



focus on

DEFENCE AVIATION SAFETY REGULATION

**DASR: the need for change from
conception to implementation**



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Foreword

In a significant advancement in aviation management, the Defence Aviation Safety Regulation (DASR) came into effect on September 30th 2016. With its genesis based on the European Military Airworthiness Requirements, the DASR aligns Australia with an emerging international convention on military airworthiness used by around 30 other nations.

By aligning airworthiness regulations with the international system Defence can harness the efficiencies of global supply chains and maintenance options. Civilian partners will be able to more easily exploit ‘blended workforce’ options; increase interoperability; improve two-way recognition of other militaries’ systems and regulations; leverage off best practice in aviation safety arrangements globally; and drive aircraft sustainment costs down.

Defence aviation has a different mission, and therefore different priorities, from commercial aviation. The DASR allows commanders flexibility through the introduction of internationally recognised concepts and organisational structures such as the Military Air Operator. This role simplifies the aviation safety framework by centralising accountability with senior leadership and giving commanders the control and freedom to establish fit-for-purpose, mission-capable, efficient and safe aviation operations.

Fifth-generation Defence Aviation demands a global best practice approach to aviation safety; the Defence Aviation Safety Authority and its DASR are delivering in this regard. On the first anniversary of the formation of the Defence Aviation Safety Authority and the introduction of the regulations, this special edition of *Focus* tells the story of its origins, and how Australia has remained a world leader in military aviation safety.

AIRMSHL Leo Davies AO CSC
Defence Aviation Authority



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Military aviation safety in Australia: a brief history



Members from the RAAF Museum and Aircraft Research and Development Unit, help the Bristol Boxkite replica aircraft across the tarmac as night falls. Photo by CPL Amanda Campbell

By FLTLT Barrie Bardoe

The history of military aviation begins in France in 1794 with the establishment of the French Aerostatic Corps. The corps was charged with using balloons for reconnaissance and observation purposes during the French Revolutionary wars.

Kept afloat by hydrogen, supplied by portable units, this new and cutting-edge capability made its debut at the Battle of Fleurus on 26 June 1794, where the Army of the First

French Republic confronted a coalition army of soldiers from Britain, Hanover, the Dutch Republic and the Hapsburg Monarchy. The French won the day and it is said that the corps and their balloon, l'Entreprenant, played an influential role spotting enemy positions.

On 24 September 1861 a notable first was achieved in the American Civil War, when the balloon, The Union, ascended higher than 1000 feet (300m) near Arlington Virginia and began telegraphing information about the positions of Confederate troops, some three miles (4.8km) away. Union guns were aimed and fired accurately at the Confederate positions with



A replica Bristol Boxkite, built to commemorate 100 years of military aviation in Australia climbs into the morning sky over Point Cook. Photo by CPL David Said

no direct visual contact being made by the gunners. This feat had never been accomplished before and signalled a world of new possibilities.

The American Civil War may also have seen the first military aviation accident when Confederate balloonist CAPT John Randolph Bryan found himself on a free flight after his tether had been cut to free an entangled crew member.

He was shot at by his own troops who thought he was an enemy but eventually returned to earth safely having made accurate notes of enemy positions despite a fast, rotational spin.

From the Australian experience, military aviation began in earnest

when the 1911 Imperial Conference in London decided that the British Empire should develop a military aviation capability. Australia had been introduced to heavier than air flight via a demonstration by renowned escapologist Harry Houdini in 1910 and interest in flying had grown rapidly. After Britain, Australia was the second nation to launch a military aviation capability and throughout 1912 pilots and mechanics were recruited.

In 1913 the government announced the creation of the Central Flying School and the Australian Aviation Corps, which later became the Australian Flying Corps. A suitable location to establish an airfield and training facility was acquired at Point Cook, near

Melbourne and advertising began for pilots and mechanics.

One of the first four pilots recruited was Richard Williams who would go on to become known as the father of the Air Force. But another recruit, Tom White, was to achieve a first that marked the beginning of the journey of military aviation safety in Australia.

The four recruits had begun training in a Bristol Boxkite, a pusher-type biplane, which as the name suggests is literally a huge kite with an engine. It lacked manoeuvrability and could, in reality do little more than rise off the ground and turn gently.

Williams took the first solo flight after less than three hours of

The Australian Flying Corps' first military operation involved a single aircraft being sent to Papua to assist in dislodging colonial German forces.

instruction but with less than two hours under his belt White was keen to impress by landing the Boxkite as close to the hangar as possible. He misjudged and slammed the primitive aircraft into the building. Apart from a bruised ego he was unharmed, but it would prove to be the beginning of a great many military aviation incidents, some of which have ended tragically.

The Australian Flying Corps' first military operation involved a single aircraft being sent to Papua to assist in dislodging colonial German forces. This was followed by a half flight being sent in 1915 to Mesopotamia (Iraq) in the Middle East to help defend British oil assets. Eventually a total of four squadrons would fly and fight over the Western front.

Australia produced 410 pilots and 153 observers for the AFC, who destroyed 527 enemy aircraft and produced 57 flying aces (five confirmed kills or more) in the

process. A further 200 pilots served in British formations, including Australia's highest scoring ace Robert Little who accrued 47 victories serving with the Royal Naval Air Service. But the cost was high. The AFC lost 175 pilots, with 111 being wounded — a casualty rate of around 44 per cent — only slightly less than ground-based infantry formations.

One of the most sobering statistics was a 10 per cent casualty rate during training. We also have no way of accurately determining how many combat losses were because of aircraft failure.

Military aviation developed very quickly in a short space of time. Tactics, doctrine and procedures were being invented as they went along. The First World War was exceptionally brutal with a vast cost in human resources and materiel that can scarcely be imagined today.



