutes, Boomerang experienced stabilator auto mode failure (daytime). The actions were carried out in accordance with (IAW) 'Stabilator Auto Mode Failure Emergency Checklist' in the pilot's pocket checklist (PPCL). Step 5 of the checklist revealed no popped circuit breakers. Step 6 – attempting to regain stabilator auto mode – did not re-engage. However, manual control of the stabilator was operable with the highest the stabilator could slew being 10 degrees trailing edge down, limiting the aircraft to 100 kts. IAW the PPCL, the aircraft was not under any landing criteria.

This is a subtle difference when compared to S-70B-2 operations. The ensuing discussions after this incident highlighted that members with previous like-type experience may have a different shared mental model of expectations and requirements compared to other crew. In this instance the crew members in the aircraft were all on the same page, but the lesson back at homebase was that aircrew need to ensure they fully understand the differences associated with different types. For military aircrew, intimate awareness of checklist requirements is non-negotiable. This nuance makes it imperative for teams with diverse aircraft experience to comprehend the contextual variations in approaching different malfunctions.

Immediate risk management in action

The crew completed the checklist and conducted immediate aviation risk management (AVRM), through internal discussion and contemplation within the crew with regards 'to what next?'. The decision was made as a crew that, based on the malfunction they were presented, and the checklist actions – which made it clear that they were not under a landing criteria – the team would recover to *Kidd* while operating the stabilator with manual mode. *Kidd* was informed, the recovery was conducted using the stabilator manual mode, a refuel was conducted before Boomerang then departed using the stabilator manual mode to slew to 10 degrees trailing edge down and returned to *Stalwart*, limited to 100 kts. All of these aspects, including transit planning and fuel considerations along with weather and associated risks were discussed prior to deciding that a launch and return to *Stalwart* outweighed any risk they were presented.

The crew, faced with a dilemma due to the failed stabilator, executed the checklist and engaged in immediate AVRM. Their meticulous planning, encompassing fuel considerations, transit, weather, and risk analysis, echoes the academic discourse on the proactive nature of risk management (Brown, *Journal of Military Aviation*, 2020).

Strategic decision-making

Choosing to recover to *Kidd* using stabilator manual mode, the crew deftly navigated the limitations imposed by the malfunction. The subsequent night-aided recovery to *Stalwart*, planned as a one-time-only event due to the stabilator issue, is a testament to their strategic decision-making under pressure. The crew fully understood what a shut down on *Kidd* may have brought with it and through careful management identified that the benefits of continuing with the malfunction (which did not require any landing criteria) outweighed shutting down on *Kidd*. The context within a risk-management decision is always important.

Academic insight

The academic insight into the benefits of aviation risk management, particularly in diverse aircraft scenarios, finds resonance in instances like the Boomerang incident. Studies, such as Smith et al.'s comprehensive analysis published in the *Aviation Safety Journal* (2021), emphasise the critical role of adaptable risk-management strategies in mitigating unforeseen challenges.

In the case of Boomerang, the crew's ability to grasp the contextual variations in stabilator malfunction approaches aligns with the findings of academic research.

This incident serves as a real-world illustration of the proactive risk-management principles advocated by Brown in the *Journal of Military Aviation* (2020). The crew's swift adaptation to the failed stabilator, coupled with strategic decision-making during immediate AVRM, stands as a testament to the practical application of academic insights. As the aviation community continues to navigate evolving challenges, these examples highlight the invaluable synergy between theoretical knowledge and its pragmatic implementation in ensuring the safety and success of military operations.

Conclusion

In the dynamic realm of military aviation, risk is inherent, but how we manage it defines our success. The Boomerang incident exemplifies the kind of risk thinking and decisive actions we expect from our warfighters. As we salute the Flights armed with a comprehensive understanding of checklists and technical mastery in immediate risk management, we recognise that continuous training, learning from incidents, and a proactive risk mitigation culture are the cornerstones of optimal safety in military endeavours.

Fly Safe, Fly Smart, Fly Navy.

The context within a risk-management decision is always important.

Snapshot continues to provide insight

By Alice Grundy

EACH YEAR THE *Snapshot* Survey offers an invaluable insight into the safety attitudes and experiences of units across the Air Force and Defence Aviation community to support the fostering of a generative safety culture. This article explores some results from the 2023 survey with particular attention on aircrew.

The *Snapshot* survey has strong theoretical underpinnings as part of its design, with items and subsequent indicators based on the Job Demands-Resources (JD-R) model – one of the most widely used organisational psychology models in the world today. The JD-R model proposes there are two basic sets of job forces that act on individuals in their workplace: job demands and job resources.

These two forces consider the physical, psychological, social and organisational aspects of jobs that can either help or hinder individuals.

In essence, job demands place individuals under pressure and job resources help individuals deal with that pressure. If demands exceed resources, individuals may experience negative outcomes such as poor health and wellbeing, suboptimal safety attitudes and low job satisfaction. This can lead to negative organisational outcomes such as reduced unit performance and greater turnover intentions.

Conversely, if resources outweigh or meet demands, individuals are likely to become more engaged and effective while at work. The *Snapshot* Survey Model, shown in Figure 1, exhibits the key job demands and resources captured in the program. It also highlights that organisational outcomes have multiple causes, some associated with the individual, some with the organisation, and some because of the interaction between the two.

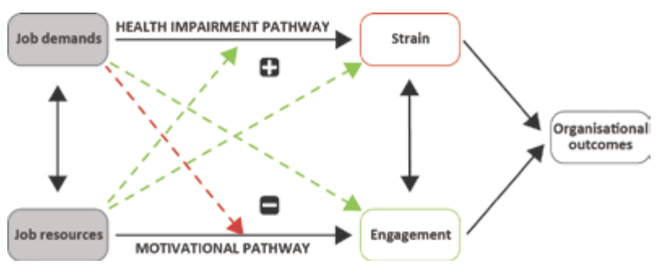


Figure 1: The *Snapshot* Model of JD-R

Snapshot results rely exclusively on the opinions of personnel. As such, results may be influenced by a variety of factors occurring at the time of survey administration. These include (though are not limited to): personal motivation and circumstances of respondents, organisational function of the work group, operational requirements of the work group, work/environmental changes occurring during the response period.

At an organisational-level, *Snapshot* results assist DFSB to identify areas of comparative strength and issues warranting further consideration. Approximately 14,500 people across 250 units participated in the 2023 DFSB *Snapshot* Survey. In Defence Aviation, 88 per cent of 2023 respondents reported seeing value in contributing to the *Snapshot* Survey and 76 per cent received feedback from leadership.

Snapshot indicators

Given the stability of the *Snapshot* instrument over time, it is possible to compare select results over a three-year period (2021–2023). This range of data provides unique insights into a workforce at the end of the COVID-19 Pandemic transitioning back into 'normal' working practices.

The *Snapshot* indicators use composite scores calculated for each of the JD-R elements (Job Demands, Job Resources, Fatigue, Motivation and Performance). These scores represent each indicator's deviation from an overall Defence benchmark, which is based on a three-year norm set of *Snapshot* data.

Figure 2: ATC *Snapshot* results compared to the Defence benchmark

Snapshot trends

Overall, in 2023 *Snapshot* indicators continue to trend in a negative direction compared with previous years' results. However, a particularly noteworthy result is the degradation of job demands in comparison to previous years.

This degradation is important to monitor as it is acknowledged individuals under strain are more likely to make errors and can often make a trade-off with thoroughness in work for efficiency. The flow on effect from this can begin to compromise our broader safety management systems.

Safety attitudes

Attitudes to the varying aspects of safety management are an important driver of performance in most industries. Defence is no exception. *Snapshot* 2023 included 13 safety-attitude items covering different aspects of safety management.

Analysis of results shows Defence Aviation remaining relatively stable across all safety attitudes items and that these items remain among the most highly endorsed throughout the survey: nine of 13 items have endorsements of 80 per cent or more.

These positive results highlight the strong beliefs within the Defence aviation community towards the importance of safety and the proactive means we apply to maintain it.

Work Role specific issues

The 2023 *Snapshot* included a number of items addressing risk controls and systems specific to aircrew and ATC. Respondents rated the effectiveness of risk controls using a five-point scale ranging from ineffective to effective. Aircrew respondents were provided with 15 items, while ATC respondents were provided with 12 items. Risk control items cover areas such as scheduling, balance of duties, management of fatigue, operating manuals and non-technical skills (NTS) training.

There was a general improvement in results related to the effectiveness of various risk controls compared with the previous year for aircrew. However, there was a decline in effectiveness of IT to support flying operations compared with previous years for aircrew. In regards to ATC, there was a general decline in risk controls with the greatest decline being in regards to balance between training and capability demands and conduct of non-technical skills training.

ATC *Snapshot* indicators

As shown in Figure 2, all indicators barring motivation have seen a continuous negative trend since 2021.

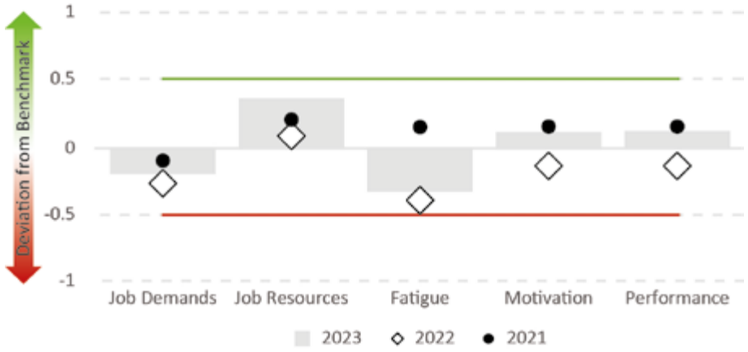


Figure 3: Aircrew *Snapshot* results compared to the Defence benchmark

In the past two years, indicators for job resources and motivation have remained close to the Defence benchmark, while job demands and fatigue remain well below the Defence benchmark.

Aircrew *Snapshot* indicators

As shown in Figure 3, all aircrew *Snapshot* indicators have trended in a positive direction compared with the previous year. Of these indicators, job resources had the most substantial increase compared to 2022 and 2021 results. Despite this, aircrew continue to have more negative perceptions of fatigue in comparison with the broader *Snapshot* benchmark. With these general trends in mind, it is important to note that results varied significantly between aircrew operating with different military air operators (MAO).

Aircrew safety attitudes

As Figure 4 shows, all aircrew safety attitude items have experienced a marginal positive trend overall compared with the previous year's result. Of all safety attitude items, perceptions of appropriate corrective action when supervisors/managers learn about unsafe practices has seen the largest increase (6 per cent). Perceptions of safety-related training being effective received the lowest endorsement (75 per cent), while safety being a shared responsibility was the highest endorsed item (92 per cent).

Aircrew-specific issues

Figure 5 displays the percentage of aircrew respondents that selected either *ineffective* or *somewhat ineffective* for each item. 'Flight and aircrew scheduling' and 'IT to support flying operations' had the highest level of relative concern.

Of note, perceptions of ineffectiveness of risk controls have decreased in comparison with the previous year, except for 'IT to support flying operations', which increased. Results varied significantly between aircrew operating within different MAOs and across aircraft types.

Final note

Surveys are only ever as comprehensive as their submissions. Your voice is important to us so be sure to take the time to complete *Snapshot* each year and support us in gaining a clearer picture of the safety culture within our organisation and better understand the challenges facing the Defence Aviation community.

