



Air Force

Capability Guidebook

2020





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An electronic version of this guide can be found at the Air Power Development Centre's website:
www.airforce.gov.au/airpower



FOREWORD

As we approach the 100th birthday of the Royal Australian Air Force, it is fitting to reflect on the extraordinary development of Air and Space power since Australians first took to the skies. This 2020 edition of the *Air Force Capability Guidebook* is intended to showcase the diverse capabilities employed by Air Force in support of Australia, its national values and its interests.

This guide aims to provide an understanding of Air Force's value proposition in contributing to the security of the Australian people, our regional neighbours, and global partners in an increasingly challenging and dynamic strategic environment.

As a component of the Joint Force, Air Force is regularly called upon to partner with other government agencies, allies, and coalition partners, and the information contained in this guidebook is intended to inform and assist understanding of the myriad ways in which the Royal Australian Air Force is postured to provide responsive, agile and potent Air and Space effects across the operational spectrum, from cooperation to high end conflict.

On the eve of our 100th year, this book charts how far we have come since our earliest days operating from the paddocks of Point Cook; but technological advancement is only part of the story. As this guidebook demonstrates, today's Air Force is much more than a collection



of aircraft but rather an integrated and networked force capable of operating seamlessly across operational domains.

I commend the *Air Force Capability Guidebook* to you, and trust it proves useful in articulating the capability, composition and character of our Air Force, and effectively demonstrates the vital role it plays in Australia's security.

Mel Hupfeld, AO, DSC

Air Marshal

Chief of Air Force

January 2020



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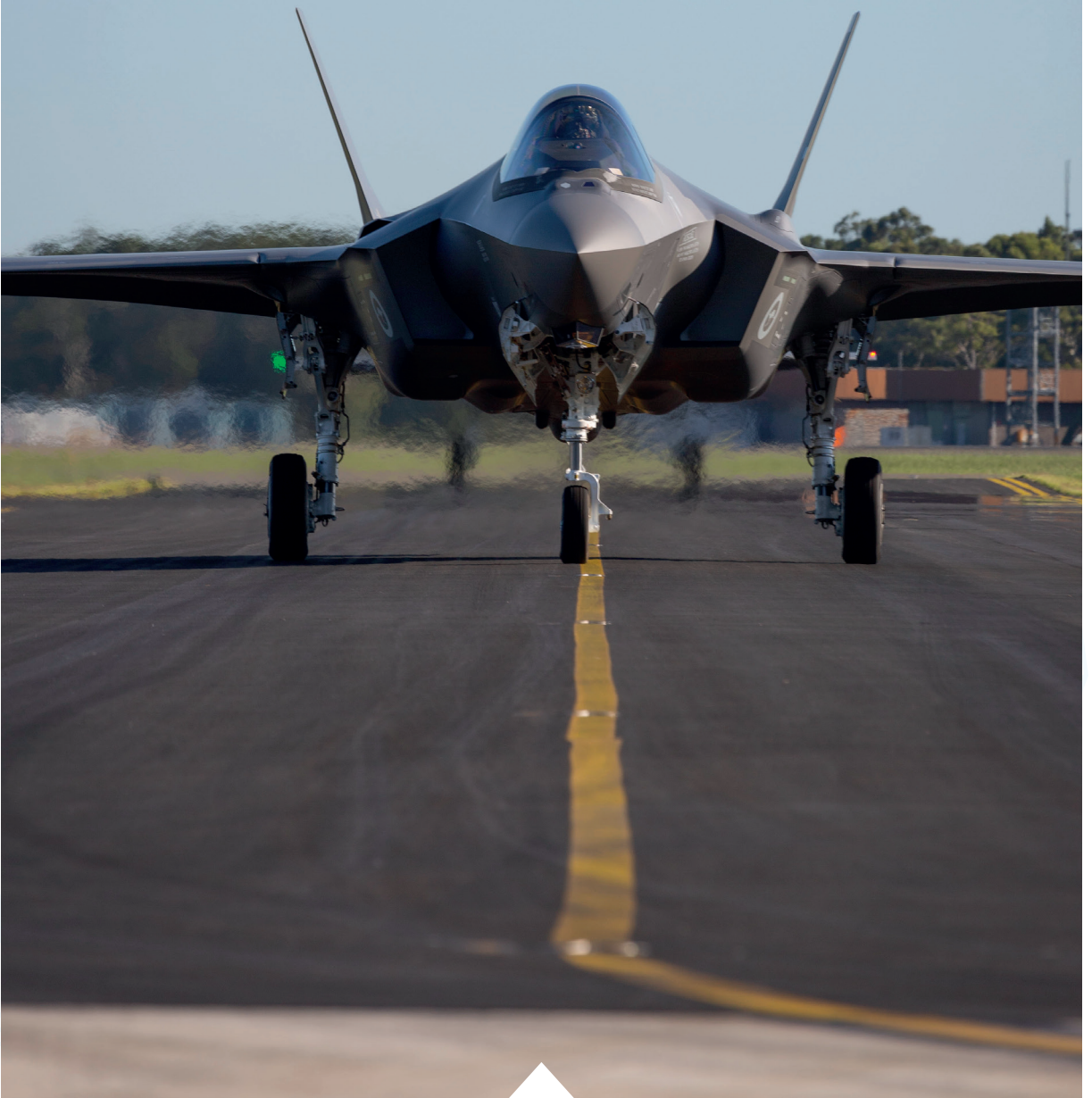
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PART 1 - AUSTRALIAN AIR POWER



INTRODUCTION

Established in 1921, the Royal Australian Air Force (RAAF), or Air Force, is the second-oldest air force in the world. We have a proud tradition of service, with a history of contributions across the full spectrum of conflict. This has—and continues to include—joint and coalition operations, peacekeeping, humanitarian assistance and disaster relief, and international military relationships management.

This section briefly describes the values, beliefs and culture that define Air Force; the higher strategic determinants that steer Air Force employment of Air Power; and the roles for the effective delivery of Australian air power that have been derived from nearly 100 years of operations.

AIR FORCE VALUES AND IDENTITY

Air Force has a shared set of values for all its members. These establish a basis for personal behaviour and reflect the standards we expect of ourselves and our colleagues. Rather than an end point for cultural change, their intent is to transform daily behaviours of all Air Force personnel: to promote a culture of high esteem and trust, to serve with pride, and to protect, support and serve the people of Australia and our national interests.

Respect

Air Force people always respect the rights of others. Our people are just and inclusive. We recognise diversity is essential to improve our capability.

Excellence

Air Force people demonstrate professionalism, mastery and continuous improvement in everything we do. Our people are motivated and encouraged to innovate. We are capability focused, operationally ready and are driven to successfully complete the missions required of us.