A graphic example is that while parachutes were routinely worn by their German counterparts, British airmen were not issued with the life-saving device lest they abandon their post (the exception being those observers in the balloon corps). Notions of military aviation safety were at best in an embryonic form. But sadly the vast improvements in technology in the following decades were often not matched by increased safety.

The AFC had been a formation within the Army and in 1921 Australia followed the lead set by the British in 1918 and established an air force as an independent military arm. Much of the impetus came from the now LTCOL Richard Williams. In 1922 and as a wing commander, he was appointed Chief of Air Staff, and effectively given command of the fledgling air force a position he would hold three times across the ensuing 17 years.

Williams was an ardent proponent of the service remaining independent and encountered considerable resistance, especially as he argued for greater resources.

In 1926 he mandated the use of parachutes by all aircrew and then proceeded to lead by example. While FLGOFF Ellis Wackett is credited with making the first parachute descent in Australia, Williams dropped over Point Cook on August 5, apparently narrowly missing the water tank and a power sub station.

Ironically, Williams leadership of the Air Force was severely damaged by a report on safety written by Marshal of the Royal Air Force, Sir Edward Ellington. In 1937 there had been a series of incidents involving the Hawker Demon aircraft that resulted in a death and four injuries. The press had made scathing attacks upon the Air Force and, along with the report, contributed to Williams being relieved of his position and effectively banished to England.

Ellington's report was, in fact, fairly positive in many regards, especially in his assessment of the engineering and maintenance capability but it was clear that the RAAF was lagging in terms of its overall approach to aviation safety.

In 1926 CAS WGCDR Richard Williams mandated the use of parachutes by all aircrew and then proceeded to lead by example by jumping over Point Cook.



Left: The Duke of York (centre) inspects a Supermarine Seagull III at Point Cook in 1927. To the Duke's right is CAS GPCAPT Richard Williams.

Below: The Duke of York with CAS GPCAPT Richard Williams and WGCDR Rolf Brown. Image courtesy of the Australian War Memorial. AWM A04579.





A3-2 Mirage III of ARDU, inverted near Woomera. It is fitted with pylon and six MK82 500lb bombs.

Williams championing of the Air Force had also attracted plenty of opponents, which contributed to his fate. He was later promoted to the rank of Air Marshal – the first Australian to achieve this rank – and he continued to serve with distinction until 1946 when he was forced to retire but he never again led the Air Force.

During WW2 the Air Force grew rapidly and by war's end it was the fourth largest such force in the world with some 37,000 aircrew having served, and more than 7000 aircraft. The Technical Services Branch oversaw engineering and maintenance activities and is generally regarded as having performed very well.

"Whatever its shortcomings the Technical Services Branch in its defacto wartime guise as the Technical List, did a remarkable job during the Second World War. It expanded successfully to provide the essential maintenance effort needed to support aircraft operations on a worldwide scale ... technical excellence and a readiness to adopt advances in military aviation technology, was one

of the hallmarks of wartime RAAF success." (Grantham/Bushell, 2003)

It is a sobering thought however, that 2832 air crew were killed during training in Australia with a further 724 killed training in Britain. This is a similar rate of loss as for WW1 and it is likewise difficult to assess how many combat losses may have been because of aircraft failure as well. The sheer carnage of the war made these sorts of losses evade the kind of scrutiny Williams came under during peace time.

In 1948 Technical Services was recognised as a separate branch of the RAAF. Post-war military aviation continued to be a dangerous business in the 1950s and '60s with the introduction of the first generation of jet-powered military aircraft -- the notion of aviation safety remained mired in the past.

Post war the RAAF decreased in size rapidly and technical expertise atrophied. By the time of the Korean war in 1950, the Air Force was in a similar position to the pre-war period, with obsolete aircraft, not enough personnel and pilots and a technical capability that was

severely stretched. In following decades the Air Force's approach to airworthiness issues would not progress much beyond the wartime experience, eventually leading to a crisis point.

Tom Wolfe, author of *The Right Stuff* cites US Navy statistics that indicate that across a 20-year career in the post-war period, a US Navy pilot had a 23 per cent chance of dying because of an accident and this did not even include combat deaths. To give an example of an individual aircraft type, of the 3947 Gloster Meteors made, 890 were lost in crashes that resulted in 444 aircrew deaths.

The Royal Canadian Air Force fleet of Starfighters experienced 110 crashes and 37 pilot deaths. An attrition rate of around a quarter of a fleet was fairly standard for the first two generations of jet-powered military aircraft, although the Supermarine Scimitar had the distinction of an attrition rate slightly above 50 per cent, as did Indian MIG 21s built between 1966 and 1984 – more than half of the 840 strong fleet crashed and since 1970 170 Indian pilots and 40 civilians have been killed. It could be argued that military aviation had never been so dangerous.

The Australian experience was only marginally better. Of the 116 Mirage 3's operated by Australia, more than 40 crashed resulting in the loss of 15 aircrew and one civilian. Since 1980 the ADF has lost 89 aircraft, although the F/A 18 fleet has a far better record with four crashes out of 75 aircraft and none since 1992. However the ADF reached a crisis point towards the end of the 1980s and early 1990s, with the loss of six aircraft in just one year in 1991 and a dozen lost in the decade leading to 1993.

The factors that contributed to this crisis are varied and at times enigmatic. While approaches to military aviation safety during the 1950s might be described as business as usual, based upon the lessons learnt during WW2, it was becoming very obvious that jet aircraft presented a very different range of challenges.