Figure 4: Results for Aircrew safety attitude survey items

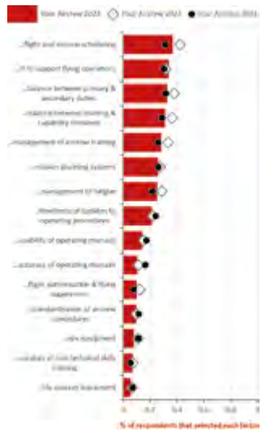
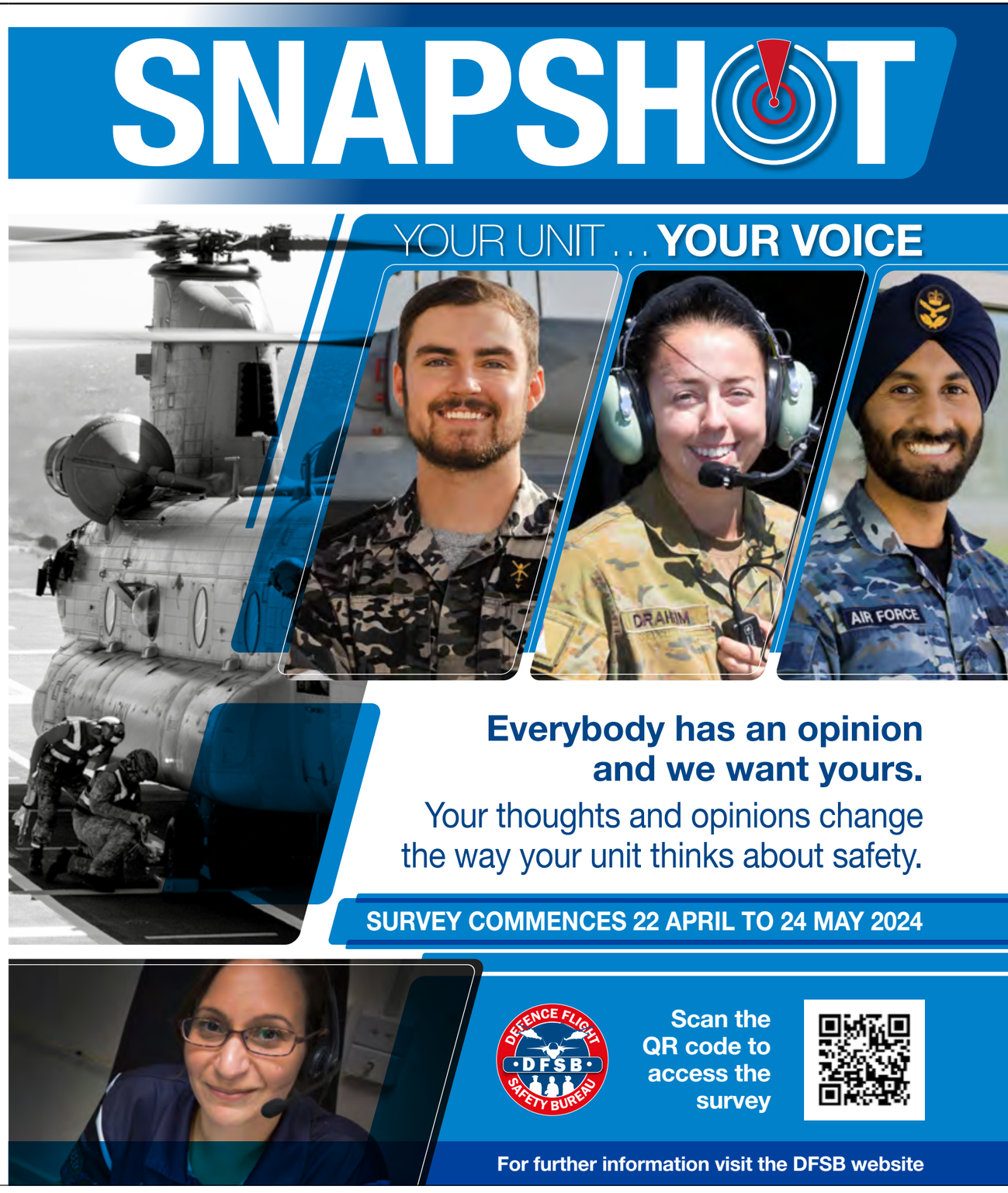


Figure 5: Aircrew risk control ineffectiveness



The unseen hand

Automation, human factors and drones

By Margo Marchbank

THERE'S AN AMBIVALENCE in aviation about automation, expressed in a joke so old it probably predates most modern flight deck automation systems. In this hoary old gag, the ideal flight crew is said to be a pilot and a dog. The pilot is there to feed the dog and the dog is there to bite the pilot if they touch anything. Accidents such as Air France Flight 447 and the Ethiopian and Lion Air Boeing 737 Max crashes make the point in no uncertain terms that the mix of machine and human can be disastrous.

By contrast, some form of automation has been part of uncrewed aviation from the beginning. But the same questions apply. What role does the human operator play in uncrewed operations, what human-factors issues are at play and how does this affect the safety of these operations?

In the loop

As an air transport first officer and chief remote pilot for the University of Adelaide, Mitchell Bannink has his foot in both camps; he is well placed to understand the role of human factors in traditional aviation and uncrewed operations. He says consideration of traditional crewed aviation human factors, such as threat and error management and situational awareness, are readily transferrable to drone operations, where you must understand airspace parameters and identify and manage risks.

What is new for drones are issues with the human-machine interface and automation. 'You can't hear the rushing wind to tell you you're in a dive [unlike a piloted aircraft] and you have to counteract that by automation, which then leads to greater automation reliance,' he says.

'Automated systems for drones are in transition and, hence, the role humans play in their operation,' he says. Although civilian drone operations are still mostly at the human in-the-loop stage, where humans pilot and operate them remotely and make decisions at all stages of the flight, 'we are one or two steps into the journey' towards human on-the-loop and, ultimately, human out-of-the-loop operations.

On-the-loop means the person is not in direct control at all times but takes control over any decisions the machine makes. 'It pushes human control further from the centre of the automated decision-making,' Bannink says. 'While there is still human oversight, artificial intelligence [AI] initiates action without needing human pre-approval, as it would in a human in-the-loop operation.'

And human out-of-the-loop? AI-powered drones are expected to fly autonomously, without human intervention, only reporting back after an operation is complete. 'It's not too far in the future,' Bannink says. In a March 2023 update, [commercial drone delivery service] Wing said it was looking to expand its model so its drones could deliver, travel and charge throughout the day in whatever pattern was most efficient, without needing to return to a central point of origin to power up their batteries.

With the increasing automation of uncrewed systems, the role of human beings is changing and, with it, the human-factors focus as it relates to uncrewed systems. Human factors aims to 'optimise the relationship between the human operator and other elements of the system' and has traditionally focused on issues such as situational awareness, human performance and human physiology and threat and error management. But uncrewed operations demand a refined focus.

Command and control

At a very high-level, operations can be segmented into visual line of sight and beyond visual line of sight (where the operator can't see the drone).

Dr Alan Hobbs, a human factors researcher at San Jose State University and NASA's Ames Research Center, focuses on uncrewed systems that are capable of operating in all classes of civil airspace alongside conventional aircraft.

AI-powered drones are expected to fly autonomously, without human intervention, only reporting back after an operation is complete.

'The Federal Aviation Administration has said that for this to occur, these aircraft would need to be IFR-equipped, controlled by a pilot from the ground, comply with ATC and meet other requirements,' he says.

Remotely piloted aircraft systems (RPAS) have a higher accident rate than crewed aircraft.

Unique identifiers

Hobbs says that while there are some parallels to crewed aviation – there is still a pilot in command – the way humans interact with uncrewed systems is different in several critical ways. 'The first is the reduced sensory information available to the pilot,' he says. 'With the lack of sensory clues, the [drone] pilot may have no idea they are hitting turbulence, heavy rain or hail and they can't smell smoke or feel the buffeting of the airframe in a storm.

'Second, command and control is via a radio link – some people even refer to this as 'fly-by-wireless'. Remote pilots have to be prepared for a potential loss of link – no link can be 100 per cent effective all of the time, so learning to manage that is critically important.'

Third is the high – and increasing – reliance on automation. Hobbs says this raises the issue of the human ability to monitor such systems. We are simply not that good at monitoring automation during times of low workload. 'There's a risk of seeing people in a low-workload situation – when nothing much is going on – being the victim of the startle effect when they jump from that monotonous 'ops normal' to an emergency.'

Rather than designing remote pilot stations with comfortable chairs and subdued lighting, perhaps consideration could be given to creating an environment which could counter the danger of low-workload sleepiness, he explains.

The in-flight transfer of control is another factor to be considered. With RPAS operations, the pilot shift handover is more dynamic than the handover in a crewed aircraft. 'The remote pilot may be handing over to another pilot on a different continent and, after the handover, may go home – that doesn't happen inflight in crewed operations,' Hobbs says.

Finally, there is the remote pilot station, to use International Civil Aviation Organization (ICAO) terminology, although some refer to it as the ground control station. It is very different to the flight deck of a crewed aircraft, with more scope for interruptions and managerial staff entering and 'putting their oar in'. 'The sterile cockpit concept could be applied to the remote pilot station,' he says. 'However, rather than using altitude as a marker as happens in airlines, for example, enforcing a sterile cockpit below 10,000 ft, the principle could be applied to phase of flight or times of crew transfer.'

Size matters

There are different human-factors considerations for smaller uncrewed systems such as the Aerosonde. Cameron Devries is a senior program manager with Textron Systems Australia, which in 1995 pioneered the Aerosonde uncrewed aerial system – a simple, robust, ruggedly designed drone with a small operational footprint.

Devries says their philosophy is for current automation to support humans-in-the-loop – to support more effective human decision-making by reducing the cognitive load of the remote pilot.

He says this takes three different tacks: to reduce human cognitive load by automating regular checklist items; to check system A for condition Z and then have the system check the check.

Automating emergency procedures in case of systems failures. For example, if an engine fails, emergency procedures will be triggered, such as minimising the electrical load and returning to base. When the operator sees the error signal pop up, they know the system is going to take some automated emergency procedure steps up front, giving the operator some cognitive space to deal with the emergency.

Machine learning in the uncrewed system can undertake real-time in-flight monitoring that can warn the operator something may be about to occur. These tools are very good at processing vast amounts of data and can recognise failures seconds, minutes or even hours before they occur. The operator, armed with the knowledge that widget X may fail in future, can then decide what action, if any, to take.

Pilot or controller?

Devries believes humans will remain in the loop, or on the loop, for some time. 'The ongoing role of automation will be to support human decision-making,' he says. 'The way [artificial intelligence and machine learning] systems are built currently means we don't get detail on the AI thought process. Until there is sufficient trust in how the AI reaches a decision, there will be a need for human intervention in making the final decision.

'As the systems mature and there is movement from automation to autonomy, and from one remote pilot operating one uncrewed aircraft to operating many uncrewed aircraft, it is conceivable that the pilot almost becomes an area air traffic controller. We're very good at ATC and although there may be additional human-factors issues in the high-stress ATC environment, we can learn from the lessons of the past.'

Learning from the past is important, Devries says. Just as there was collaboration when crewed flight was first introduced into civil airspace, now, as autonomous systems and systems with autonomy are coming of age in civil airspace, 'we have a unique opportunity for the civil regulator and the uncrewed systems industry to work together to develop a safe ecosystem'.

The USAF Northrop Grumman RQ-4B Global Hawk crashed in North Dakota, USA, in August 2021.

Automation and the human-machine relationship

The case of an RQ-4B Global Hawk, which crashed 6.8 miles from Grand Forks Air Force Base, North Dakota, on 6 August 2021, highlights the problematic nature of automation and the human-machine relationship. According to the US Air Force Accident Investigation Board report released in April 2022, the aircraft had been in the air for 14 hours when the ground control workstation locked up. In the event of such a failure, the RQ-4 was autonomously pre-programmed to return to base. However, in this case, the remote pilot did not sever the ground link to the aircraft, leading to the aircraft being at a higher altitude than it should. The aircraft attempted a missed approach but, because of its altitude, missed the runway and made a controlled flight into terrain north of the base. The report found that if the remote pilot had severed the link to the RQ-4, it 'would have descended in accordance with published procedures and been on a normal approach and route to landing'.