Agility

Air Force people respond swiftly to challenges. Our people are resilient and quickly adapt to changes in our environment. We are flexible in how we think and act and we use resources wisely.

Dedication

Air Force people are trusted to defend our country. Our people are courageous and serve with pride and commitment. We cherish our heritage, honour the achievements and sacrifices of those who have gone before us and will create the legacy for the future.

Integrity

Air Force people have the courage to do what is right. Our people are honest, ethical and demonstrate sound judgement. We hold ourselves and others to account.

Teamwork

Air Force people work together to deliver precision air and space power. Our people collaborate with the Defence Team and our partners. We share the responsibility to ensure a safe environment, everywhere and always.



The RAAF Badge

In 1937 the newly appointed Chester Herald, John Heaton-Armstrong, was commissioned to prepare a design for a RAAF badge, which was finally accepted in 1939. The Air Force Badge features a circle inscribed with the words 'Royal Australian Air Force', and ensigned with the Imperial Crown, in front is a wedge-tailed eagle in flight. Beneath the circle is a separate scroll with the Latin motto: 'Per Ardua Ad Astra'. Although no specific record of the translation exists, it is widely believed to mean: 'Through Struggle to the Stars'. The motto was derived from Sir Henry Rider Haggard's famous novel *The People of the Mist* and was selected and approved as the motto for the Royal Flying Corps on 15 March 1913 and remains with the Royal Air Force today. In 1929 the Royal Australian Air Force decided to adopt it too.



Air Force Roundel

When the Royal Australian Air Force was formed on 31 March 1921, it adopted the existing red, white and blue roundel of the Royal Air Force to identify the aircraft. However the red inner circle was removed during World War II when a No 11 Squadron Catalina was mistaken for a Japanese aircraft by a United States Navy Wildcat. After the war the red was re-introduced, but on 2 July 1956 the red kangaroo 'in motion' was chosen as the most popular centre piece from a range of other options including the Southern Cross, a boomerang and a sprig of wattle. It has been displayed with pride, not only on aircraft, but on various promotional material ever since. The kangaroo within the Air Force roundel always faces the left except when used on aircraft or vehicles, when the kangaroo should always face the front.



Air Force Logo

On 20 December 2001, the Chief of Air Force formally standardised the Royal Australian Air Force's public 'signature' logo format—a combination of the RAAF Roundel as the 'O' within the customised logo and the text of Air Force in the Air Force blue colour. The RAAF roundel is recognised worldwide as Australian, and within the wording 'Air Force', it is readily recognisable on a variety of general promotional material, publications and displays.



RAAF Ensign

The design of the Royal Australian Air Force ensign was approved by King George VI in 1948 and formally adopted in Australia in 1949. Previously, the ensign of the RAF had been used. The Australian ensign differed from the British ensign by the addition of the Southern Cross and Commonwealth Star. A red kangaroo 'in motion' had replaced the red inner circle of the RAF roundel in 1956, to create a distinctive national emblem for identifying RAAF aircraft, and this roundel was also adopted on the Australian ensign in 1982. This effectively makes the ensign the battle ensign of the RAAF. Accordingly, the ensign is always to be treated with the dignity and respect befitting the proud history of the RAAF. It is flown at all Air Force establishments and paraded at ceremonies, and signifies the bond of service.

AIR FORCE OPERATIONS – PAST AND PRESENT

Early History and World War I

Military aviation came of age during World War I when airships and early aircraft were principally used for reconnaissance. Australia's four Australian Flying Corps (AFC) squadrons were part of the Australian Imperial Force (AIF) and attached to larger British Royal Flying Corps/Royal Air Force formations.

During World War I, 800 officers and 2840 airmen served in the AFC. Of these, 175 made the ultimate sacrifice in giving their life for their country. Many AFC veterans helped to lay the foundations for the Royal Australian Air Force, whilst others would enter industry and make significant contributions to civil aviation. In 1920, the AFC aircraft and personnel were formed into the Australian Air Corps. The Australian Air Force was established as an independent Service on 31 March 1921, with the 'Royal' prefix added on 31 August 1921.

World War II

In World War II, Australian airmen fought in air campaigns conducted over Europe, North Africa, the Middle East, North Atlantic, Indian and Pacific Oceans, the Mediterranean and Asia. They also fought over Australia, its territories and approaches. In late 1944, the strength of the RAAF peaked at over 182,000 personnel and 6200 aircraft, organised into 61



squadrons. In August 1945, Australia had the fourth-largest air force in the world. Over 215,000 RAAF men and women served during the period 1939 to 1945. Of these, 9870 personnel lost their lives due to the war. Over 55 per cent of the Australian aircrew deaths occurred in the allied air war conducted against Germany over Europe.

Recent Conflicts and Peacekeeping

Air Force personnel have since served with distinction in military air campaigns conducted over Korea, Malaya, Vietnam, the Indonesian 'Confrontation', Iraq, and Afghanistan. We are proud of our roles and achievements in peacekeeping and humanitarian assistance operations throughout the world, including Bougainville, Cambodia, East Timor, Fiji, Indonesia, Japan, Pakistan, Papua New Guinea, Philippines, Rwanda, Solomon Islands, Somalia, Sudan, Vanuatu, and Australian sovereign territory, in which many hundreds of RAAF personnel have been involved. Since 1945, over 60 RAAF personnel have lost their lives in operations-related incidents.

Today's Air Force

Air Force is always ready to serve Australia. Working closely with Navy, Army, other government agencies and departments, and our regional friends and international partners, Air Force delivers air power around the globe. Air Force has partnerships with other Defence Groups and industry partners to generate and sustain its air power. Air Force personnel are required to master strategy, operations, tactics, engineering, logistics and support to ensure that Air Force generates and delivers appropriate

and effective options for Government, using a range of integrated kinetic and non-kinetic air and space power effects across the sea, land, air, space, electromagnetic, and cyber domains—anywhere, at any time.

Since 1946, Air Force operations have responded to situations arising around the globe, as depicted in Figure 1. Recently international deployments have involved Air Force C-17A Globemaster III, C-130J Hercules, AP-3C Orion, F/A- 18A Hornet, F/A-18F Super Hornet, E-7A Wedgetail, KC-30A Multi-Role Tanker Transport, and appropriate personnel, logistics, and materiel. Additionally, Air Force tasks support a wide range of domestic operations, including the provision of air mobility and Intelligence, Surveillance and Reconnaissance (ISR) within peacetime Australia, space situational awareness of the Earth orbital environment, and support to a wide range of whole-of-government operations.

Recent operations have involved Air Force AP-3C Orion, C-130J Hercules and E-7A Wedgetail aircraft engaged in the search for Malaysian Airlines Flight MH370. Additionally, Air Force medical teams conduct aeromedical evacuations and disaster relief missions in Australia and in overseas locations with C-130J Hercules and C-17A Globemaster III.