Part of the problem was operator culture. There was an expectation that pilots would push the envelope and absorb levels of risk in attaining operational readiness that seem foolhardy by today's standards – it was the cost of doing business and it seems that every air force simply accepted an attrition rate as part of this cost. In Australia there were deeper organisational and structural issues that also contributed. In the 1970s there was no agreed definition of military airworthiness and technical roles were broken down into specialisations that operated in increasing isolation.

WGCDR Stewart Nicol, a specialist from the Defence Aviation Safety Authority, says there were problems of stovepiping and a lack of a co-ordinated and an overarching approach to how the knowledge base was managed.

There was no type certification and when an aircraft was delivered from the manufacturer, the technical information was often sparse, with maintenance schedules then being devised in consultation with industry. Aircraft were often serviced until failure, based upon a fairly minimal instruction set. Aspects of how airworthiness was approached might best be described as ad hoc.

It wasn't until 1984 after AVM Tony Deets had challenged the engineering cadre to agree to a definition of military airworthiness that a workable and agreed upon

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By the 1980s the public's expectation of aviation was that it was consistently safe and civilian authorities were delivering

definition emerged. Sadly AVM Deets died in service that year but he provided an important impetus. However, real change only came on the back of multiple tragedies and the written equivalent of a hand grenade lobbed into the engineering organisation by a senior officer.

AIRCDRE Rusbridge's letter dated March 1992 from Headquarters Logistic Command, contained some of the most scathing language imaginable. He stated "we have lost our way" and "there are many ghosts haunting this organisation -- the trouble is that most of them are not dead ... most people would not relish being part of an organisation which is regarded as a management basket case ... this headquarters has had a poor reputation for years ...".

In seeking to uncover underlying problems, he listed many issues including: sloppy contracting, with contracts that are technically un-executable without amendments; lack of knowledge, let alone understanding of the seminal data bases; serious mistakes in fatigue life calculation; no idea of a coherent and defensible modification policy; 'an almost complete lack of configuration management, and confusion over what should be clear lines of airworthiness authority.

He concluded that "the overall picture is of crisis management, together with neglect, if not abandonment of the fundamentals of engineering management. At the same time, I am encountering a turbulence and a refusal to admit error which smacks of closed minds and which is very disturbing to behold".

He was also disturbed by "declining experience levels" and

concluded that "flight safety is on the line" and that these problems were now being "reflected in the accident statistics of the RAAF". He charged the engineering branch with being ossified and moribund, having changed little in the past four decades, and demanded it as an absolute requirement that the organisation "lift our game".

The general public's expectation of aviation by the 1980s was that it was consistently safe and civilian authorities were delivering in this regard. It was clear that it was not an option for a peacetime military to sustain such losses and a proactive approach to military airworthiness was essential. AIRCDRE Rusbridge's letter articulated a vast range of deep structural issues with how the Air Force approached airworthiness, and what he termed "mission readiness". Change on a massive scale was no longer optional.

In July 1993, a draft of a document entitled Blueprint 2020 was delivered by the RAAF Engineering Planning Team. This resulted from a call to establish a team and develop approaches to confront the issues facing Air Force engineering and devise a comprehensive strategy to deliver world-class engineering support to Australian military aviation.

"Australian defence policy is to maintain a technological edge. In employing air power the commander needs to have at his disposal the technical ability to overcome equipment deficiencies and exploit technological opportunities. Throughout the history of the RAAF its commanders have enjoyed the advantages that technical independence brings.

Blueprint 2020 -Engineering the

Future examines the nature of this independence, and explores what is needed to ensure continuation of its essential features in the face of constant change both now and into the future".

The report called for a great deal of change, while being mindful of existing and possible future resource constraints. The establishment of an integrated technology support organisation, greater co-operation with industry partners, decentralisation of some engineering and technical functions to FEG and squadron levels and an overarching and agreed upon approach to airworthiness defined some of the strategies outlined. It was a comprehensive document designed to provide a framework for mitigating the deep organisational and cultural issues that had plagued military aviation engineering in Australia.

In the early 1990s the ADF delivered what was then world leading approaches to military airworthiness, the Technical Airworthiness Regulations (TAREGs). TAREGs were intended to provide a comprehensive framework for regulating airworthiness in ADF aviation, and they proved to be very

successful, ushering in an era of vastly safer military flying.

At the time they could be considered world leading. As the 1990s progressed, additional elements were added and the notion of operational airworthiness came into being. This terminology related to how operators made decisions regarding flight safety in an operational context – a situation that differs markedly from civilian use. As new issues emerged, band aids were added and it started to become increasingly clear that a standalone system that was unique to Australia was becoming harder to defend.

Australia's commitment to joint coalition operations made interoperability vital and yet the ADF's airworthiness language differed markedly from partner nations, creating

translation issues and impacting sustainment and maintenance options.

By the second decade of the century it had become clear that once again Australia would need to undergo major change if it was to retain a safe approach to military aviation.



Airworthiness

the past, the future and the need for change

By SQNLDR Ulas Yildirim and FLTLT Barrie Bardoe

A significant issue with a bespoke airworthiness system, like Defence had with the TAREGS, was the need to translate regulations each time a new aircraft was acquired and even for aspects of sustainment and maintenance.

With more maintenance and engineering being outsourced to industry and the increased use of civilian-based platforms, the problem was worsening, creating mounting expenses and significant logistical issues. It was calculated that the TAREG system was up

to 30 per cent more expensive to operate than civilian equivalents.

The ADF's system also used terminology and constructs unfamiliar to other nations and its industry partners.

As problems and deficiencies emerged, it became clear that taking contemporary ideas and trying to affix them to the existing regulations was a band-aid approach that could not continue indefinitely.

In 2012 the Directorate General Technical Airworthiness – ADF acknowledged that because of an inability to further rectify the

then extant regulatory suite it was necessary to establish a regulatory reform programme to explore other options.