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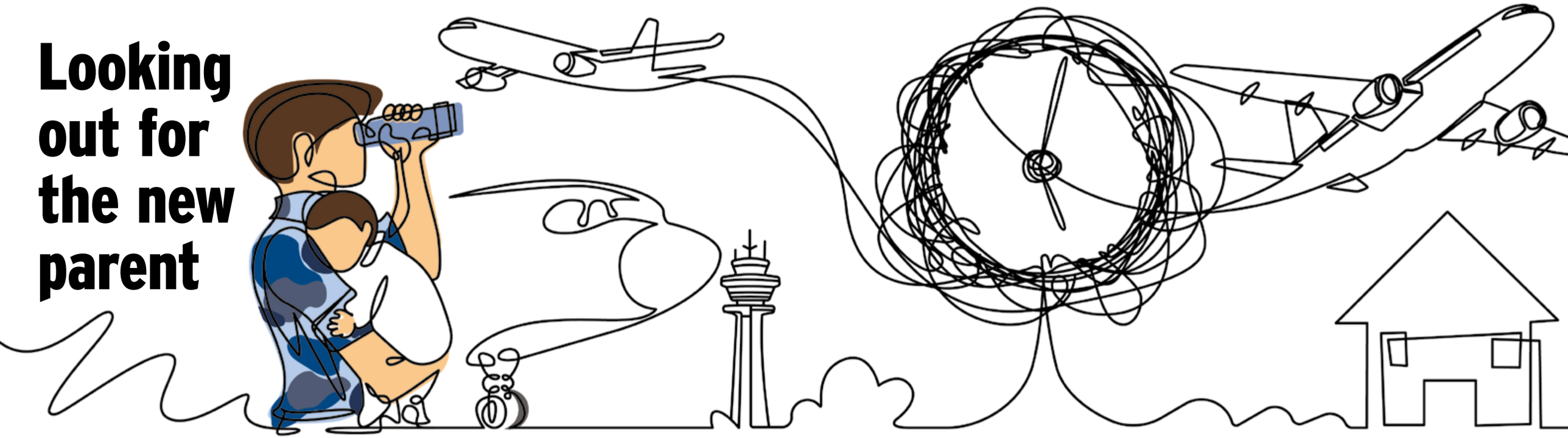
Looking out for the new parent



By FLTLT David Hansen

WHEN I BECAME a father for the first time in 2020, it changed my perspective on rostering and work planning. Let's unpack how my experience influenced the way I look after my controllers when they enter parenthood and return from parental leave.

Before my son was born, I provided command with a detailed plan to use my entitled parental leave. There were many shifts to be filled and members were eager to have me return, but I wanted to maintain my time off with my family.

On my return to work, I was fatigued due to a level of sleep deprivation I hadn't ever experienced. I was going to work with five hours of broken sleep and performing air-traffic duties, at a complex international airfield, without highlighting my fatigue.

I didn't want to let the team down by saying I couldn't control, which would add a decent workload to all other controllers' busy schedules.

On my return to work, I was fatigued due to a level of sleep deprivation I hadn't ever experienced.

For unfamiliar personnel, air traffic tower operations are divided into three positions:

- Surface Movement Controller: responsible for aircraft/vehicles moving around the airfield.
- Tower Controller: responsible for the airspace in close proximity to the airfield and all associated runways and helicopter landing sites.
- Tower Supervisor: responsible for tower operations, does not speak to aircraft, manages the flow of traffic, administration and personnel matters.

One morning I was on the open shift, responsible for opening Townsville Aerodrome for the day (0530 start time). I had had three-and-a-half hours of broken sleep, and knew I wouldn't be able to manage the level of traffic expected for a weekday morning, let alone be talking to aircraft in the early afternoon before my shift ended.

When the 0700 supervisor came in, I advised them I wasn't happy to talk to aircraft for the remainder of my shift, however, I would be happy to supervise as it was less dynamic and safer. This option was agreed upon and that was how I finished the rest of my shift. So many ambers here.

That afternoon, after a sleep, I reflected on what had taken place that morning. I agreed to perform only the role of the supervisor who is responsible for leading and mentoring two personnel talking to aircraft, managing emergencies and more.

The first line in the duty statement for the supervisor position is, 'A supervisor is responsible to the Operations Commander for the provision of Air Traffic Services'. I was lucky nothing went wrong and saw how dangerous this situation could have been.

So, what happened next? I sat down with my Operations Commander and highlighted what had occurred. I advised him that moving forward I would be highlighting fatigue and electing not to perform the controller position. I then suggested that the Operations Commander, and all the air traffic supervisers reporting to him, should be checking in on those with young children at home, either formally or informally, to prevent the push-on attitude I was operating under.

It is worth noting there were four other staff who were new parents as well, going through the exact same fatigue issues.

This was effective, not for unit output, but for aviation safety. There were numerous times members either would self-identify their fatigue, or be stood down after discussions with command or supervisors.

The unit's organisational culture shifted. Previously if someone could not control due to fatigue or other issues, they were viewed as letting the team down.

After this change in attitude to focus on aviation safety, it became respected and a sign of strength and courage if an individual put their hand up.

The unit's organisational culture shifted.

Catching fire

How burnout from work crosses over to those around us

By Nicholas Lewins

BURNOUT IS A term many of us have heard over the past few decades; particularly in the last year or so with the recognition of psychosocial hazards in the *Work Health and Safety Act 2011*. **This shift is driven by the growing acknowledgment of burnout as a systemic issue facing workforces across the globe, particularly during the height of COVID-19. Burnout can have significant detrimental health outcomes on individuals.**

In 2019, the World Health Organisation (WHO) recognised burnout in its International Classification of Diseases, describing it as 'resulting from chronic workplace stresses that have not been successfully managed'. While many of us have unfortunately seen or experienced burnout, a lot would think of it as something of a personal wellbeing issue. But what if burnout is something that you can catch from others?

While relatively novel, crossover is understood to be the process in which closely situated individuals can affect the psychological states of one another. This effect has been shown to occur between team members at work as well as between partners at home. It can be '... the process through which psychological stress or strain experienced by one individual affects the level of stress or strain of another individual in the same social environment.' (Westman, 2011, p 177). In simple terms, if you're feeling stressed or strained it is likely to make others around you stressed and strained as well. Now you might be saying to yourself 'Great, thank you for this revolutionary insight', but it's a bit more nuanced than you might think.

A similar concept to crossover is spillover: the process of stressors in one area of life spilling over into another (for example, work and home life). Research has identified that these two concepts can often intertwine, with an individual's spillover of stress in one part of their life then having crossover to others (Brough, Muller, & Westman, 2018).

In addition to its relationship with spillover, crossover can also occur through three key mechanisms. Direct crossover is the transfer of psychological states between individuals as a result of empathetic reaction. When showing empathy an individual is 'sharing another's feelings by placing oneself psychologically in that person's circumstances.' (Lazarus, 1991). Social learning theory suggests that sharing feelings can also lead to emotional crossover between people. Indirect crossover is the transfer of psychological states through interpersonal exchanges.

This often occurs through coping strategies, social support and social undermining. It may seem counter-intuitive to read coping strategies and social support, but while these aspects are useful in helping others they also come with their own psychological costs. Conversely, we can understand how a lack of these aspects and social undermining such as excessive criticism and negativity is likely detrimental to our mental states.

Shared stressors is the third mechanism, where the stressors in a shared environment can affect multiple individuals. Although it is interesting to think about how this crossover occurs and may resonate with your own experiences,

Crossover is the process when closely situated individuals affect the psychological states of one another.

I want you to take a step back and think about the broader implications of crossover and spillover.

Modern work has become highly collaborative and the prevalence of dual-career partnerships is at an all-time high. This means there are more opportunities than ever for individuals to spread stress to each other. Worse still is that people around you then spread that stress to others and then they spread it to even more people. The word 'pandemic' might be coming to mind, and you have hit the mark.

While the possibility of transferring psychological states like stress and strain is disheartening to hear, it can extend even further than that. Research has found evidence of crossover with depression, work-family conflict and burnout (Bakker, Petrou & Tsaousis, 2012; Rodriguez-Munoz, Sanz-Vergel, Demerouti & Bakker, 2014; Bakker et al., 2005).

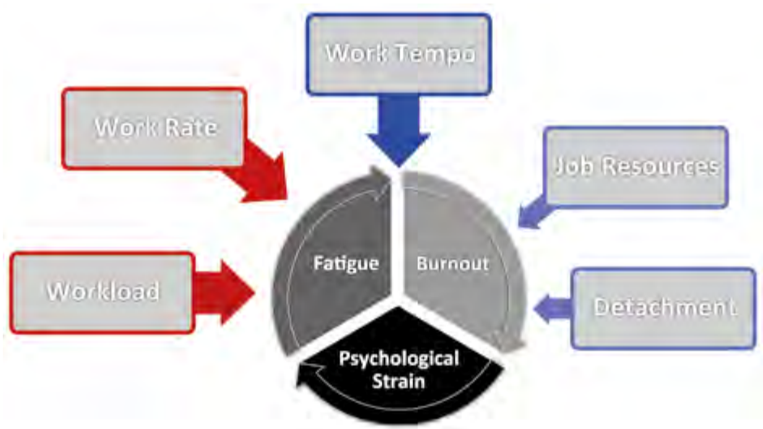
As described earlier, burnout results from chronic stress and is a psychological syndrome characterised by emotional exhaustion, depersonalisation and diminished feelings of personal accomplishment (Maslach, Schaufeli, & Leiter, 2001). While awareness of burnout and its negative outcomes has improved, it is still prominent within the working population and often considered one of the most prevalent forms of fatigue in organisations today. The incidence of burnout within the Australian workforce has been a growing area of concern with overall workplace wellbeing having progressively declined since 2011, according to the Australian Psychological Society.

Research has also identified that burnout can crossover between individuals. One of the initial studies in this space, conducted by Westman & Etzion (1995), found bi-directional crossover of burnout among couples, whereby if one individual was experiencing burnout it was more likely their partner was as well. Additional research also found this to be true among individuals working within teams (Bakker, Demerouti & Schaufeli, 2005). This becomes particularly problematic when we examine the effects burnout can have on an organisation.

The prevalence of burnout among a workforce can have wide-spread negative impacts such as absenteeism, turnover, decreased job satisfaction and poorer work-life balance. In an organisation such as the Australian Defence Force, the negative outcomes of burnout can also affect safety.

In recent years, burnout has also been included as a measure within the annual *Snapshot* Survey. The 2023 survey identified burnout, fatigue and psychological strain as being strong drivers of one another and highly interrelated. This is not surprising when thinking about health and wellbeing outcomes more holistically.

It also identified that perceptions of increased workload and unsustainable work rates were



There are more opportunities than ever for individuals to spread stress to each other.

key drivers of these strains, while work-tempo management and recovery, sufficient job resources and the ability to detach from work were moderators. The outcomes of these strains were found to be negatively related to safety attitudes and performance among respondents. Additional *Snapshot* research has highlighted the negative effects of strain impacting individual errors and non-compliance. Outside of the Defence landscape, recent research identified burnout as negatively affecting pilots' simulator training performance (Demerouti, Veldhuis, Coombes & Hunter, 2019).