Globally, on any day, Air Force may have between 500 and 700 people deployed on active duties in operations contributing to border protection, coalition operations, peacekeeping missions, humanitarian assistance and disaster relief. Recent Air Force history of overseas deployments include:

1. **Operation ACCORDION:** Australia's military contribution to supporting operations

in the Middle East Region (MER) and neighbouring Gulf States.

2. **Operation GATEWAY:** Australia's enduring contribution to the preservation of regional security and stability in South East Asia, including supporting Australian efforts to counter people smuggling in the region.
3. **Operation HIGHROAD:** Australia's military contribution to the NATO-led mission to train, advise and assist the Afghan National Defense and Security Forces (ANDSF).
4. **Operation OKRA:** Australia's military contribution to the fight against Daesh in Iraq and Syria.
5. **Operation RESOLUTE:** ADF contribution to the Whole-of-Government effort to protect Australia's borders and offshore maritime interests;
6. **Operation SOLANIA:** ADF contribution to maritime surveillance within the Pacific Region to provide intelligence, surveillance and reconnaissance to Pacific Islands Countries that supports their economic development through the protection of fisheries and other resources.
7. **Operation ASLAN:** ADF contribution to the United Nations' Mission in South Sudan (UNMISS) to protect the people of the Republic of South Sudan through the monitoring of human rights and the delivery of humanitarian aid.
8. **Operation AUGURY:** ADF partnership activity with the Armed Forces of the Philippines focused on sharing experiences and approaches to countering complex urban terrorist tactics.



Air Force Deployment

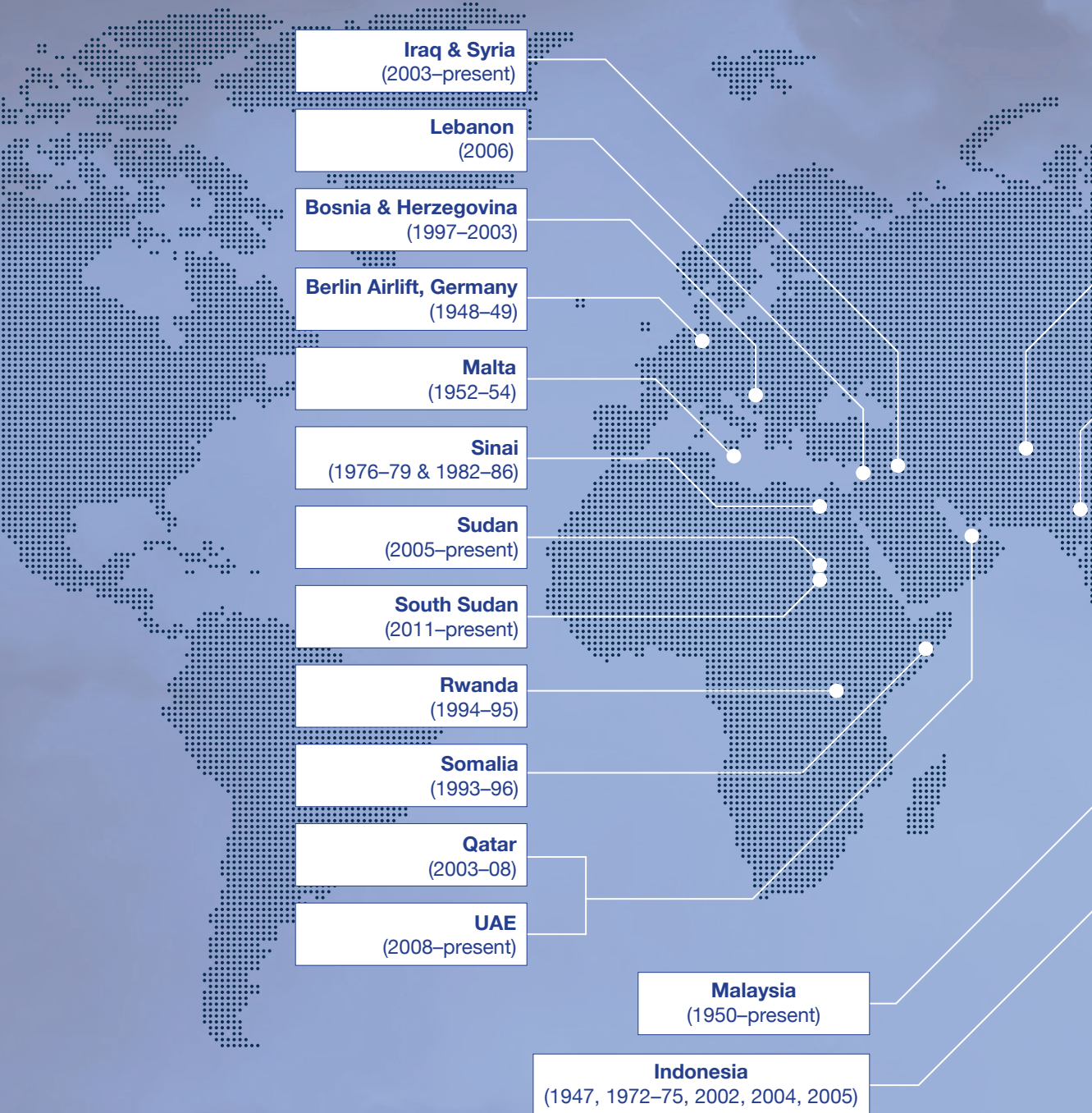


Figure 1. Royal Australian Air Force deployments 1946–Present

nts: 1946 – Present



FROM STRATEGIC TASKS TO FORCE DETERMINANTS

The 2016 *Defence White Paper* describes the strategic defence objectives agreed by the Australian Government in its expectations of the ADF:

- Deter, deny and defeat attacks on or threats to Australia and its national interests, and northern approaches.
- Make effective military contributions to support the security of maritime South East Asia and support the governments of Papua New Guinea, Timor-Leste and of Pacific Island Countries to build and strengthen their security.
- Contribute military capabilities to coalition operations that support Australia's interests in a rules-based global order.

Air Force will structure its force to support the joint force to meet the strategic defence objectives.

Strategic Utility of Air Power

Being an island nation continent that is dependent on overseas trade for its prosperity, Australia is critically dependent on the sea, and the maritime environment, as a means to actively protect and promote Australia's interests and influence strategic events in the region. That dependence, and the vulnerability of our air, data, and sea lines of communication, from interference that could damage the national economy and security, makes it essential that Australia can control its sea and air approaches (see Figure 2). Australia's security hinges on a Maritime Strategy that

requires sea, land and air forces to operate in concert to project power and control the air and sea approaches.