The options included continuing with the bespoke regulatory suite, making no changes; combining with the Civil Aviation and Safety Authority (CASA) by adopting CASA regulations; establishing an aviation safety system aligned with the International Civil Aviation Organisation (ICAO), which would create another bespoke system; or adopt an emerging military convention in airworthiness regulation - the European Military Airworthiness Requirements (EMAR) already in use by more than 30 countries.

Following the review in September 2013, the Air Force Board noted the current Defence airworthiness regulations no longer represented best international practice and directed DGTA and Director Airworthiness Co-ordination and Policy Agency (DACPA) to “provide CAF with a brief in December 2013 (outside the AFB committee process) that recommends migration of the current airworthiness regulations to a more efficient and contemporary military airworthiness regulatory system over the next five years”.

Accordingly, 30 September 2016 marked a seminal moment in Defence aviation safety with the introduction of the Defence Aviation Safety Regulation (DASR),

aligning Australia with an emerging European-based convention, and the formation of the Defence Aviation Safety Authority (DASA).

DASR based on EMAR represents their purest form in implementation meaning that recognition of other Military Airworthiness Authorities is conducted much more efficiently allowing for DASA to be able to conduct quick and simple recognition of other MAAs based on DASR. Director General Defence Aviation Safety Authority AIRCDRE James Hood says “by aligning airworthiness regulations with the European system we can harness the efficiencies of the global supply chain and maintenance options; increase interoperability; allow civilian partners to more easily exploit blended-workforce options; improve mutual recognition of the approvals and certifications provided by other military and

civilian airworthiness authorities for common aircraft types; exploit contemporary improvements in aviation safety arrangements globally; and drive aircraft sustainment and aircraft costs down.”

DASR recognises that military airworthiness requirements are different to their civilian counterparts and have flexibility built into the suite to cater for unique military operational requirements. This allows a commander to operate outside the system of certification in satisfaction of national objectives while continuing to ensure that hazards to people are eliminated or minimised so far as reasonably practicable.

Air Commander Australia AVM Steve Robertson says the relationship between the Military Air Operator (MAO), System Program Office and industry is strengthened under the new construct.

DGDASA AIRCDRE James Hood, delivers a presentation at the inaugural International Military Airworthiness Regulation Conference. Photo by Robert Palmer



FSFT Reece Dufty, 292 SQN, checks the condition of the propellers during a pre-flight inspection of an AP-3C Orion before a tactical training sortie. Photo by CPL David Cotton

DASR

a global solution
to airworthiness

The Royal Australian Air Force's first P-8A Poseidon flies in formation with a current AP-3C Orion and past No 11 Squadron aircraft including the Lockheed Neptune and Catalina.
Photo by CPL Craig Barrett

By FLTLT Barrie Bardoe

The next step in the drive for excellence in Defence aviation safety began with the implementation of the Defence Aviation Safety Regulation (DASR) on 30 September 2016.

This new regulatory system brought Australia into alignment

with an emerging European convention being implemented by around 30 other countries — and Australia and the ADF are leading the way in its adoption.

DASR replaces the previous bespoke system — one that was unique to Australia and affects Defence aviation organisations and its civilian industry partners. The move to DASR represents the single biggest change in Defence

This allowed feedback and comment from stakeholders as well as assisting with planning for implementation by Defence and industry partners.

A review of all Defence aviation platforms was completed in July 2016, and the first phase of implementation began at the end of September.

DASR is being implemented under a two-phase strategy to treat risks associated with a rushed implementation and others that might emerge during transition.

The first phase sees Defence organisations and selected industry partners implementing the DASR, while the second phase is different for each aircraft type and allows organisations to explore the benefits at a rate with which they are comfortable. Full implementation for Defence and industry partners is expected by 30 December 2018.

Former Director Airworthiness Coordination and Policy Agency (ACPA) GPCAPT Dave Flood says the new regulations combine technical and operational aspects.

“Having both in the one place will make it easier for everyone,” he says. “The operational regulations use the European framework but will allow commanders the freedom of decision that is required for operations.”

The implementation has progressed smoothly with organisations migrating to the DASR with minimal impact to existing management plans, contracts, and organisational structures.

The technical DASR is published electronically, enabling easy cross referencing between regulations and guidance material.

There are many benefits to the new system. Director General Defence Aviation Safety Authority AIRCDRE James Hood says that by aligning airworthiness regulations with the European system the ADF can harness the efficiencies of the global supply chain and maintenance options; increase interoperability; allow civilian partners to more easily exploit blended-workforce options.

It can also improve mutual recognition of the approvals and certifications provided by other military and civilian airworthiness authorities for common aircraft types; exploit contemporary improvements in aviation safety arrangements globally and drive aircraft sustainment and aircraft costs down.

“The current regulations have kept us safe for around 20 years,” he says, “but it is no longer feasible or desirable to maintain a bespoke system. By aligning with global best practice we derive many benefits, and further enhance military aviation safety going into the future.”

DASR promotes mutual recognition and interoperability with civilian and military design and maintenance organisations and the many benefits have attracted strong regional interest.

It is anticipated that many of Australia's regional partners will now also align with DASR, underlining Australia's commitment to constant improvement, and world leading excellence in Defence aviation safety.

The Military Air Operator

Changes to terminology and clarification of roles and accountabilities assists with global recognition and a smooth transition to the new airworthiness regulatory set.

By FLTLT Barrie Bardoe

From 30 September 2016 the new Defence Aviation Safety Regulations (DASR) aligned Defence aviation with an emerging European-based convention on military airworthiness, a system used by about 30 other nations.

As part of this, some terminology changed and roles were clarified, particularly in regard to accountabilities for flight safety.