So, if we sit back and consider the prevalence of burnout among workforces, its negative outcomes on ourselves and the systems around us, and the growing opportunities for crossover, we start to paint a fairly depressing picture. Fortunately, it's not all doom and gloom. Research has also demonstrated that positive psychological states can crossover. A study by Bakker, van Emmerik & Euwema (2006) found that work engagement crossed over within teams. Evidence has also demonstrated the crossover of self-esteem and self-efficacy, enabling individuals to function as a job resource for one another (Neff, Sonnentag, Niessen & Unger, 2015).

There are also ways of minimising burnout. One of the most common methods is prioritising self-care. This is taking the time to replenish physical and emotional energy by prioritising sleep, nutrition, exercise and enjoyable hobbies. Another crucial barrier is having social support networks both in and outside of work. However, this network is not just a group of people you can vent your frustrations to; this network should include those who can support problem-focused strategies that identify issues and brainstorm solutions, while providing mutual support.

Burnout can also be minimised by taking time to reflect on the root causes and what is within your control to change. Anecdotally, from my time doing executive coaching, I found that sometimes the source of burnout is self-imposed; to lead every project, to never say no when asked for help, for every output to be perfect. Such attitudes are often admirable but it is crucial to recognise when you are pushing your limits. For those sources out of your control, it is about trying to reduce your exposure to stressors where you can. This might include resetting expectations at work or home and establishing stronger ground rules to set up a healthy work-life balance. Finally, the most important way of minimising burnout is by catching it earlier, just like most other illnesses.

This article highlights an opportunity for us all. Burnout is not incurable; it can be diminished through targeted social and psychological support from individuals, teams and organisations. If we collectively work towards addressing burnout early we can stamp it out as an amber rather than waiting for it to catch on fire.

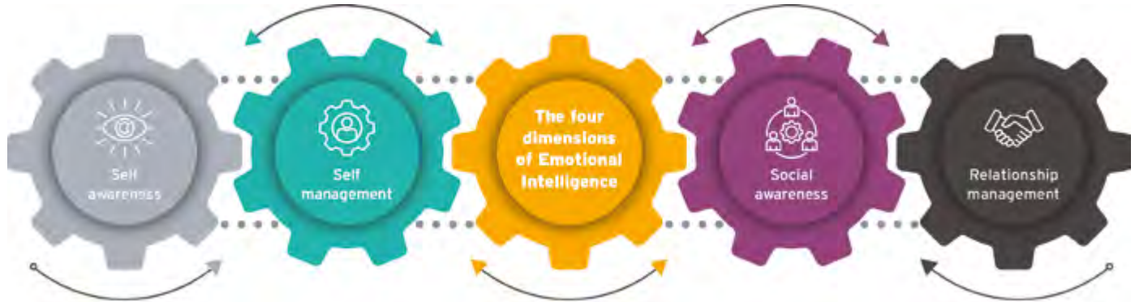
One of the most common methods of minimising burnout is prioritising self-care.

Mindful of what's above

Emotional intelligence in Defence Aviation

By Andrew Ee

DEFENCE AVIATION IS a high-risk environment where precision, teamwork and quick decisions are paramount. Achieving mission success and ensuring safety of personnel heavily depends on factors beyond technical expertise. One such factor is emotional intelligence, which plays a critical, yet often overlooked, role in ensuring safety and establishing a positive safety climate. This article looks at the critical link between emotional intelligence and safety in the high-pressure environment of Defence Aviation.



What is emotional intelligence?

Emotional intelligence (EI) can be defined as one's ability to monitor their own and others' feelings and emotions and use this information to assist in decision-making and actions (Salovey & Mayer, 1990). EI, much like intelligence quotient (IQ) differs for individuals depending on their upbringing, genetics and other factors.

EI can be broken down into four dimensions.

- Self awareness – the ability to recognise and understand your moods, emotions and drivers, and their effect on others.
- Self-management – the ability to control moods and actions and think before acting.
- Social awareness – the ability to understand the emotional makeup of other people and being skilled in treating people according to their emotional reactions.
- Relationship management – the ability to manage relationships, develop constructive networks and build rapport.

Individuals with higher levels of EI usually exhibit higher functioning across a range of emotional, behavioural, and social traits. These individuals are able to express emotions better both verbally and non-verbally. Socially, they are more perceptive of non-verbal cues and have higher empathy. They are able to regulate their emotions better and are able to assist in the regulation of others' emotions. High-EI individuals are able to utilise their emotions in creative thinking, flexible planning, motivation and redirecting attention (Salovey & Mayer, 1990). In Defence Aviation, these skills are invaluable, affecting both daily operations and mission-critical situations.

Effective communication and team dynamics

Clear and effective communication is paramount in aviation, particularly in team-oriented environments such as helicopter crews or maintenance settings. EI can aid and enhance communication effectiveness (Jorfi et al., 2014). Higher levels of emotional and social intelligence allow individuals to understand and relate to others and have better interpretations of non-verbal cues, which can enhance communication effectiveness as it allows individuals to adapt and use their understanding of others to tailor communications. For example, leaders with higher levels of EI are more adept at understanding the emotions of their team. Such leaders are also better equipped to manage conflicts and build trust among team members given their understanding of their team's emotions. They use this knowledge to effectively maintain and develop team communication.

Decision-making under pressure

Pilots are often confronted with high-stress situations that demand quick, precise decisions. The ability to remain calm, think rationally, and accurately assess a situation is directly influenced by EI. It can help develop the capability to maintain self-control. By maintaining self-control, individuals faced with high-pressure situations can regulate their emotional responses, giving the individual the capacity to have a clearer picture of the situation they are in and make rational decisions (Hess & Bacigalupo, 2011).

Emotional intelligence (EI) can be defined as one's ability to monitor their own and others' feelings and emotions and use this information to assist in decision-making and actions.

Relating back to the four dimensions of EI, each dimension can affect decision-making.

Self-awareness can help individuals recognise and understand their emotional state, allowing them to accurately assess their state of mind and make decisions accordingly. Being aware of their own emotions reduces the chances of impulsive decisions and allows them to consider the potential consequences of their actions.

Self-management can assist in decision-making by reducing the chances of an individual to be overwhelmed by stress. By staying calm, the individual will be able to think more clearly and rationally, which in turn will lead to more effective and efficient decision-making.

Social awareness allows for an individual to understand the emotions and perspective of others, so the individual can make more informed choices that incorporate the needs and safety of team members involved in a given task.

Relationship management can facilitate strong interpersonal connections and allow for effective communication with others. Strong interpersonal connections foster teamwork and allow for the input of diverse perspectives before reaching a final decision.

Self-management can assist in decision-making by reducing the chances of an individual being overwhelmed by stress.

Crisis management and resilience

EI plays a crucial role in helping individuals to adapt to crises. It provides individuals the tools to understand and manage their own emotions as well as others, which enhances their ability to problem-solve (Singh & Sharma, 2012).

Developing EI in Defence Aviation provides personnel with the ability to stay composed, make informed decisions, and lead effectively in high-pressure situations.

Awareness of their own emotions and the emotions of others helps individuals better assess a situation, identify potential solutions and adapt a response.

Safety climate and organisational culture

EI assists in the development of good safety culture in an organisation. Individuals with higher levels of EI are likely to have greater levels of empathy, which will encourage individuals to consider the impacts of an act and how it may affect others' wellbeing (Dugger & McCrory, 2021).

A good safety climate and organisational culture is essential in Defence Aviation; particularly since one error may lead to a fatal injury. Therefore, integrating EI in Defence Aviation culture can improve interpersonal dynamics and enhances operational efficiency and safety.

Improving EI

In the same way you can work to improve your IQ, you can also improve your EI. The following practices can help:

Self-awareness
- Reflect on your emotions regularly, identifying specific feelings and what triggers them.
- Journaling can assist to track and identify emotions.
- Practise mindfulness to stay in tune with your emotions.

Self-regulation
- Find techniques that help you deal with stress.
- Pause before reacting to emotionally charged situations, giving yourself time to choose a thoughtful response.

Improving social skills
- Practise active listening.
- Pay attention to non-verbal communications.

Be more empathetic
- Listen and try to understand others' perspectives without judgement.
- Try putting yourself in others' shoes to gain a deeper understanding of them.

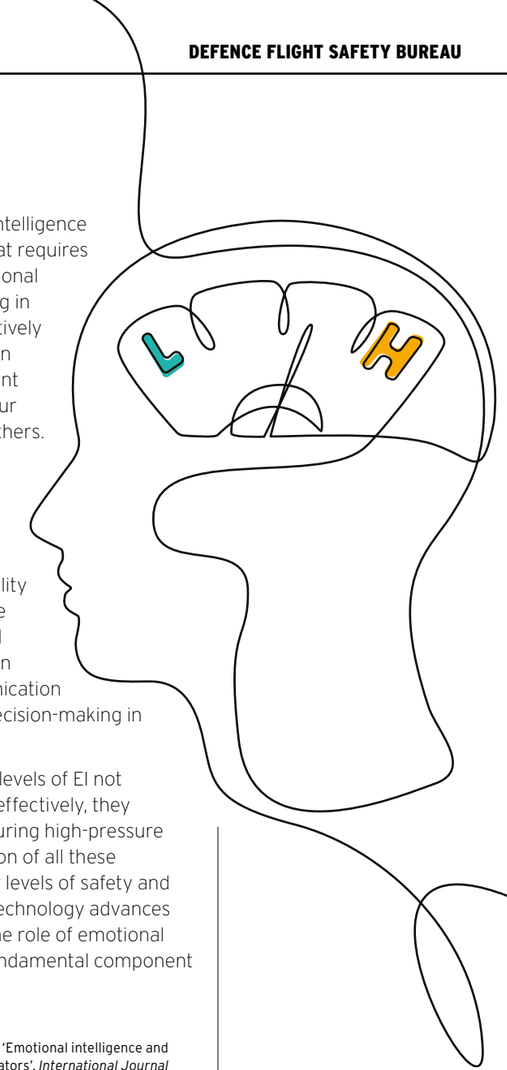
Continuous improvement
- Read literature around emotional intelligence and interpersonal skills to further your understanding.

Improving emotional intelligence is an ongoing process that requires self-reflection and intentional effort. Consistently tuning in to your emotions and actively practising communication skills can lead to significant growth in understand your emotions and those of others.

Conclusion

The influence of EI in Defence is undeniable and far-reaching. The ability to navigate high-pressure situations with emotional awareness, self-regulation and empathetic communication significantly enhances decision-making in this critical environment.

Personnel with higher levels of EI not only can manage stress effectively, they can communicate well during high-pressure situations. The culmination of all these elements result in higher levels of safety and success in missions. As technology advances and challenges evolve, the role of emotional intelligence remains a fundamental component of Defence Aviation.



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EI in Defence Aviation culture can improve interpersonal dynamics and enhances operational efficiency and safety.

By FLTLT Larissa Stephens

DURING A ROUTINE operation in 2021, a P8-Poseidon aborted a take-off at 72 kts due to a pitot tube cover still being in place on the aircraft. The pitot tubes provide pilots with information about aircraft speed and are covered while an aircraft is on the ground to prevent damage or blockage. These covers are generally bright red with long red 'Remove Before Flight' tags for ease of visibility to ensure they are removed before flight. Ultimately, ensuring this system is uncovered is, therefore, the responsibility of the captain. In this instance, there were many other contributing factors, and is an excellent example of why the Defence Aviation Safety Analysis Model (DASAM) is used to investigate Aviation Safety Reports (ASRs).

This operation faced a large amount of scrutiny and oversight, both at a national senior leadership level and at an international level because of its location. The crew involved had been deployed on the operation for nearly four weeks at the time of the incident and were cognisant of the potential implications of every sortie. Maintenance and aircrew were operating with minimal members and had been for some time. Fatigue and COVID-19 were everyday issues at the squadron.