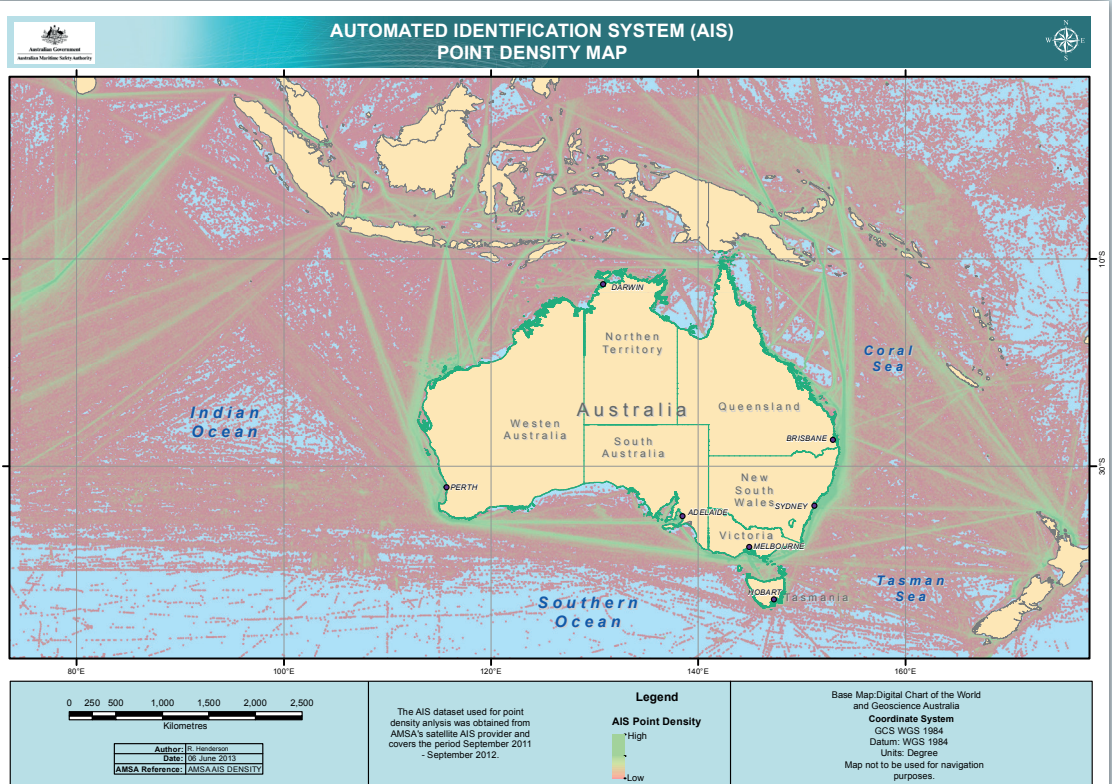
Australia's Maritime Strategy is underpinned by the Air Force ability to control the air in our sea and air approaches.

Air Force draws on its core roles of control of the air, strike, air mobility and ISR to provide Government with flexible and responsive air power options.

Within the Maritime Strategy, Air Force remains prepared to offer Government a wide range of air power options to meet a variety of challenges, from supporting humanitarian operations or deterring aggression, through to taking offensive action in joint or coalition operations against a military threat. This requires an ongoing investment in maintaining the capabilities to conduct all our core air power roles as part of a joint force or coalition, or independently, depending upon the prevailing circumstances.

The employment of Air Force's air power in conflict and other operations globally over the past quarter century illustrates air power's inherent agility. Although air power is most effective when used in offensive operations, Air Force's agility and ability to exercise its roles in tailored combinations means that it has always been capable of creating a wide range of unique air power effects. These effects may be created at the strategic to tactical levels across the spectrum of conflict.

Australia's Maritime Strategy requires naval, air and land forces to influence strategic events through the maritime environment by the astute application of their power. This requires safeguarding Australia's air and sea approaches and the regional



Source: <https://www.operations.amsa.gov.au/Spatial/DataServices/MapProduct>.

Figure 2. Sea Lines of Communication

maritime commons. The ADF must be able to: **shape** the security environment; **deter** actions inimical to our interest; or **respond** by denying, coercing or punishing any subversive actions in our area of strategic interests; or some combination of these. Because Australia's maritime interests lie primarily in the Pacific, Indian and Southern Oceans, maritime, land and air power capabilities that can project power into and across these vast areas are fundamental components of Australia's Maritime Strategy.

Air power has distinct characteristics such as perspective, speed, reach and flexibility that offer a unique range of options in support of national objectives. Air power can be applied with great speed over the

great distances and diverse terrain that characterise our regional environment. It can be applied in one area, or concurrently over a number of operating areas. This can include concurrent air operations over maritime, littoral or land environments, in conflict, in peace operations and in humanitarian assistance/disaster relief.

The operational utility of air power can only be provided by a deliberately structured air force, with a balanced range and level of capabilities to meet our strategic needs. To remain credible and effective, Air Force must have a critical mass of modern air power systems and skilled personnel. That critical mass must be able to conduct and sustain the full breadth of actions necessary to protect our national interests, with

the capacity to simultaneously conduct operations, maintain training and regenerate operational forces. Air Force must also have the mass to absorb operational losses without loss of effectiveness in extreme circumstances.

Failure to maintain an effective Air Force will inevitably restrict Australia's national capacity to provide effective responses to emergent crises or conflict that affect our national interests.

Air Force Strategic Tasks

Air Force's strategic tasks are built on the need to **shape** our environment, **deter** potential adversaries and, where necessary, **respond** to defeat emerging threats.

Shaping Australia's Security Environment

Air Force's contribution to shaping Australia's security environment is based primarily on the activities it undertakes to engage other nations. Air Force plays an important part in ensuring Australia's ongoing security, specifically through global engagement activities by, inter alia, participating in and hosting international exercises, and providing training and exchange opportunities. This is vital in promoting understanding and goodwill with a breadth of regional nations. This engagement develops the key relationships and capabilities that enable interoperability between the Air Force and regional air forces. These relationships contribute to Australia's ability to respond in an expeditionary manner by enhancing our ability to conduct operations in partnership with regional nations, and facilitate our access to overseas bases in such instances.

Deter Threats to National Interests

By maintaining a capable and credible force at an appropriate posture, Air Force, in conjunction with the other Services, achieves a measure of deterrence without having to apply force. This effect is created through the combination of carefully selected and well-maintained systems that meet security demands, and the level of training provided to personnel in operations, exercises and training institutions. Deterrence is a long-term activity that requires sustainment of current capability whilst planning and implementing changes to Air Force's structure, organisation and equipment to ensure credibility into the future. However, because the responses of potential adversaries can never be predicted with total certainty, Air Force maintains an agreed level of preparedness at all times to rapidly apply military air power in armed conflict if required.