To facilitate global mutual recognition and transition to contemporary regulatory best practice, Defence has adopted the new regulatory system, and part of this is the concept of the Military Air Operator (MAO).

DASRs simplify the aviation safety framework by centralising accountability at the lowest level — the MAO. Aviation safety is a capability enabler and an integral accountability of command.

Left: Commander Air Force Training Group AIRCDRE Geoff Harland at the inaugural International Military Airworthiness Regulation Conference in Melbourne. AIRCDRE Harland spoke on the importance of the globally recognised concept of the Military Air Operator, which clearly states the accountabilities that a commander of aviation assets holds in relation to managing safe and effective flight operations. Photo by Robert Palmer



The introduction of the MAO clarifies this accountability and gives MAO accountable managers (which will typically be Force Element Group commanders or equivalents) the control and freedom to establish fit-for-purpose, mission-capable, efficient and safe aviation operations.

The central role of the MAO offers considerable leverage to ensure maintenance, design, and training organisations meet the MAO's requirements.

Introduction of the MAO addresses current gaps in regulatory oversight by regulating at the one-star aviation commander level, aligning regulatory oversight with the organisation more directly accountable for the aviation safety and continuing airworthiness of each aircraft type.

While regulatory accountabilities are targeted at the MAO, DASR does not subordinate or undermine command accountabilities. It emphasises the centrality of command in making capability decisions; ensuring safety and imposing common systems for the purposes of command, governance and interoperability.

Aviation safety is a command responsibility and while the Defence Aviation Authority (Defence AA) is responsible for assuring aviation safety through the establishment of a framework for the management of aviation safety risks within Defence, commanders are accountable for ensuring that aviation safety hazards/risks are eliminated or otherwise minimised so far as is reasonably practicable.

Historically, these obligations

and accountabilities have been confused because of the appointment of an operational airworthiness authority (OAA) in the command chain. DASR addresses these long-standing issues and reinforce the centrality of command in discharging aviation safety responsibilities.

Commander Air Force Training Group AIRCDRE Geoff Harland says the Military Air Operator regulations clearly state the accountabilities that a commander of aviation assets holds in relation to managing safe and effective flight operations.

"It makes it significantly more clear what I need to do as a commander in delivering air power capability and as a Military Air Operator to ensure flight safety," he says.

AIRCDRE Harland says that in terms of safe flying operations, the new regulations' intent is exactly the same as the previous regulations. The new regulations, specifically the MAO concept, clarify accountabilities and acknowledge the primacy of command in balance with the military air operator's requirement to ensure safe operations.

"Since Defence introduced its original regulations, which were arguably leading edge at the time, global standards have developed and overtaken existing ADF safety programs and regulation," AIRCDRE Harland says

"As an MAO, we will continue with safe and effective flight operations, it is just expressed in terms of globally understood structures and terminology.

"The accountable manager of the MAO is the FEG commander,

who is responsible for delivering capability in accordance with the Air Commander's direction as well as ensuring safe flight operations, ably supported by an aviation safety program that has all the elements you would expect with clear accountabilities," AIRCDRE Harland says.

AIRCDRE Harland says the introduction of MAO also offers opportunities for greater alignment with civil and military aviation authorities in future should the opportunity arise as well as a simpler and more effective structure.

The concept of the MAO is part of an integrated approach to military aviation safety, which aligns with global best practice, and reinforces Defence commitment to being at the cutting edge.

AIRCDRE Harland is an Air Combat Officer, whose background includes flying and commanding F-111's at 1SQN and Officer Commanding 82WG, where he oversaw the Super Hornet achieve final operational capability.

He has worked for the Civil Aviation Safety Authority as a senior manager and has been Director, Airworthiness Co-ordination and Policy Agency.

"As an MAO, we will continue with safe and effective flight operations, it is just expressed in terms of globally understood structures and terminology."

Continuing airworthiness

The Continuing Airworthiness Management Organisation is a new construct in line with the ADF's quest for global best practice



Aircraft maintenance personnel assist the pilot of an F/A-18A before participating in a mission over the Northern Territory as part of Exercise Arnhem Thunder. Photo by SGT Rob Mitchell

By FLTLT Barrie Bardoe

On 30 September 2016 the next stage in the evolution of Defence aviation safety began with the adoption of the Defence Aviation Safety Regulations (DASR). The new regulations bring Australia into alignment with an emerging European convention being implemented by about 30 other countries, and Australia is leading the way in its adoption.

Part of this is the use of terminology and organisational concepts that are familiar to the global military aviation community such as the Continuing Airworthiness Management Organisation (CAMO).

FLTLT Cameron Shuck, DASA, says the ADF's previous airworthiness regulation structure centralised around approved maintenance organisations and authorised engineering organisations conducting maintenance and providing design changes respectively.

"There are several other functions required to keep aircraft airworthy [safe to operate] that were not explicitly regulated and were being conducted by these organisations through the good will and professional relationships

established between operators, engineers, and senior technical staff. These functions include configuration management, fleet planning, capability upgrades and maintenance co-ordination," he says.

WGCDR Jason Dean, DASA, sees considerable benefit in having these functions clearly defined under the one organisation.

"Contemporary better-practice regulation grips up these requirements, regulates them and assigns the responsibility of their conduct to a single entity," he says.

"This entity is known as a Continuing Airworthiness Management Organisation (CAMO). The CAMO ensures these functions are conducted on behalf of the Military Air Operator (MAO), the operating organisation for the air vehicle. It resides within the MAO and hence works closely with operators to meet capability and operational requirements," WGCDR Dean says.

"The primary function of the CAMO is to ensure the aircraft

continues to remain airworthy. This is collectively known as continuing airworthiness management. It does this by managing the fleet of aircraft, tasking and contracting maintenance organisations to conduct the required maintenance, and consulting design organisations to provide repairs and modifications.