The maintenance crew's arrival at the aircraft was delayed by 30 minutes due to tarmac access restrictions. When able to commence the maintenance pre-flight, the crew deviated from their normal planned and briefed roles and responsibilities due to the reduced time available before the scheduled aircraft ready time.

Conduct of the maintenance pre-flight checklist was also hampered by the late arrival of the fuel tanker, compounding pre-flight delays. Certain tasks in the checklist cannot be completed until the aircraft refuel was finished. The maintainers split the checklist into multiple parts spread over the time period, rather than conducting it from start to finish.

One maintenance member (outside the aircraft) removed the lower right-hand (RH) pitot static cover from the aircraft and attempted to remove the upper RH pitot cover, however, they were unable to remove it due to the height of pitot tube.

A second maintenance member who was in the aircraft cockpit removed the upper left-hand (LH) pitot cover via the pilot-side window, but did not remove the upper RH pitot cover as it was assumed the maintainer on the ground had removed it. The maintainer on the ground subsequently assumed the second maintenance member had removed both the upper LH and RH pitot covers.

The removal of a pitot cover is a dual signature task; one member must remove it and another must witness the removal and both sign that the work has been completed. Both maintainers certified that the RH pitot cover was removed despite not personally carrying out the task and not physically confirming that the task had been completed. The aircraft was then released, nearly an hour late, to the captain.

Organisational-optimising violations are generally committed to meet performance goals, in this case, meeting an aircraft ready time by signing for work that was not completed.

During the aircrew pre-flight, the tactical coordinator communicated with the captain that the tactical systems were beginning to show signs of overheating and failure and that the take-off needed to occur promptly, despite the late handover of the aircraft. Without a prompt take-off, the systems were at risk of long-term damage, or potentially complete system failure.

During the captain's internal pre-flight, it was noted that the fuel system was incorrectly configured by maintenance, however, it was rectified by the captain. The captain's job demands were increased further by junior crew members who needed a higher-than-normal level of supervision.

A previous ASR action item resulted in the requirement for all walk arounds to be conducted with safety glasses due to the risk of skydrol drops on the face. Consequently, the captain, who wore prescription glasses, was wearing two sets of glasses stacked on top of each other, in accordance with (IAW) squadron standing instructions.

Due to the humidity, upon stepping outside to do the walk around, the captain's glasses fogged immediately. Both pairs of glasses continued to fog up for the entire walk around despite being wiped multiple times. It was also raining, further reducing visibility on both pairs of glasses.

During the captain's walk around it was noted that several pieces of ground support equipment were incorrectly placed around the aircraft and needed to be moved prior to taxi to prevent an accident. This was communicated to maintenance, further interrupting the already rushed pre-flight walk around.

After engine start and taxi, the aircraft lined up to take off, with the captain in the right-hand seat (RHS) and the co-pilot in the left-hand seat (LHS). During the take-off roll, the captain noticed that the aircraft appeared to be moving faster than the RHS airspeed indicator stated; the LHS airspeed indicator was reading approximately 72 kts while the RHS read 45 kts. The captain called for an abort. Upon shutdown with maintenance in attendance, they noticed the upper RH pitot cover was still on and had been missed in both the maintenance pre-flight, captain walk around and aircraft launch.

Upon investigation, the three forward pitot tube covers were all missing the red 'Remove Before Flight' streamers and were covered in grey/black grease, the same colour as the P8. As such, they were in an unserviceable condition. There was no deferred defect in the aircraft maintenance documentation to reflect the unserviceable condition of the pitot static covers.

This incident demonstrates many components of the DASAM. If any one of the issues were stopped, this event would not have occurred, demonstrating the Swiss cheese understanding of latent failings.

Organisational-optimising violations are generally committed to meet performance goals, in this case, meeting an aircraft ready time by signing for work that was not completed. The organisational influences pressured maintenance members to sign for work they had not completed or witnessed and the captain to rush their walk around. The organisational influence of making new safety policy (the requirement to wear safety glasses) with the best of intentions, and local conditions, reduced the effectiveness of standard risk controls such as a visual check of the aircraft. Further risk controls such as 'Remove Before Flight' tags were less effective as they were unserviceable and undocumented as such.

Many lessons come from this one safety event, which highlights the importance of a healthy reporting culture at squadrons.

Beyond the flight deck

Integrating threat and error management

Name withheld

MY JOURNEY WITH the principles of threat and error management (TEM) began at flight school, an environment where every lesson is steeped in the importance of safety. It was there that I first encountered TEM, learning to recognise and manage potential risks even before setting foot in the aircraft.

This foundational knowledge was further developed during a multi-crew coordination course, which emphasised the critical role of teamwork and communication standardisation in managing threats and errors. These experiences laid the groundwork for my understanding of TEM, not only as a set of guidelines for pilots, but also as a versatile framework that can significantly enhance safety across various aspects of the aviation industry.

Now, as I reflect on applying these principles beyond the piloting of aircraft, I see vast potential for their application in other areas of my professional life, such as rappel firefighting and aircraft maintenance. With the same ethos of anticipation, prevention, and continuous learning, TEM can bring about transformative improvements in safety and operational efficiency.

Understanding TEM

Initiated by aviation specialists at the University of Texas, TEM encompasses a broad spectrum of strategies to manage both latent and immediate threats in aviation, along with various types of aircrew errors. Latent threats, often systemic and not immediately apparent, can linger and interact with other factors, potentially escalating into more significant risks. Immediate threats, in contrast, are more direct and observable, requiring prompt and decisive action. Within this framework, recognising the differences between unintentional errors, such as slips (execution errors) and lapses (errors of omission), and intentional errors or mistakes (resulting from flawed decision-making), is crucial. This nuanced understanding is a cornerstone of TEM, enabling tailored approaches to effectively manage these errors.

Moreover, the TEM framework significantly enhances the avoidance of undesired aircraft states – situations where safety margins are reduced. It empowers aircrews to anticipate and identify early signs of developing risks, thereby applying effective countermeasures before these risks evolve into more severe incidents. This proactive posture, focusing on early detection and response, is key to preventing circumstances that could lead to safety compromises.

Thus, TEM serves as an essential tool in maintaining the highest levels of operational integrity and safety, providing a comprehensive method to address the full range of potential threats and errors when piloting aircraft.

TEM in forest firefighting

In rappel firefighting, the application of TEM plays a critical role in addressing both latent and immediate threats. Latent threats might include systemic issues like deficiencies in training or equipment maintenance, which can subtly undermine safety over time. Immediate threats, more conspicuous in nature, often involve dynamic changes in weather patterns and the rugged, challenging terrain common to bushfires. Through TEM, rappel firefighting teams are equipped to identify potential undesired states – scenarios where safety and operational effectiveness could be severely compromised.

This process of identification is key to developing robust contingency plans as effective risk-control measures. With TEM, situational awareness is heightened, enabling firefighters to anticipate and aptly respond to both latent and immediate threats. Addressing latent threats might involve systematic revisions to training and maintenance routines, whereas managing immediate threats, such as navigating through harsh terrain, requires quick decision-making and adaptability in the field. By foreseeing potential undesired states, crews can formulate and rehearse specific contingency plans, ensuring they are prepared for a variety of emergency scenarios.

This forward-thinking and adaptable approach is at the heart of TEM, offering a structured method to mitigate risks, bolster operational safety, and ensure readiness for unforeseen challenges. In rappel firefighting, applying TEM is not just about tackling immediate hazards but also about building a resilient and versatile response capability for future challenges.

TEM in aircraft maintenance

Applying TEM in aircraft maintenance involves a comprehensive approach that encompasses planning, execution, and review of countermeasures, each integral to the unique demands of the role.

The Plan, Brief, Execute, and Debrief (PBED) framework is central to this approach, acting to implement all three countermeasures throughout the various stages of maintenance work.

The PBED framework ensures meticulous planning and thorough briefing sessions that cover all aspects of the maintenance task, from identifying potential challenges to establishing clear communication protocols. This structured approach sets the stage for effective risk mitigation, aligning with the planning countermeasure.

During the execution phase, PBED continues to guide the process, focusing on continuous monitoring, robust cross-checking, and the independent inspection of safety-critical tasks. These practices, integral to the execution countermeasure, ensure that each maintenance step adheres to stringent safety standards.

Finally, the debriefing stage of PBED aligns with the review countermeasure, providing a dynamic platform for evaluation and modification based on real-time feedback. This stage emphasises open communication and assertiveness, allowing for the incorporation of feedback to enhance efficiencies and correct errors in documented maintenance procedures, thereby fostering a continuous improvement cycle in aircraft maintenance operations.

Conclusion

The principles of TEM, with the focus on proactive safety and continuous improvement, can be effectively applied across all areas of aviation safety. As discussed, in my professional career thus far, I have witnessed the impactful application of TEM in two distinct areas: rappel firefighting and aircraft maintenance. In rappel firefighting, TEM enhances the management of both latent and immediate threats, significantly improving situational awareness and emergency preparedness.

Similarly, in aircraft maintenance, the adoption of the structured PBED framework exemplifies how TEM's planning, execution, and review countermeasures can be meticulously integrated to uphold safety and precision at every maintenance stage.

TEM is adaptable and is integral across diverse aviation sectors, where principles of anticipation, detection, and responsive adaptation are paramount in maintaining the highest standards of safety and reliability in every facet of the industry.

YEAH, NAH AND THE WILDCARD OF MAYBE

By MAJ Drew Burkitt

FOR ME, IT was a hard no. But perhaps it should have been a solid maybe. The auto-refreshing screens of the Bureau of Meteorology office showed the technical, quantifiable and predicted weather information. The view out the windows suggested that today was not a good day to fly. The voice on the phone was clear – 'You have to complete this task. It's the CDF, and he needs to get to the landing zone!'

The phone conversation bounced between the task and the effects of the weather. On one hand, the Chief of the Defence Force (CDF) needed to get to the landing zone. However, bushfire smoke had reduced visibility in eastern and north-eastern Victoria. Visibility was at the limit for helicopter visual flight and forecast to be below what is required by standing instructions for instrument recovery, should it be required. The tasking authorities weren't trying to pressurise the situation, although this 'no-fail' mission was flailing in the murkiness of yes, no, and the opportunity of maybe.

You've seen this must-do predicament before; it's not unique to Army Aviation, rather it's part of being human, and you must decide on the way forward. In Defence Aviation, there is power in the words yes and no, and it's worth interrogating what wielding them in dynamic, complex environments can mean. This article considers the context that requires yes/no decisions, how to avoid being stuck between these options and suggests an opportunity positioned in the maybe, as the aforementioned event highlights.

Reflex obedience

Military operations are synonymous with people carrying out orders – often portrayed in the movies as a higher-ranking member barking verbal commands that require immediate action. There is a place for these orders, and the corresponding reflex obedience of a 'yes' they trigger has a place (Clark, 2017, p 2). However, reflex obedience may not always suit the situation in complex working environments such as Defence Aviation.

Undoubtedly, commanders' decision-making relies on what they determine needs to be done, based on the information they have (*Aviation NTS*, 2023, p 63) Yet, sometimes, disagreeing with their decision might be the more prudent option. You must make this distinction and, when necessary, make a representation to your superior with complete and objective facts, free of unnecessary emotion. This conversation will, sometimes, require moral courage (ADF-P-0 ADF Leadership, 2021 p 22).

Decision-making dilemmas

Across civilian and Defence decision-making, in aviation and beyond, critical thinking is necessary to effectively resolve challenging moral and/or ethical situations. Whether it be standing up to unacceptable behaviour or as part of the crew on US Airways Flight 1549 landing in the Hudson River after losing all engine power, strong leadership is needed to navigate towards a decision.