Respond to Attacks or Threats to Australian Interests

By developing and maintaining a structured and balanced force, Air Force is prepared to contribute to a military response where deterrence has failed to dissuade an adversary whose actions continue to threaten national security interests. Such action could be in response to a direct attack or threat to Australian territory, personnel or resources. Alternatively, a crisis within the region may lead to a request for Australian intervention, most likely within a coalition. Responses may involve the use of force—short of armed conflict—such as the establishment of an overt military presence to prevent further adversary action, enforcement of sanctions, or providing support for diplomacy. These operations are invariably complex, challenging and often dangerous. Hence, they have the potential to demand the innovative and effective application of the full range of air power capabilities in support of the joint force.

Whole-of-Government Approach to National Security

Air Force provides air power options as an essential part of an Australian whole-of-government approach to national security, whether operating from Australia or from locations overseas. This requires Air Force to operate with a range of military forces and other government agencies, such as Department of Foreign Affairs and Trade. This approach also requires Air Force to work with a variety of other public and private sector elements as well as non-government organisations, industry, academic institutions and the commercial sector. Orchestrating the efforts of these agencies to achieve national security outcomes requires careful planning and a common basis for focusing activities and their coordinated application to achieve the desired objectives.



AIR FORCE – LEADING THE DELIVERY OF AIR POWER

Air Force Vision

The Royal Australian Air Force (RAAF) will become a fifth-generation Air Force, to provide integrated and networked air power options for the Australian Government. We will work with Army and Navy to ensure we deliver a networked future joint force across the spectrum of air, space, electromagnetic and cyber.

The vision describes what Air Force aspires to achieve and the type of force we will remain. Air Force will fight and win by rapidly generating integrated kinetic and non-kinetic air and space power effects across the sea, land, air, space and cyber domains.

Air Force will continue to exploit the air power characteristics of perspective, speed, reach, precision and flexibility, in order to ensure that we can deliver effective air power options when and where required by Government. We will achieve our vision now and into the future by acquiring, integrating and exploiting leading-edge air power systems and ensuring that they are operated by high-quality Air Force personnel who are well-trained, innovative and respected. Ongoing investment in such personnel and systems is vital to ensure that Air Force remains ready to complete its vital roles in Australia's Maritime Strategy. As the challenges in our areas of interest become increasingly diverse and dangerous, investments in achieving Air Force's vision are also essential to ensure that the force

can better mitigate any limitations in its air power.

Achieving Air Force's vision requires ongoing investment across the full breadth of its air power. We will only lead in the application of air power if we are trusted and respected as a leader in command and control of air and space operations; professional mastery of air power; Intelligence, Surveillance, and Reconnaissance (ISR); targeting; and the generation, employment and sustainment of military air power.

Through ongoing commitment to the achievement of its vision, Air Force will meet its strategic tasks, to shape, deter or respond to any exigency with resilience, in a swift and decisive manner.

Air Force Mission

Air Force provides integrated air power options for the Australian Government. Our people are innovative masters of the air domain, working alongside Army, Navy and coalition partners.

The purpose of the mission statement is to outline why Air Force exists.

Australia's national interests are diverse, including a range of strategic partnerships with other nations who share our security goals, customers for our exports and suppliers of a range of products. They are also dispersed over an area that is vast geographically and includes nations who share our interests and nations whose interests may be at odds with our own. Such diversity has the potential to create challenges that may arise suddenly and be unpredictable in nature. To meet such challenges, Air Force is prepared to respond with effective air power where and when

threats to our interests arise and has the agility to adapt quickly to meet modern challenges that can continue to evolve as adversaries seek new ways to find weaknesses in our forces.

Air Force cannot rely on size and numbers alone to generate, employ, and sustain the military air power required to comprehensively safeguard the Nation's security. Air Force's enduring capacity to generate and employ responsive, potent and effective air power options whenever required by Government, must therefore be carefully crafted. Our force is built to a prudently considered size, with a critical mass of deliberately chosen systems, quality people, preeminent training, and

robust support systems. Air Force is also united by the values of the force and this unity is maintained through continuous reviews of the ways we care for our personnel, in peace and conflict.

Air Force's mission also requires that we support Government's efforts to advance security in our region by contributing air power and demonstrating the capabilities of its systems and the skills of its personnel in these broad-ranging activities. Air Force also assists in deterring those whose interests are contrary to our own.

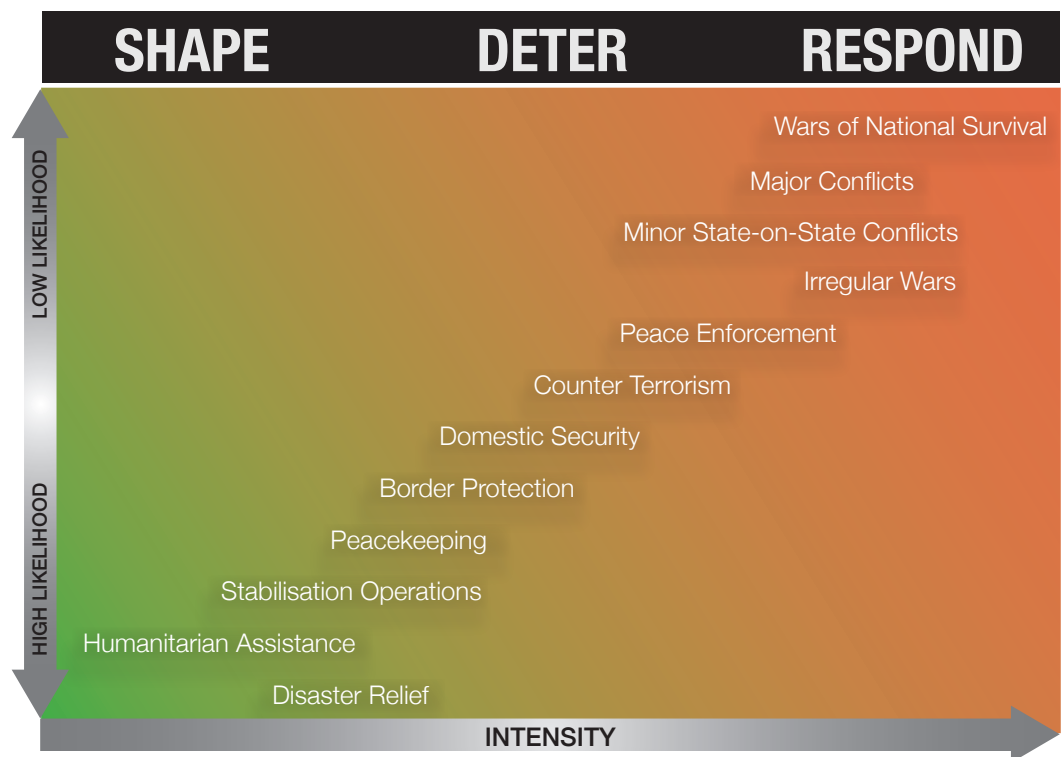


Figure 3. Spectrum of Conflict

Air Power

Air Force defines **air power** as:

...the ability of a nation to assert its will by projecting military power in, through, and from the air domain.