"The CAMO combines the previously disparate disciplines of technical, operational, and logistical management to deliver an outcome that focuses on maintaining flight safety for an aircraft and delivering capability to the MAO".

Director Logistics Capability, the Continuing Airworthiness Manager for HQ Air Combat Group GPCAPT Daniel Reid is a strong advocate of the new approach to managing airworthiness.

"Implementing a new airworthiness regulatory framework across Air Combat Group has taken considerable effort and has not been without its challenges but the investment has been worth it," he says.

"To formally align the accountabilities to where they should be — with the FEG commander, via a CAMO embedded in the FEG HQ is a great improvement. The accountabilities will now be significantly simplified and clearer.

"Under DASR, we have transitioned 10 different approved maintenance organisations into a single maintenance organisation and replaced four maintenance management plans with a single maintenance organisation exposition. These are just minor examples of reduction in overheads that DASR implementation brings. ACG will also benefit from greater standardisation and flexibility associated with a single regulated maintenance organisation for all of ACG."

The CAMO is another element of the new internationally focused airworthiness regulations, which helps the ADF achieve congruence with global conventions, and makes the work of maintaining aircraft simpler.



A Royal Australian Air Force F/A-18A Hornet sits on the flight line of Australia's main air operating base in the Middle East Region. Photographer: CPL Nicci Freeman

IMARC: the globalisation of airworthiness



By FLTLT Barrie Bardoe

DASA hosted the International Military Airworthiness Regulation Conference (IMARC) in November 2016, which provided a global forum to discuss the benefits of aligning with an emerging global convention on military airworthiness.

The ADF is leading the charge towards a new global convention on military airworthiness. With the release of the Defence Aviation Safety Regulations (DASR), Australia has moved from a standalone system to aligning with a European-based convention used by about 30 nations, with more set to come onboard and the inaugural

International Military Airworthiness Regulation Conference (IMARC) provided a forum for international partners to better understand the considerable benefits of a global approach.

The IMARC – which was held on the 14 and 15 November 2016 in Melbourne – provided a forum to look at the many benefits of the global convention including the reasoning behind moving from the old standalone system and the lessons learnt from other organisations that have adopted it.

Attendees included representatives from the US, NATO, France, China, Turkey, Germany, Indonesia, Cambodia, Italy and Britain, as well as a wide range of industry partners.

It gave international stakeholders an opportunity

Above: Speakers, delegates and representatives from the first IMARC. Some 600 people from more than 25 countries attended the two-day conference in Melbourne.

Photo by Robert Palmer

to compare notes and better understand the Australian experience, which has seen a world-leading level of adoption of the European system, which is 95 per cent based on its civilian equivalent.

Head Aerospace Systems Division at Capability, Acquisition and Sustainment Group AVM Catherine Roberts saw the promise of a globally based military airworthiness convention as a challenge that should be enthusiastically embraced.

“By making a rational choice on regulation we can leverage global supply chains and support, to extend our global reach,” she said.

“New technology is challenging our thinking ... a global regulation convention will provide a benchmark against which we can be measured.”

AVM Roberts likened the new convention to a team event and challenged attendees to embrace the considerable opportunities it afforded with a team mindset.

“My challenge to you is to make a choice to be an active participant in this global military aviation community,” she says.

“I urge you to be part of the team so that we can achieve the benefits of international military aviation regulation”.

Chief Engineer Boeing Defence Australia Stephen Hudson described how his company has been an enthusiastic early supporter of DASR.

“We have embraced the DASR and we’re excited about the benefits of the flexible outcome based regulation to our global business,” he says.

“Boeing made a decision very early on that we would take a lead role in the DASR transition. We gained an in-depth understanding of the DASR and worked in close partnership with the Defence Aviation Safety Authority (DASA) to provide strategic industry advice and guidance on potential challenges and how we might solve them.

“This collaborative approach, where Defence has been able to rely on industry to provide subject matter expertise, has been a tremendous success

and is helping to prepare for the continued smooth transition to the new regulations.

“At Boeing we believe in a world that requires more from less. That we can move towards a future in military aviation where the DASR allow us to embrace the offered flexibility and efficiency, to provide unprecedented capability enhancement and support to the ADF, while improving upon the established level of aviation safety. We can imagine that world under DASR.”

Director General DASA AIRCDRE James Hood says IMARC provided a unique opportunity for international military and industry partners to come together and explore the benefits of an emerging global convention on airworthiness.

“It is an exciting time for Australian Defence aviation with global attention now focused on Australian recognition activities with partner nations,” he says.

German Military Aviation Authority MAJGEN Dr Ansgar Rieks says there is a definite need for clear harmonised requirements during multinational procurement, delivery, operations and sustainment.

“A global military airworthiness convention establishes a new culture of mutual trust and transparency where nations still maintain their sovereignty.

Recognition is a business card for each nation. In a century of budget constraints and limited people, a consistent global aviation military safety regulation convention is not an option, it is a must,” he says

Major General Yom Som of the Royal Cambodian Air Force

says, “For me, as well as the Royal Cambodian Air Force, this conference was the chance for us to be considerably more involved in to the world's air-force affairs, mainly in the areas of rules and safety regulation.

In this regard the Cambodian Air Force found itself as the new comer and we need to work harder before getting a final outcome.

“However, I'm maintaining a high value from the conference's outcome, because I do believe that a similar conference in either form or size will be held in the future no matter where in order to provide the world's Air Forces with sophisticated and affordable safety regulation.