The unlimited liability contract, which is a fundamental characteristic of the profession of arms, requires that as long as the order is legal, a military member is expected to carry out the mission despite personal fear or danger. (ADF-P-0 Military Ethics, 2021, p 4) The strong 'yes' that this implies demands individual and collective reflection before such situations.

Reflex obedience may not always suit the situation in complex working environments such as Defence Aviation.

RULE OF THREE

PROCEED
Well within limits or assumptions

CONSIDER
Nearing the boundary of being acceptable

STOP
Out of limits or unacceptable

HOW TO APPLY:

- Use PEAR to identify your AMBERS and REDS
- Speak up and discuss issues with team/supervisor
- Eliminate all unnecessary risk
- Apply all reasonable treatments/controls (ensure they are authorised for use)
- Ensure all decisions are made at the appropriate level
- Remember three or more AMBERS equals a RED

Deciding between yes and no

However, there are times when a strong 'no' is appropriate. No ADF commander or leader may ethically or lawfully order anyone to engage in an unlawful act. Further, obeying an obviously illegal order is ethically and legally wrong (ADF-P-0 Military Ethics, 2021, p 6). It is essential in aviation to understand the ethical and legal aspects of our roles to avoid defaulting to 'yes'.

Members may require a degree of intelligent disobedience as they question assumptions, facts, or decisions to achieve safe flying operations. Importantly, intelligent disobedience isn't a 'no'; rather, it is the culture, education and training that allows you to manoeuvre in the 'maybe' (Clark, 2017, p 2).

Knowing you have an option

'Will you launch with the CDF on time?'

It's a tremendously closed question that seeks only a simplistic yes/no response. Asking such questions can be appropriate and a legitimate way of seeking information quickly, ideally on occasions that require a simple response. Follow-up questions can allow for clarification or detail in a response. Members usually have to choose two out of quality, quantity and speed. Attempts on all three will likely be unsuccessful. Similarly, emphasising only one area, for example, communication quantity alone, may complicate the response to the point where a series of closed questions attempt to return to the original topic. Retracing details can cause confusion and waste time. To avoid this, understanding how to deliver your options confidently and accurately will expand the closed question to one that can drive insightful discussion.

Do you want the option?

'Currently, the forecast weather prohibits the mission. However, I would like to provide and discuss some options to mitigate the situation.'

Clarity in communication opens the door for productive discussion and resolution. Discussing options in aviation shouldn't be considered a hostile or combative situation; instead, effective communication networks throughout an organisation are critical drivers in an organisational safety culture (*Aviation NTS*, 2023, p 50).

To assist in maintaining the dialogue at a level that drives good organisational culture, the common language of aviation safety, especially risk management, helps align individuals approaches. Considering the Rule of Three, the language surrounding Red and Green should be clear, while Yellow provides the potential for negotiation and debate. Within the Yellow, organisational maturity can foster creativity and synergy, ultimately allowing success (Covey, 2004, p 268). And, like all communication, practise within the Yellow operationalises the tools and language that help de-escalate conflict from Red or Yellow to Green.

Opportunity in maybe

'I realise the importance of the task, and I'm interested in your thoughts on two options that we think will move the CDF within your intent.'

Acknowledging the task and larger purpose can present options that achieve a Win/Win paradigm. The Win/Win frame of mind constantly seeks mutual benefit. Considered the only viable option of the Six Paradigms of Human Interaction (Covey, 2004, p 211) Win/Win depends on the cooperation between members. The required interdependence allows for communication that is both highly considered and courageous (Figure 1, Covey, 2004, p 218). Unlike reflex obedience, this approach provides a process that seeks agreement through understanding the situation before jointly clarifying a path forward.

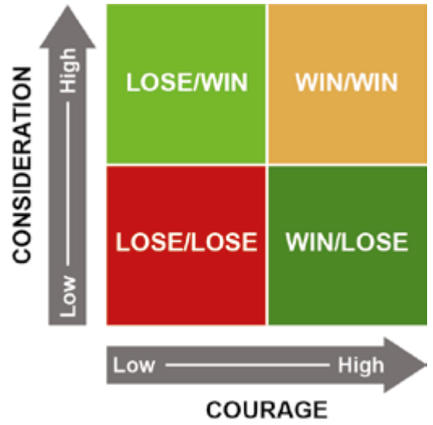

Figure 1: Win/Win frame of mind

The military outlines several processes to achieve this task clarity that can facilitate action. The Military Appreciation Process, the 7-Step Safety Risk Management Process and the Rule of Three are tools that can establish a logical decision-making process. While implementing these tools varies across the ADF, often relative to the role, all three methodologies seek to achieve a Win/Win outcome. In reality, a 'least-worst' option that isn't a Win/Win may be selected by a member when presented with a choice. In this case, decision-makers deliberately choose a bad but better option than any available alternative.

The term 'least-worst option' conjures up dangerous scenarios, situations at the extremes of the worst plausible and least likely. However, that's where the most opportunity for decision-makers lies. Within high-performance organisations, challenging their workforce to 'wildcard' scenarios (with intolerable Reds and Yellows and minimal Greens) allows members to exercise the difficult choice of the least-worst option. In doing so, the organisation benefits from improved decision-making, communication, and confidence in situations akin to combat operations.

On the face of it, this article discusses three simple words: Yes, No and Maybe. We use these words constantly: at work and in our private lives. However, leaders should consider these three words can be something beyond efficient decision-making. In Defence Aviation, moral courage helps select the correct word for what can be dynamic, difficult, dark and degraded situations.

While understanding when and how to use these words is essential for operational success, the opportunity exists in education and training for Wildcard Yellows that may continue to drive organisational culture towards decision-making excellence during 'least-worst' combat operations. When the Win/Win of unanimous Yes and No decisions is not possible, it's time for intelligent disobedience to excel in the Maybe.

Having looked out the window once more at the poor weather that hot day, I said: 'The CDF has enacted the ground transport backup plan and will move to the location via road. The helicopters aren't required to transport him this morning. At the agreed time, let's consider the visibility again and discuss options to return the CDF via helicopter. We can make another decision then.' Later that afternoon, the Task Force returned the CDF to RAAF Base East Sale via CH-47F Chinook helicopter. While this example ended as an easy Win/Win, how could it be a Wildcard Training 'Maybe'?

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Moral courage helps select the correct word for what can be dynamic, difficult, dark and degraded situations.

Award recognises efforts to keep colleagues safe

By Rebecca Codey

FOR LIEUTENANT KIARA PENMAN, being named winner of the 2023 Dr Rob Lee Defence Flight Safety Award, is confirmation that in fulfilling her role as 816 Squadron (816 SQN) Maintenance Aviation Safety Officer (MASO), she has had a positive impact on those around her. The Royal Australian Navy (RAN) Lieutenant says the award is recognition that she is helping to ensure colleagues can do their jobs and go home safely to their families – and that her efforts are contributing to the goal of achieving aviation capability safely.

'At 816 SQN, and overall in the MH-60R [workforce], I'd like to believe we are continuously seeking ways to do our business better, safer and in an environment that promotes an intrinsic motivation to conduct safe aircraft maintenance,' LEUT Penman says.

LEUT Penman, who joined the RAN in 2014, was awarded the Royal Aeronautical Society (RAeS)-sponsored accolade for her commitment to improving aviation safety at 816 SQN. Director Defence Flight Safety Bureau, GPCAPT David Smith, presented LEUT Penman with the award certificate and $500 at Headquarters Fleet Air Arm earlier this year.

LEUT Penman has been recognised for her 'outstanding leadership through exemplary stewardship of the squadron safety system, with her focus on a generative safety culture through pragmatic analysis and problem resolution particularly noteworthy', according to her award citation.

The citation reads, 'You diligently pursued improvements to squadron safety and engineering challenges through communication activities including: non-technical skills training, safety survey analysis and reporting, and the mentoring of trainee engineers and technicians on safety investigations and reporting'.

LEUT Penman says her people-focused approach makes her inherently safety focused. 'I'd like to believe I've been people focused throughout my career, however, it wasn't until I got to the squadron that I had a real understanding and appreciation of what they go through in order to achieve such great feats,' she says.

'Seeing this has empowered me to try to do the best I can to ensure they are able to achieve these safely and ensure they can do it time and again without significant detriment to their physical and mental wellbeing.'

'People are our single most important asset; without them we cannot hope to achieve what we strive for in the ADF. If we focus on the people, their welfare, their career and their safety, success will follow.'

As MASO, LEUT Penman is predominantly responsible for the maintenance aspects of the 816 SQN safety management system (SMS) through: the management of maintenance Aviation Safety Reports (ASRs), trend analysis of maintenance safety events, and taking actions and providing recommendations to improve the unit or group SMS.

LEUT Penman also provides insight into WHS reports and trends, and provides support to the UASO for overall management of unit SMS, which can range from maintenance input into Flight Ops ASRs to providing a position on the potential maintenance impacts on safety-related processes or safety events.

LEUT Penman's award citation also reads, 'You supported units outside of 816 SQN, demonstrating your commitment to military aviation safety beyond your immediate responsibilities. Your support to Class C investigations at 725 SQN ensured accurate and timely outcomes were achieved across the Fleet Air Arm and provided an important commitment to shore and embarked helicopter operations.'

The RAeS Award recipient says accurate and timely reporting allows the organisation to identify potential safety impacts and apply immediate actions to prevent recurrence. 'This also flows into accurate and timely investigations. It allows us to ensure we have actions that actively reduce the likelihood of safety event recurrence. What I'd like to emphasise, however, is that this should not be placed as a higher priority to a well investigated safety event that is commensurate to the perceived risk level.'

ROYAL AERONAUTICAL SOCIETY
AUSTRALIAN DIVISION

The Royal Aeronautical Society's Dr Rob Lee Defence Flight Safety Award recognises an individual or collective effort that enhances aviation safety in Defence and is open to all members of the ADF, Defence civilians, Defence contractors and Australian Air Force cadets.

The award considers the following:

1. demonstrated commitment to improving aviation safety
2. overcoming barriers to addressing aviation safety issues
3. outcomes resulting from the aviation safety initiative
4. engagement with stakeholders in making the contribution.

Nomination forms are available on the DFSB intranet site and may be submitted at any time. To be considered for the current calendar year, nominations must be submitted by 30 September in each year. Nominations received after this will be considered the following year.

RAISE-ing the art of communication

By Gareth McGraw

COMMUNICATION IS THE oil that lubricates any complex organisational system such as aviation. And like any oil it needs to be refreshed in order to maintain its effectiveness. This article introduces some tools and techniques to refresh communication in the workplace and hopefully enable it to be more effective.

We will talk through some underpinning theory on communication, including where and how some of the issues that may negatively influence communication can occur.

We will look at strategies to improve communication processes and introduce a new framework to better navigate potentially difficult conversations.

'The single biggest problem in communication is the illusion that it has taken place.'
– George Bernard Shaw

How often do you fall prey to George's assertion and find a conversation is less than effective? Let's look at why individuals may have incorrectly believed communication has taken place, and what can be done to turn illusion into reality.

'The single biggest problem in communication is the illusion that it has taken place.' – George Bernard Shaw

Communication basics

At the heart of much miscommunication is the fact that communicating is an unconscious process and we generally do not think about 'how' we communicate.

We can fall into the trap of composing and sending a message with minimal active thought, revert to a style we're comfortable with and assume that, as we know what has been said, so does the receiver. And, we assume we can move on without verifying their understanding.

Even the standard definition of communication gives an indication where some of the issues may lie. Communication has been defined as 'the transfer of meaning between two individuals or groups through a common framework of signs, symbols and words'.

Simply stating that some kind of transfer of meaning has occurred still leaves George's assertion well and truly in play. We are therefore in danger of believing we have communicated our intended meaning while actually only having transferred 'a' meaning.