Australia's national air power includes all the Nation's fixed- and rotary-wing aviation and aviation-related resources, both military and civilian. Air Force's air power includes systems that to deliver effects, or respond to effects, within the atmosphere, through the atmosphere to space-based systems, ground-based air surveillance and air defence systems. Military air power is primarily the responsibility of Chief of Air Force who is appointed as the Defence Aviation Authority responsible for the regulation and oversight of all aspects of military aviation.

Air Force provides the Government of Australia with military air power options across a spectrum of conflict (see Figure 3). Air Force also supports humanitarian assistance and disaster relief operations at home and abroad and makes important contributions in direct support of border protection and national domestic security imperatives. Air Force has also participated in a range of joint and coalition operations for the protection of national interests in major conflicts, while remaining prepared, should circumstances arise, to operate in wars of national survival.

Air power is considered to be an essential component of Australian national power. Together with land and sea power, it makes a vital contribution to the national effort to ensure the security of our nation, our people, and our interests. The contribution of air power to national security is an enduring mission that, regardless of

technological advances or changes in our security circumstance, performs a number of essential roles. Some of these roles enhance or enable the activities of other elements of Australia's national power.

Air Power Roles

Air Force exists to generate, employ, and sustain air power to defend Australia and its national interests. This is achieved through functionally organising air capabilities for air power roles, prepared to support a joint force in a joint campaign, and ready to respond across spectrum of conflict.

Australian air power is normally operated and deployed either from permanent bases established within Australia, or from forward expeditionary bases temporarily or permanently located in overseas locations. The effects generated by Air Force complement the effects created by the other services of the Australian Defence Force (ADF), as well as other elements of Australia's national power.

Air Force has extensively analysed its history, to capture the lessons learned, and identify the fundamentals for successful air operations. At its highest level, Air Force has identified four core air power roles and three enabling air power roles as enduring functions for the effective application of Australian air power. These fundamental roles are prescribed in Australia's air power doctrine to guide the Australian planning and employment of air power in future operations. These core and enabling air power roles are described in more detail in the following paragraphs.

Core Air Power Roles

Control of the Air

Control of the air is the ability to conduct operations in the air, land and maritime domains without effective interference from adversary air and air defence capabilities. This is Air Force's pre-eminent role and is a precursor to the conduct of all other operations.

By assuring control of the air, Air Force enables control of the sea and contributes directly to all other military operations. Although control of the air will not guarantee success, failure to achieve adequate control will critically constrain the conduct of other operations. Air Force will normally lead the planning and conduct of the air operations to achieve control of the air. Although, land, maritime, and cyber forces may assist by conducting operations against an adversary's aircraft and operating bases, and by suppressing their air defences.

Strike

Strike is the ability to attack with the intention of damaging, neutralising or destroying a target. Strike can be planned with due regard for collateral damage and conducted with weapons designed to deliver lethal or non-lethal effects against an adversary.

Australian air power employs a balanced inventory of conventional unguided and precision weapons that provide flexibility in tailoring strike missions with the appropriate cost, effort and risk to the necessary degree of accuracy, effectiveness, proportionality, discrimination, lethality and collateral damage. Precision allows Air Force to apply a decisive military force, while minimising the risk of collateral damage and unnecessary casualties.

Air Force's strike capabilities are being broadened to complement traditional kinetic weapons with non-kinetic options, such as airborne electronic attack. Airborne electronic attack will electronically disrupt an adversary's ISR sensor by jamming or placing of false information into their electronic systems. Our strike capabilities provide Australia with a unique politico-military instrument of force that can be tailored to swiftly and directly apply military power when and where required, creating the greatest strategic effect with the required degree of precision.

Air Mobility

Air mobility is the ability to move personnel and materiel using airborne platforms and is a significant component of ADF force projection capability from, within, or between theatres of operations. Air mobility also includes air-to-air refuelling and is often the transportation of choice when speed, reach, terrain, and avoidance of ground and sea-based air defences are necessary. In some cases, air mobility may be the only viable response to create the desired effect when considering the mission payload, delivery time and distances involved.

The availability of modern long-range air mobility aircraft—such as the C-17A Globemaster III, C-27 Spartan, KC-30A Multi-Role Transport Tanker and commercial aviation—significantly enhances the capacity for Australian air power to conduct global airlift operations. This capability has proved vital to the rapid and long-range deployment and support of ADF forces overseas in conflicts and humanitarian operations.

Intelligence, Surveillance, & Reconnaissance (ISR)

The ISR role synchronises and integrates the planning and operation of sensors, assets, processing, exploitation and dissemination systems in direct support of current and future joint operations. Operational requirements for ISR will steer the mission planning for aircraft and space-based ISR missions.

The fundamental mission objective of ISR is to enable decision superiority—the ability to make informed decisions faster than an adversary—by providing key pieces of data, processed information and intelligence that the joint force need to achieve battlespace awareness and understanding, information superiority, and thus, decision superiority.

Enabling Air Power Roles

Command and Control

The ADF describes the key enabling air power role of Command and Control (C2) as “... the process and means for the exercise of authority over, and lawful direction of, assigned forces.” The Air Force C2 role has unique features that reflect the nature of the air domain and the way that professional military personnel in Air Force operate and fight. The C2 role covers the planning of air campaigns within joint campaigns, the execution of the campaign and the targeting process.

Air Force C2 also includes the management of military air and space operations, airspace control, and Electronic Warfare Battlespace Management (EWBM). EWBM coordinates the use of non-kinetic options that exploit the Electro-Magnetic Spectrum (EMS). EWBM is needed to ensure that EMS operations do not adversely affect friendly activities. Air Force C2 also includes mechanisms to manage its Raise, Train,

and Sustain (RTS) functions for its air power through the Air Force organisational structure and chain of command.

In Air Force, the structuring and tailoring of C2 for the optimal employment of assigned air power, is controlled from the Air and Space Operations Centre (AOC), at the Headquarters Joint Operations Command (HQJOC). In the execution of this function, Air Force applies the fundamental tenet of centralised control and decentralised execution: centralised control ensures the optimum application of effort where and when needed; decentralised execution provides operational and tactical level commanders with sufficient freedom to exercise professional expertise and initiative in carrying out their assigned missions.

Force Protection

Force protection includes all measures and means to minimise the vulnerability of personnel, facilities, materiel, information and operations to any threat from an adversary or operating environment, while preserving the freedom of action and the operational effectiveness of the force.