“We have also been impressed with our Air Force's role in the International Air Force community through the IMARC. I think the Royal Cambodian Air Force has to engage in order to learn about their military airworthiness regulation, (MAR) which would be valuable for our future.

“At the conference forum I found that the presentation made by the Royal New Zealand Air Force regarding their MAR impressed me because of its size and shape, and these two Air Forces having several similar points.

“Finally, I still hope that the common implementation of EMAR if it is possible, is the key toward the future sharing between the world's military aviation community of experiences and interests in many areas such as education and training, and aviation engineering as well.”

Airworthiness boards: continuing a safety tradition

Airworthiness boards provide Defence with an holistic approach to military aviation safety by drawing on the extensive experience provided by senior Air Force aircrew and engineers.

Defence rolled out the new Defence Aviation Safety Regulation (DASR) in September 2016, to align with an emerging international convention used by about 30 other militaries.

Airworthiness board members and key stakeholders met in Canberra in July 2017 to discuss key issues and the role airworthiness boards will take within the new regulatory framework. With Defence's commitment to aviation safety, airworthiness boards will continue to provide continuity and oversight of airworthiness issues for each aircraft platform into the future under the DASR framework.

AVM Robert Treloar says airworthiness boards provide an executive review of the

management of Defence aviation safety matters for aircraft and aviation systems that report to the Defence Aviation Authority.

“The Board process continues to be a cornerstone of the Defence Aviation Safety Framework,” he says.

To identify issues and formulate questions, presentations are provided to board members on areas of particular interest, issues of concern and areas where there are ambiguities or new concepts that need further clarification.

AVM Treloar says the reduction of aircraft accidents and serious incidents across the past 20 years can be attributed in no small way to the activities of the airworthiness system and the ongoing conduct of airworthiness boards, enabling the ADF to effectively conduct air operations.

“Airworthiness boards continue to provide a valuable service supporting Defence aviation safety for the foreseeable future”.

AIRCDRE Noel Schmidt says he is very pleased to see continuation

of airworthiness boards under the new DASR regulatory suite.

“This continues the important role identified when the first airworthiness board was setup over 25 years ago in 1991 of providing CAF, in his role as the Defence Aviation Authority, a rigorous and independent review of the operational and technical elements of each aircraft platform,” he says

“Airworthiness boards form an important part of the assurance process for the conduct of safe flying operations and represent continuation of a key element of the old regulatory suite to the new”.

The retention of airworthiness boards continues the executive review of airworthiness management of aircraft and aviation systems and provides y FEGs an opportunity to formally review the effectiveness of their procedures while providing feedback to the Defence Aviation Authority.

As a cornerstone of the Defence aviation safety framework, airworthiness boards will continue into the future.



Le Bourget Momentum

DASA signs historic agreement between international military airworthiness authorities

The Defence Aviation Safety Authority (DASA) continues to leap to new heights to deliver a number of firsts since its establishment on 30 September 2016.

Since that seminal moment and, with the implementation of the Defence Aviation Safety Regulation (DASR), DASA has been recognised internationally as the first non-EU nation to implement DASR based on European Military Airworthiness Requirements (EMAR), — their purest form in implementation.

In November 2016, building on its expertise through Defence's two-decade drive for excellence in aviation safety DASA hosted more than 650 international participants at the International Military Airworthiness Regulation

Conference (IMARC) in Melbourne. It was there that some of the world's most powerful Military Airworthiness Authorities (MAA) openly discussed ideas of airworthiness recognition, co-operation and participation out of which the *Le Bourget Momentum* was born.

Le Bourget Momentum represents the French MAA's vision by promoting co-operation in aviation safety through airworthiness recognition among international MAAs — a lofty goal to say the least. So, it was no surprise when, in May 2017, DASA was the first Military Aviation Authority to be invited by the French MAA to participate in *Le Bourget Momentum* among a host of 18 MAAs representing the most forward thinking and proactive MAAs in the world. The momentum, signed at the 2017 Paris Air

Show, encapsulates the will of the participating MAAs to improve the use of airworthiness recognition as a substantial contributor to deeper international defence co-operation.

The development and implementation of EMAR by more than 30 countries was the first step in increasing the ability of countries to more readily recognise each other's efforts in managing aviation safety. Australia's implementation of EMAR in DASR places Defence in a unique position in being able to provide Australia with many benefits, such as harnessing the efficiencies of global supply chains and maintenance options including allowing civilian partners to more easily exploit blended-workforce options, increased interoperability, improved two-way recognition of other militaries' systems and

regulations, leverage off best practice in aviation-safety arrangements globally, and driving aircraft sustainment costs down.

The French MAA's initiative recognises these benefits and aims to assist participating MAAs in achieving them. As the director of the French State Aviation Authority General Labourdette says, "collectively we need to seize the opportunity of the Paris Airshow to underline our common will to improve together the efficiency of the recognition processes ... to get the most benefit from military airworthiness".

The momentum highlights the need to realise the benefits of recognising other airworthiness authorities, based on an agreed, internationally recognised military airworthiness requirements. The organiser, Colonel Stéphane Copéret of the French State Aviation Safety Authority, acknowledged that the official signing of *Le Bourget Momentum* during the Paris Airshow was a great success and that Australia was first among the nations that adhered to the dynamic.

Director General Defence Aviation Safety Authority Air Commodore James Hood, summarised the benefit saying "Increased recognition against the emerging international convention in military airworthiness simplifies global acquisition and sustainment arrangements, and also increases the level of interoperability between our respective militaries," he says

"Additionally, recognition provides the necessary evidence that a MAA is considered competent in fulfilling its responsibilities by independent and international peer organisations."

As support arrangements become more global in nature, such as with the Joint Strike Fighter, it is paramount that MAAs work closer and smarter to achieve their aviation safety goals.