However, if we refine our definition of communication to 'the accurate transfer of meaning between two individuals or groups' we can see straight away that there is little doubt as to what the result should be.

How do we turn transfer of a meaning into the transfer of the correct meaning? How can we assure a more consistent level of effective communication throughout the aviation environment? Additionally, how can we improve our chances of successful communication under difficult circumstances and where there is the possibility for conflict?

First of all, no good discussion can occur without common context. So, let's go over some 'Comms 101'. Communication is described as a 'three-part process' with a sender, a receiver and feedback loop.

Comms begins when a sender has information they need to transfer to a receiver.

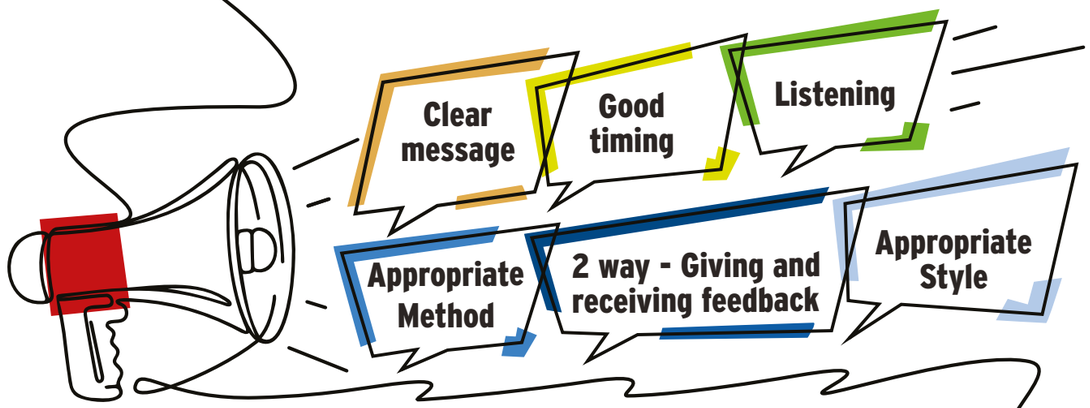
- They do so (hopefully) in a format that will convey meaning about that information – the reason for communication, for example to transfer knowledge about a task, convey the need for it to be completed, or to ensure that it has been done.
- The receiver takes that information in, as raw sensory data (visual and auditory), applies cognitive resources to it (thinks it over) and comes to an understanding of what they think the sender is saying.
- The receiver provides the sender with feedback on what they understand, which if all has gone well, should align with the sender's intended meaning.

As easy as that all sounds, George's ghostly visage peeps out from behind each part of that 'simple' process.

Going back to basic comms theory, the process needs certain characteristics to be effective.

The first ghost of George involves the sender. We need a clear (and concise) message. and for this to happen, the sender needs to take time not just to think about what they are going to say but to think about what the receiver is going to hear. They need to ensure the message is technically accurate and sent in such a manner that the receiver is likely to extract the correct meaning. Think, appropriate style, national language, technical language, slang, acronyms and enunciation.

Communication has been defined as 'the transfer of meaning between two individuals or groups through a common framework of signs, symbols and words'.



What's more, physical environment, context and timing have a huge impact on reception. Consider the complexities of the aviation environment. A noisy flightline, a critical phase of flight, a busy control tower, or during a safety-critical task. All times when messages may not be received well by personnel too busy to listen or unable to clearly hear what is being said.

Jumping to the last characteristic in the picture: communication style. Style means selecting tone, level, and urgency of delivery to suit the circumstances and importantly the need to engage the listener.

The four-quadrant model (to the right) describes communication styles ranging from submissive, through supportive, assertive and aggressive. Each style has defined characteristics that describe both the tone and delivery of information and the emphasis they place on parts of the communication process. Assertive and aggressive may have more emphasis on the sending aspect of the process, submissive on receiving and supportive on both receiving and feedback.

Which is best? I'm sure at one time or another nearly all readers will have been informed that assertive is the answer ... and is THE effective communication style. Why then do failures to speak up still happen regularly (and can be seen in many incident reports) when organisations, both inside and outside Defence, teach and encourage the use of assertive communication?

I contend that while an assertive style of communication can be effective, it is only PART of your effective communication toolkit. As a communication tool it should be viewed as the hammer of communication – valid to a point, but you need to be careful you don't start seeing every conversation as a nail.

A major difficulty with an assertive communication style can be the highly individual and subjective nature of communication, which can lead to one person's assertive being experienced by another person as aggressive. That can very easily be a recipe for conflict, especially if a sender goes straight to an escalated delivery, or if an interaction is between individuals who don't know each other very well.

Aligned with this potential misperception is a natural aversion to conflict in most people.

Style means selecting tone, level, and urgency of delivery to suit the circumstances and importantly the need to engage the listener.

This can be a barrier to people speaking up, even when it is critical. And though we encourage people to speak up, we can still see a failure to do so when it counts. Evidence can be found in investigation reports for many safety events that include details of individuals who knew something was wrong but didn't speak up for fear of creating conflict.

Using any communication technique takes practice. Theory is a good start, but until you actually say the words, get a feel for how it sounds and get over your initial reticence you'll likely baulk at the critical moment.

And I'll be willing to bet (a small amount) virtually no-one will be able to point to any realistic attempts on their behalf of actively using assertive communication. Whether due to a perception of seeming aggressive, fear of looking foolish or just never feeling confident trying it in case they are wrong. When I talk to personnel about communication as a skill you have to practise to truly master, very few can recall practising any kind of communication style or technique.

Most interactions will generally occur somewhere in the supportive region, rather than assertive. Techniques such as the use of an even tone, speaking clearly and slowly enough for a receiver to listen and register what has been said, re-phrasing if necessary and giving time for the receiver to understand the message before moving on can help.

If the sender has somehow managed to encode and transmit their message in some semblance of the correct manner, they may still have another communication 'ghost' to deal with. One that now involves the receiver.

I'm sure we've all heard about the need to use appropriate listening techniques, including the holy grail: active listening.

Active listening involves focusing an appropriate amount of attentional resources on registering stimuli and on extracting the meaning.

Active listening is often discussed in terms of the expected behaviours: steady eye contact, nodding, paraphrasing et cetera. But a critically important and often overlooked piece of the active listening puzzle is what is going on as you're bobbing your head up and down and repeating words like some kind of hyper-active parrot.

To understand what is happening as we listen, we need information processing (pun fully intended). As discussed, we receive auditory and visual stimuli as part of the communication processes. However, we'll only really effectively register stimuli if we have applied attentional resources too.

To process meaning, you've heard what the sender has said and seen their facial expression and body language; then you need to understand the context, what it relates to, the meaning of the words, the urgency of the message, expectations, and any associated actions.

Active listening involves focusing an appropriate amount of attentional resources on registering stimuli and on extracting the meaning. In other words, you can't do it by accident.

Our second ghost of illusionary communication appears because we can often be distracted by the myriad of secondary tasks and cognitive demands that surround us, and end up thinking about everything but the message.

On to our third and final ghost and the one most likely overlooked or lost in a sea of assumption. The feedback step can be bypassed or executed in a cursory manner. When we are under pressure, giving or receiving feedback may seem like wasted time. Both sender and receiver may not consider or want to admit there could be any issue with the way they communicate, or their ability to understand a message.

For the receiver, those techniques centre on not simply repeating what has been said, but being able to 'reconstruct' what they have heard; in other words, effectively paraphrasing what they have understood the meaning to be. For the sender, the techniques mean taking the time to actively listen and ensure they are hearing their own meaning repeated back to them because, if we are truly invested in the transfer of accurate meaning, feedback of what has been understood is a critical component in our efforts to shatter George's assertion.

Okay, we have discussed 'Comms 101' ... and perhaps made you doubt you'll ever have an effective conversation again. But there are some techniques that, if applied, can vastly increase the chances of exorcising the ghosts of conversations past.

Foundational principles for effective communication

The first principle is that we may need help to think about message construction and delivery. We want it to be concise and with a clear intent of the response or outcome required. We know that we should take a few moments to think through before we start, but even with some thinking time, the hardest part is sometimes knowing where to start.

Remember, you can only hold someone's attention for so long. Don't start before you at least have the skeleton of your conversation.

The second concept is that effective communication is adaptive. You may start it using one style but have to adapt and move into another style to ensure the communication process results in the all-important transfer of correct meaning.

Looking back at the four-quadrant model of communication styles, even in the subjective arena of comms we can say with certainty which of those styles work and which don't. Supportive and assertive should be, and often are, used when appropriate. But aggressive or submissive will never produce effective communication (except possibly by luck, but never in a repeatable manner).

Why is this?

A supportive style centres on the sender delivering the message in a way that supports the receiver's understanding. This is by first engaging the receiver to get their attentional resources focused on receiving and understanding the information. Delivering it in a way that gives the receiver time to register and assimilate it. And by the sender giving themselves time to receive feedback and possibly re-phrasing their message if some component has been misunderstood.

Assertive communication is a step up from this. Using a heightened tone of voice to impart an understanding of increased urgency and delivering the message in a manner to ensure the receiver has definitely focused their attention on you. But the change from supportive to assertive should still use the same elements of the communication process.

When you are aggressive instead of assertive there is a high chance that anyone unlucky enough to be on the receiving end of your wrath will either be shutting off mentally and doing very little active listening, or will react in a defensive or aggressive manner. You will probably also not seek or want feedback and operate in 'transmit only mode'.

Remember, you can only hold someone's attention for so long. Don't start before you at least have the skeleton of your conversation.

Conversely, anyone in a submissive space will probably not be active as a listener and is not likely to question or provide any feedback if a message has not been understood. Both styles will effectively close down portions of the communication process and definitely not have many of the all-important characteristics of effective comms.

Let's talk solutions: RAISE

RAISE is a framework designed to guide personnel through the communication process and assist the sender to construct their message and adapt its delivery if necessary. RAISE is similar in intent to PACE (Probe for better understanding, Alert personnel of anomalies, Challenge suitability of present strategy, Emergency warning of impending risk, cf. *Aviation NTS Guidebook*), however, provides a little more structure on how to probe and alert in the early stages of conversation.

RAISE was designed for Qantas to improve the ability of individuals to use an assertiveness style (even to superiors when appropriate) without it resulting in confrontation. If used correctly it should also greatly improve the likelihood of effective communication.

As discussed, people (even in Defence) are generally conflict averse and have difficulty starting potentially adversarial conversations.

RAISE stands for:	
RELAY	(information)
ASK	(if the receiver is aware)
INDICATE	concern (what you think may happen)
SOLUTION	offered
EMERGENCY	language

The RAISE framework assists individuals to begin interacting at the correct point of our 'continuum of communication'. It guides them in how to construct and frame a message as objectively as possible, how to escalate delivery and content, as necessary, until they get the right response.

Importantly, RAISE can help individuals to deliver a message in a way that should reduce the risk of misunderstanding and conflict, making even difficult conversations constructive.