Air power has a degree of relative impermanence; air combat systems must return to a base at the end of a mission. Force protection is essential in air power operations, and during all phases of an air campaign, including the protection of scarce, expensive and fragile air power assets – including air combat systems and air bases. Protection of other valuable assets such as personnel and support systems, particularly when they are vulnerable on the ground, is also critical to assuring effective air operations.

Force Generation and Sustainment

Force generation and sustainment focuses on ensuring that the current force has the

necessary personnel, skills and materiel to conduct and sustain the generation of air effects in joint operations to meet the foreseeable operational needs—both domestic and expeditionary—while maintaining the ability to regenerate the force during and after the cessation of operations. This role includes concurrent broader planning for the designs for the future Air Force and initiates actions to ensure the timely acquisition, introduction, and sustainment of air and space power capabilities, appropriate to the future needs of Australian air power.

Air Force Capability

Air Force conducts its air power roles with a suite of highly capable systems operated and supported by well-trained personnel. As well as becoming increasingly sophisticated, complex and expensive, these systems require a substantial whole-of-life investment in maintenance and upgrades to maintain the necessary levels of performance.

Modern systems are generally most effective when operated as part of a system of systems. For example, control of the air requires a range of complementary systems, such as fighter, air-to-air refuelling and early warning and control aircraft. These are supported by extensive ground-based and space-based systems and will increasingly be connected to systems of other Services and forces. Such support is essential for the operation of piloted aircraft as well as for unmanned aerial systems that are becoming an important element for Air Force.

The nature of Air Force's capabilities means that forces deployed for operations will form and operate as a mix of capabilities tailored for each specific operation. This mix will be determined on the basis of a range of factors such as the nature of the mission, speed of required response, threat

and environment. Whether a deployment is relatively simple, such as providing assistance to low-level relief operations, or deployment of a large, complex force for combat, any deployment will demand extensive planning for operational, logistic, personnel and maintenance arrangements.

The **Fundamental Inputs to Capability (FIC)** is a standardised list of nine inputs, designed to enable the effective generation of Defence capabilities.

- Organisation
- Command and Management
- Personnel
- Collective Training
- Major Systems
- Facilities and Training Areas
- Supply
- Support
- Industry

For Air Force to deliver effective, responsive air power options, all elements of the FIC must be resourced and supported appropriately. Air Force personnel are vital to supporting and operating our FIC and they must be recruited and trained to satisfy a wide breadth of occupations and specifications. Generating and sustaining these personnel is just as critical as maintaining and operating the highest level of air power systems.

Transforming the Air Force

Air Force is currently undergoing the greatest capability transition in its history. By 2030, not only will almost every single aircraft in Air Force's fleet have undergone a systems upgrade, or have been replaced, we will also have introduced new platforms delivering new capabilities in emerging mission types.

Much of this capability upgrade will modernise existing systems. However, Air Force will continually seek ways to utilise emerging and disruptive technologies and concepts that arise during our capability transition. Air Force will also seek to protect our forces against a potential adversary's use of such technologies. Within the needs phase of the capability development cycle, assisted by Defence Science and Technology Group (DSTG), Air Force will explore opportunities and seek to understand the threats inherent in these developments.

The changing nature of our capabilities, and the environments they will operate within, requires that Air Force undertake a process of transformation. Our new systems, and the organisational structures we will operate them within, have enormous potential to change the way we will fight in the future. Future wars will take place in an environment that is dangerous, complex, ambiguous and contested. For any force to prevail in this environment it must be agile and adaptive, capable of adjusting to the requirements of the environmental context. Delivery of the required joint effects will likely involve multi domain systems, used in a highly coordinated and integrated way, in a dynamic command and control construct. In preparing for this future fight, our three guiding themes will be harnessing the combat potential of an integrated force, developing an innovative and empowered workforce, and changing the way we acquire and sustain capability.

Air Force's transformation will be guided by the *Air Force Strategy*, *Plan Jericho*, and subsequent Air Force plans. Plans will cyclically reassess a range of factors such as technology, the strategic environment, and emerging threats. They will measure

our current capability state and generate input into the strategic framework and capability plans of action. These concepts and plans will deliver integrated warfighting capabilities that will increase the lethality and survivability of the whole force.

Plan Jericho is a strategy designed to transform the Royal Australian Air Force by capitalising on future high technology systems.

Plan Jericho, launched in early 2015, is a suite of activities in operations, personnel and capability that will create the Air Force of the future. *Plan Jericho* is Air Force's plan to transform into a fully integrated force that is capable of fighting and winning in the information age. The *Plan Jericho* Program of Work contains 16 initiatives to be actioned under the leadership of Deputy Chief of Air Force (DCAF), Head Air Force Capability (HAC) and Air Commander Australia (ACAUST) through accountable Air Force senior leaders. The lead initiative of *Plan Jericho* was the establishment of the Air Force Air Warfare Centre (AWC).

The transformation will touch all aspects of Air Force's operations. It will require an integrated systems approach where the refueller is given as much consideration as the fighter pilot, resulting in a balanced force supported by fully realised single-service and joint enabling capabilities. A requirement of the transformation is investment in specialist skill sets. Some of these will be traditional and understood, while others will need to be created to deliver new functions in support of new concepts.

As regional militaries continue to modernise, Air Force will only retain its capability edge through superiority in a few key areas. These areas are likely to be decision superiority, training, and by fully realising

our enabling systems. ISR will be essential to decision superiority. We will need to build governance systems that can drive system performance across a number of groups and services. Most importantly we will develop a culture that allows us to get beyond the issue of Service ownership, enabling us to achieve truly joint and integrated effects.

As technology evolves and environments change, Air Force strategies and tactics will need to develop in response. Air Force will continue to develop its professional mastery of air power by adapting, refining and updating its doctrine, concepts, education and training. Air Force will continue its tradition of service to the highest standard—continuing to embrace emerging technology and offer responsive military air power options to Government for the defence of Australia and its national interests. We will carefully transform the force to achieve our vision.

The Networked Fifth-Generation Air Force

A fifth-generation Air Force will provide the necessary strength to win against the increasingly complex and lethal threats of warfare in the Information Age.

It is Air Force's intention to become a fifth-generation Air Force. Fifth-generation refers to the latest technological evolution of aircraft. The fifth-generation Air Force will be a fully-networked force that exploits the advantages of an available, integrated, and shared battlespace picture, available for use by all combat elements in the task force, to better deliver lethal and non-lethal air power.

While the reference to the different generations is traditionally meant in

reference to the generation of the fighter jet design, Air Force is applying this term in reference to the objective of a networked force design for Air Force. Additionally, using this fifth-generation concept as a change driver, also means that our people working with all aircraft and systems need to be trained, educated and equipped to become professional masters of air and space power in the new fifth-generation force.