Accordingly, *Le Bourget Momentum* represents a significant leap forward for the signatories and the broader international military airworthiness community. So, in the very near future don't be surprised to come across a USAF JSF being maintained by RAAF maintainers at an overseas coalition base using spares overhauled in Europe.

Exploiting the products of other authorities

Recognition enables the ADF to exploit the products of other military airworthiness authorities and serves as a valuable platform for sharing best practice.

One of the principles underpinning aviation safety in Australia is that the design, production, maintenance and operation of aircraft are regulated and overseen.

In the ADF these functions are fulfilled by the Defence Aviation Safety Authority (DASA) in its role as Australia's National Military Airworthiness Authority (NMAA). However, the increasingly global nature of aviation-platform-support networks means that many of the products and services sought by DASA's regulated community are already overseen by other airworthiness authorities.

Earlier this year a series of workshops were held to support DASA's recognition of the French, Spanish and Italian NMAAs and at the same time promote the recognition of DASA by its Dutch, Norwegian, Danish and Turkish counterparts. Each of these engagements was positive and the relationships developed enable DASA and other NMAAs to maintain a productive dialogue with each other, reducing unnecessary duplication.

To recognise another airworthiness authority, DASA must develop a robust understanding of that authority's competence and capability as well as the regulations it applies. This understanding is gained through the formal exchange of information at recognition workshops. These workshops provide a valuable opportunity for DASA to develop relationships with other airworthiness authorities. A recent example of this was the engagement of DASA by the Canadian Department of National Defence to support recognition of DASA by the Canadian NMAA.

If the regulation and oversight applied by another authority are acceptable, that authority's products — its certification of designs and its approval of maintenance and production organisations — may be leveraged upon. This recognition avoids the duplication of oversight activities and is applied by civil and military airworthiness authorities around the world.



ADF takes Route 66

The introduction of DASR 66 licensing sees technical personnel benchmarked against international standards

By FLTLT Barrie Bardoe

The ADF currently has a very strong learning and development system for the respective Services' aviation technicians based on attaining Australian Units of Competency, experience and demonstrated performance — this does not change.

DASR 66 will see the adoption of a globally recognised licensing standard for technical personnel.

These licences will consist of core privileges and extensions depending on individual's qualifications, training and experience. Personnel will not be required to undertake additional training and will still undertake the same jobs they are authorised to do after September 2018 without disruption.

In cases where there is a particular skillset lacking with regard to DASR 66 requirements, individuals will still be licensed but their licences will have limitations (exclusions) reflecting the missing skillset.

DASR 66 licensing allows the Defence aviation technical workforce to be benchmarked against recognised criteria.

For maintenance, DASR 66 represents a great opportunity, allowing technician skills to be recognised in the wider, global aviation community.

It also enhances possible military/civilian blended-workforce approaches and enhances sustainment and supply options. A common licensing approach is also a win for personnel on deployment — and increasing issue as Defence undertakes operations with coalition partners.

The Defence Aviation Safety Authority (DASA) is set to commence issuing draft licenses to eligible individuals

from mid 2017. They will need to be reviewed for accuracy with the assistance of supervisors. Any inaccuracies can be reported to DASA before an individual's Military Aircraft Maintenance Licence is issued for September 2018.

With close alignment between DASR and the Civilian Aviation Safety Authority's (CASA) Regulation, recognition between DASA and CASA is underway.

One of the outcomes of this work is that CASA will recognise DASA-issued Military Aircraft Maintenance Licences (MAML) and DASA will recognise CASA-issued licences, allowing blended workforces on both civil and Defence aircraft within one commercial entity — supporting the emergence of a single aviation sector in Australia.

This is another part of the journey towards the ADF being fully integrated into a globally recognised system of military airworthiness.



DASA: three goes into one

By FLTLT Barrie Bardoe

September 30, 2016 was a significant date for Defence aviation in more than one way.

It marked the transition to the Defence Aviation Safety Regulation (DASR), and it also saw the inception of the Defence Aviation Safety Authority (DASA), which incorporated the three existing Defence aviation safety agencies into a new body that more closely conforms to internationally recognised organisational structures.

From October 2016, DASA became an integrated military aviation safety organisation consisting of seven directorates — the Airworthiness Coordination and Policy Agency; the Directorate of Defence Aviation and Air Force Safety; Directorate of Business Support and Improvement; Directorate of Aviation Engineering; Directorate of Aviation Regulation; Directorate of Aviation Certification

and Directorate of Aviation Compliance.

DASA Director of Aviation Engineering GPCAPT Joe Medved said the change provided scope for removing stovepipes between the three agencies, improving efficiency by utilising common business systems, and providing greater consistency.

“By seeking global recognition we focus more on being an exemplar military aviation safety authority,” he said.

“An integrated authority makes it easier to identify and resolve gaps in our functions and helps focus us on tasks that cross agency boundaries.”

DASA will enable increased engagement across the seven directorates; provide a more integrated approach to regulation and common administrative systems.

Much of the effectiveness of any approach to aviation safety is dependent on analysis of data from common systems which will

be easier with the one authority. DASA will provide a more cohesive approach consistent with an exemplar aviation authority. It will provide greater transparency to commercial and international organisations, and increased engagement with civil authorities such as CASA.

It will also enhance engagement with military authorities, and increase mutual recognition of other aviation authorities and frameworks. The simplification of international global recognition activities inherent in the new structure is a strong advantage.

DGDASA AIRCDRE James Hood, says the new Authority will strongly support the success of the new regulatory system.

“Greater alignment and less duplication will improve efficiency”, he says.

“We can expect improved clarity across the seven directorates, and we will have a framework in place that will support mutual recognition of other organisations, products, and services internationally”.