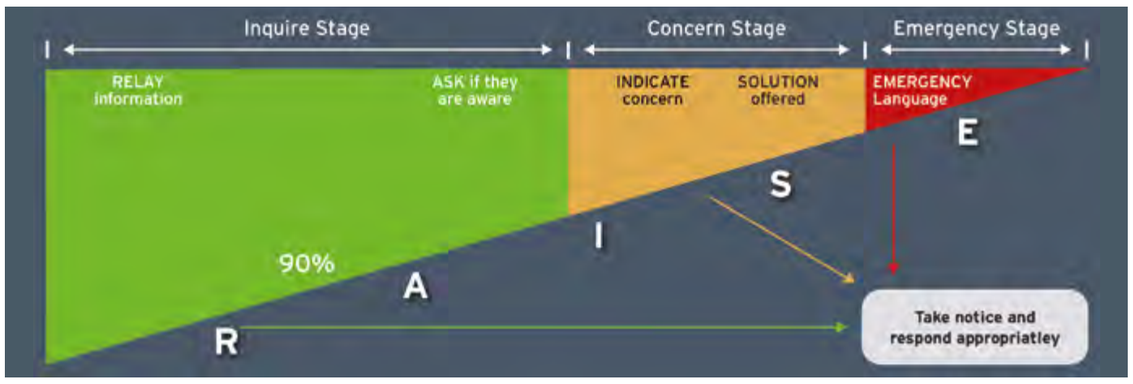
RAISE provides an avenue for the receiver to identify the sender's meaning, and self-correct at the earliest opportunity. Most, if not all, readers would describe the aviation environment as very busy, with multiple distractions vying for their attention. RAISE is intended to ensure the receiver has a sufficient amount of their focus on the message.

We want to start the conversation in a style that supports understanding. If we don't get feedback that the person has understood and responded, we can then move further up the continuum to escalate our message and maybe 'grab' more of their attentional resources.

The levels of RAISE

Looking at the RAISE diagram, the elements fit in a framework that envisages a 'sliding scale' of application, depending on how a situation develops. Any conversation you initiate has a reason (context and meaning). When we step through RAISE, each element is intended to add to that meaning and context to assist the receiver to understand why you are having the conversation and what is needed in response (the all-important transfer of meaning).

As stated, communication happens on a continuum, but 90 per cent of the time a supportive communication style and language will be used as part of everyday communications.



GREEN ZONE

You should ideally be using the green 'relay and ask' Inquire Stage to communicate within your teams every day. It starts with the initial relaying of relevant information in a way that allows an individual to listen, analyse and understand the need to respond in some way. It should enable the receiver to understand the correct meaning behind the conversation, especially if the sender is trying to inform them of an error or need to correct behaviour.

YELLOW ZONE

The yellow zone is what you would use if the person didn't listen, understand or dismissed your initial comments. It helps the person to realise that you're concerned or that something needs to be done. If the receiver does not respond appropriately; the sender can become increasingly more direct and assertive. However, this increase in assertiveness is still objective and constructive.

In the Concern Stage you move onto a statement of concern detailing a potential risk and should include a definite negative outcome in terms of performance or safety that will impact the individual or team.

If they still don't respond appropriately to the concern, a solution should be offered (if one is known). This only adds context to a conversation and helps to make the discussion constructive.

RED ZONE

If a safety concern is not being understood or responded to, the sender moves to a higher priority statement requiring an immediate response. The red zone, the Emergency Stage, is used when you don't have much time to act and you really need to grab someone's attention. Examples are 'Stop!', or 'Move away!'

Remember RAISE is a guide, not a rule, and you can also shortcut these phases, making a statement and asking a question in one sentence, stating a risk and a solution together.

Or, if you think there is a serious safety concern that could immediately affect the wellbeing of personnel or the operation, speak up, be assertive and use emergency language straight away to get your point across.

How would RAISE work practically?

We will try to dispel George from the get-go and set some context by using a scenario-based example.

You are walking through a hangar and see a technician using an improvised work stand. They are about 2 m high and you can see that they are leaning out over open space and are in danger of doing a very good Wile E Coyote impression off the side. What do you do?

Options may historically include one of two extremes:

1. running up shouting various expletives, naming the ways in which the individual is cognitively deficient
2. simply walking on by and waiting to hear about how someone took a swan dive from six feet up.

Neither of these outcomes is desirable. But we can probably all imagine them occurring. Sometimes it can just be too difficult to have that conversation, or to have it constructively.

Applying RAISE in this scenario

The meaning you will be trying to transfer is to stop using that stand and select an appropriate one or seek assistance if there are none available. We will step through RAISE to see if we can achieve that.

Start with a relevant statement of fact.

- **Relay information:**
  A good rule is to say what you see. Draw their attention to the issue with a statement of fact. For example: 'There's no fall protection fitted to that work stand.'

  You can see in the diagram that at each step we are looking for an appropriate response (verbal and behavioural). Hopefully, the message will be understood. and they will, in this case, get down from the stand.

What if they don't respond? Or brush you off? Ask a relevant direct question.

- **Ask if they are aware:**
  Asking if they are aware gives them more context about the situation, for example: 'You know that stand needs fall protection, right?'

  What are we doing with a direct question? We're now getting the individual to pay attention and think about an answer to the question. This should then prompt them to understand they need to adapt their behaviour.

We've come across a stubborn individual who still has not understood your meaning, so let's continue the scenario.

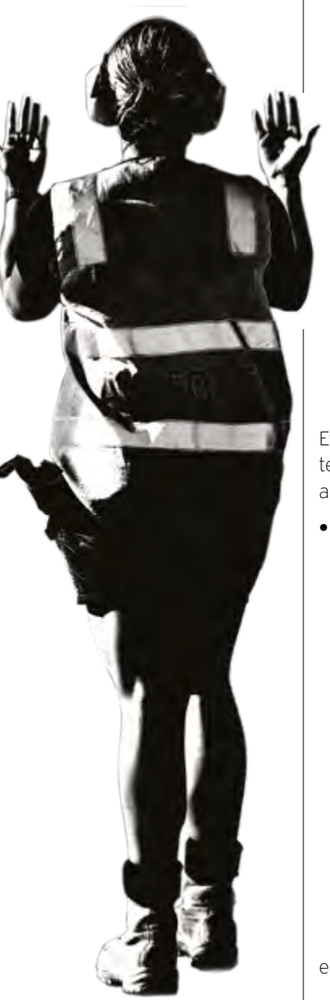
- **Indicate concern:**
  If you didn't get the right reaction, you would then indicate a concern.

  A statement to indicate concern is in the form of a risk that could be realised from the situation. Stating a risk enables you to further grab their attention and help them to understand your meaning.

  While this is still not in a truly assertive style it is more focused. A statement such as, 'I'm concerned you are going to overbalance and fall headfirst'. At the very least you should give them cause to reconsider their actions.

If they fail to respond or self-correct, we move up the scale.

- **Solution offered:**
  An example of offering a solution might be: 'Let's go to the GSE area and grab one of the stands with a full guardrail, I'll help you bring it over'.



Why don't we just go assertive and use emergency language to start with?

Why offer a solution and not use emergency language telling them to get down? Someone under a lot of pressure may not have the head space to think of what the solution should be; asking a question helps them to understand what the correct response is.

You are also still allowing the receiver the opportunity to self-correct. This will reduce the likelihood of being seen as unnecessarily aggressive and prevent them from either tuning out or a conflict occurring.

Communication is not a blood sport for you to win at all costs. You are after the accurate transfer of meaning and appropriate response. By offering a solution you are expanding on the reason for the communication to ensure they understand. You are also framing the exchange as a positive one, which will likely see future constructive interactions.

Even after using the best communication techniques, there may come a time for a fully assertive style. This is our emergency language.

- **Emergency language:**
  Emergency language is used if they still haven't understood, haven't responded correctly, you don't have any time left and, if you don't act, an incident could easily happen.

  Use short, sharp, direct transmission of a concise statement in an urgent tone. In this case 'STOP, get down from that stand now!' Here we have forced the attention of the receiver on the message and left little doubt as to what is required. Using the person's name – if you know it – is also a good way to get someone's attention even when they are focused on another task.

Why don't we just go assertive and use emergency language to start with?

If the situation is safety critical and there is not time for a discussion we can and should go straight to emergency language. But, remember the hammer analogy? Another way to think about assertive communication is it having a half-life. If you use it all the time people will start to tune out and it will stop grabbing anyone's attention, let alone their active engagement and appropriate response.

Those thinking this may just take too long in a real-world setting we may actually combine elements, as previously stated. RAISE should help you construct and deliver your message better, not get in the way.

What about responding to RAISE?

It is important that everyone is open to receiving support from others. Sometimes people can be nervous about speaking up because they are worried about the response they will get. This will be especially true if they are trying to correct the understanding of someone in a supervisory role or talking to someone who is more experienced.

RAISE is a communication 'vehicle' for a subordinate to question or correct a superior if it is appropriate. We can all be mistaken and the last thing we want is for junior members with critical information that could correct a mistake, but too afraid to relay it.

If you are on the 'receiving' side of someone using RAISE, try to recognise it early and respond in a non-confrontational manner.

Supervisors should also consider it part of their job to encourage speaking up when appropriate. Invite feedback in briefing sessions using a 'Monitor Me' statement, for example: 'As we all know anyone can make mistakes and we all want to go home safely, so if you think I'm mistaken, or see me doing anything that may put people at risk, make sure you let me know so I can do it better next time.'

Introducing the use of RAISE into a work area might be a big cultural change at first, but with time and commitment it will have a big impact on how you and your team communicate.

Communication is a skill you need to practise in order to perfect, not just muddle through. Take time to apply some of the techniques discussed and make every conversation the best you can, and maybe we can keep George's laughter to a dull chuckle at work.

References

Daly L., Cheng K., *'Captain we have a problem – The barriers to cabin to flight deck safety communication'*.

2024 Aviation Safety Training Courses

ASO (I) Aviation Safety Officer (Initial) Course	**COURSE AIM:** To graduate Unit ASOs, Maintenance ASOs and Flight Senior Maintenance Sailors.	**PREREQUISITES:** Personnel who are required to perform the duties of an ASO.	**COURSE DESCRIPTION:** The course is delivered as two separate weekly components (the first is online; the second is face-to-face) with a one-week break in between. The course provides theory and practical exercises in the broad topics of the Defence Aviation Safety Management System, risk management, human factors, the Defence Aviation Safety Analysis Model, safety event investigation and reporting.
ASO (A) Aviation Safety Officer (Advanced) Course	**COURSE AIM:** To graduate Base, Wing, Regiment, Fleet, Group and Command ASOs.	**PREREQUISITES:** ASO (I) practical and applied experience as an ASO (or equivalent).	**COURSE DESCRIPTION:** The course provides theory and practical exercises in the broad topics of the Defence Aviation Safety Management System, human factors and risk management, and base/unit emergency response.
NTS Non-Technical Skills Trainer	**COURSE AIM:** To graduate students with the knowledge and skills to deliver non-technical skills training.	**PREREQUISITES:** A solid background in crew/maintenance resource management and/or human factors.	**COURSE DESCRIPTION:** The course provides the theoretical background of aviation non-technical skills and trains students in the skills and knowledge for delivering non-technical skills training. The course also introduces students to scenario-based training and assessment techniques.
AIIC Aviation Incident Investigator Course *Available upon request	**COURSE AIM:** To develop members to support their ASO in conducting aviation incident-level investigations.	**PREREQUISITES:** Any personnel who are involved with Defence Aviation. There is no restriction on rank, Defence civilians and contractor staff are also welcome to attend.	**COURSE DESCRIPTION:** This one-day course provides theory (taken from the ASO(I) course) on the topics of: the Defence Aviation Safety Management System; generative safety culture; error and violation; the Defence Aviation Safety Analysis Model; aviation safety event investigation and reporting. Interested personnel should contact their ASO.

For further details concerning location and up-to-date course dates visit the DFSB intranet site or email dfsbet@dpe.protected.mil.au

All courses are generally oversubscribed, nominations from individual units or candidates will not be accepted, nominations are to be forwarded with the Commanding Officer's endorsement to:

- **Air Force:** the relevant Wing Aviation Safety Officer, or for CSG, Staff Officer Safety HQCSG
- **Navy:** the Fleet Aviation Safety Officer and
- **Army:** Army Safety Section, DOPAW, AVCOMD.

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