Generations of Fighter Aircraft

First-Generation Fighter: Jet fighters of the immediate post-Second World War and Korean War period.

Second-Generation Fighter: Fighters with sustained transonic or supersonic dash capabilities, rudimentary fire control radars and infra-red-guided air-to-air missiles.

Third-Generation Fighter: By the late 1950s and 1960s, fighters were capable of sustained supersonic flight, carried improved fire control radars and semi-active-radar air-to-air missiles, as well as the first generation of tactical electronic warfare systems.

Fourth-Generation Fighter: By the 1970s, fighters employed more efficient and powerful turbofan jet engines, 'look-down' Doppler fire-control radars, fly-by-wire flight control systems providing high agility, integral and podded electro-optical/infra-red targeting sensors, laser and GPS-guided precision weapons, active-radar air-to-air missiles, head-up displays and improved electronic warfare systems. Although nearing their planned withdrawal date, this generation of fighters has endured the longest.

Fifth-Generation Fighter: Those aircraft are more advanced than later 4th-generation aircraft and have features such as designed-in low observable shaping and materials, internal weapons bays and a high degree of situational awareness through integrated sensors and networking. To date, the only operational fifth-generation aircraft in operational service with western air forces are the US Air Force F-22A Raptor and the F-35A Lightning II.

Note: There are a few aircraft that have evolved to the point where some of their capabilities span the gap between the fourth- and fifth-generation categories, such as the Super Hornet. These aircraft are referred to as '4.5-generation' fighters.



AIR FORCE: TODAY'S AIR POWER

Organisation

Organisation of RAAF Bases

The Air Force is commanded by the Chief of Air Force (CAF) and has a complement of about 14,700 uniformed members, supported by about 3,300 Air Force Reservists and 770 Australian Public Service (APS) employees. Air Force personnel also serve in positions located across other areas of the Defence organisation and in overseas positions in representational appointments, liaison

positions, and exchange postings. Figure 4 shows the location of Air Force bases and headquarters throughout Australia.

Command of the RAAF

CAF commands the RAAF through three principal executives—DCAF, HAC and ACAUST—as shown in Figure 5. DCAF leads Air Force Headquarters (AFHQ), the organisation through which CAF commands Air Force at the strategic level. HAC is the Air Force capability manager, responsible for shaping the capability requirements of the Air Force. ACAUST leads Headquarters Air Command (HQAC), which is responsible for the conduct of Air Force's operations and the RTS function that ensures Air Force combat capabilities are at the levels

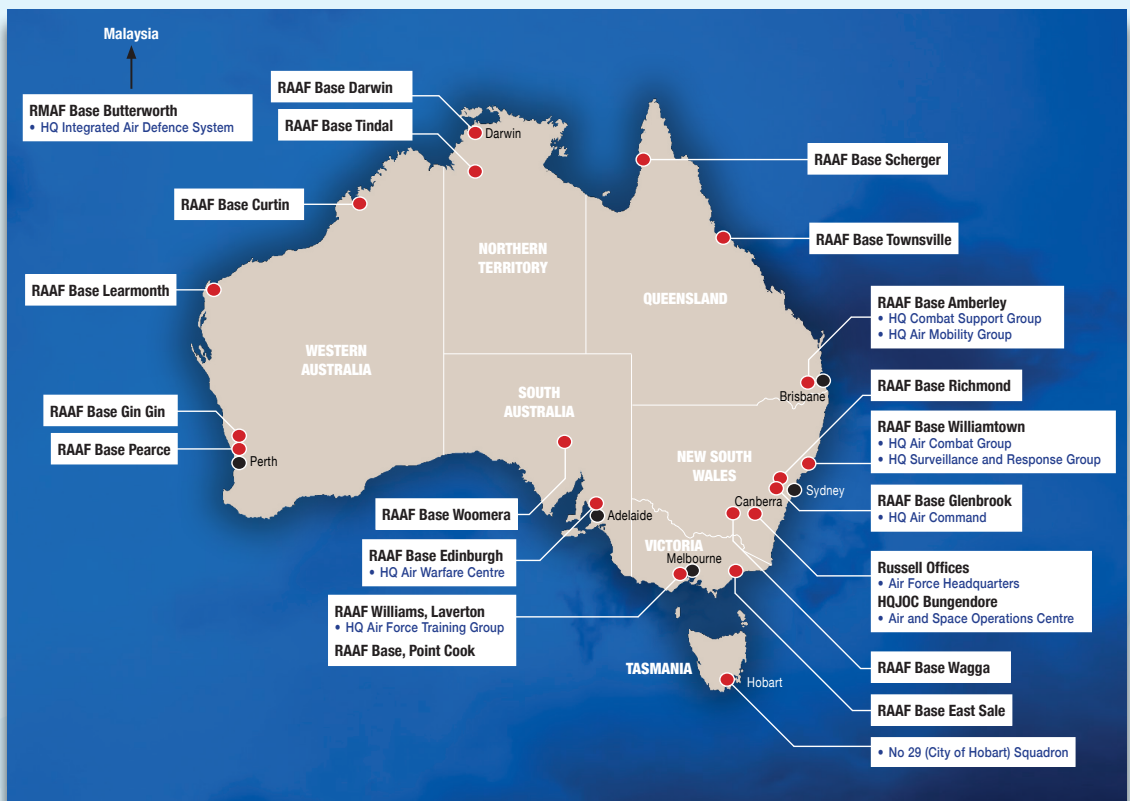


Figure 4. Air Force Bases and Headquarters Locations

of preparedness directed by CAF for assignment to operations.

Below these two headquarters, Air Force is organised into operational, support and training formations located at a range of Defence offices and major air bases established across Australia.

Structure of Air Force Formations

The generic structure of Air Force's formations is based on a hierarchical organisation of groups, wings, squadrons and sections, organised along functional lines. While there are likely to be variations in the shape of each formation within a type, the basic structural principles listed in Table 1 generally apply.

The highest level of formation is the Force Element Group (FEG), comprising a headquarters and one or more wings. The FEGs are responsible for specific capability components. For example Air Mobility

Group (AMG) is responsible for the Air Force's air mobility capability.

Wings are the operational elements of Air Command. Each wing is made up of two or more squadrons plus the wing headquarters.

Squadrons are the core tactical elements around which the Air Force operates. Each squadron is responsible for an output, support function or aircraft. For example, No 11 Squadron is responsible for maritime operations with employment of the P-8A Poseidon maritime patrol aircraft. The flying squadrons are different sizes, depending on aircraft type and role. A flying squadron will generally contain between about five to 20 aircraft. Combat Support Squadrons include the broad range of personnel and equipment necessary to establish and operate forward air bases and to operate some permanent air bases.

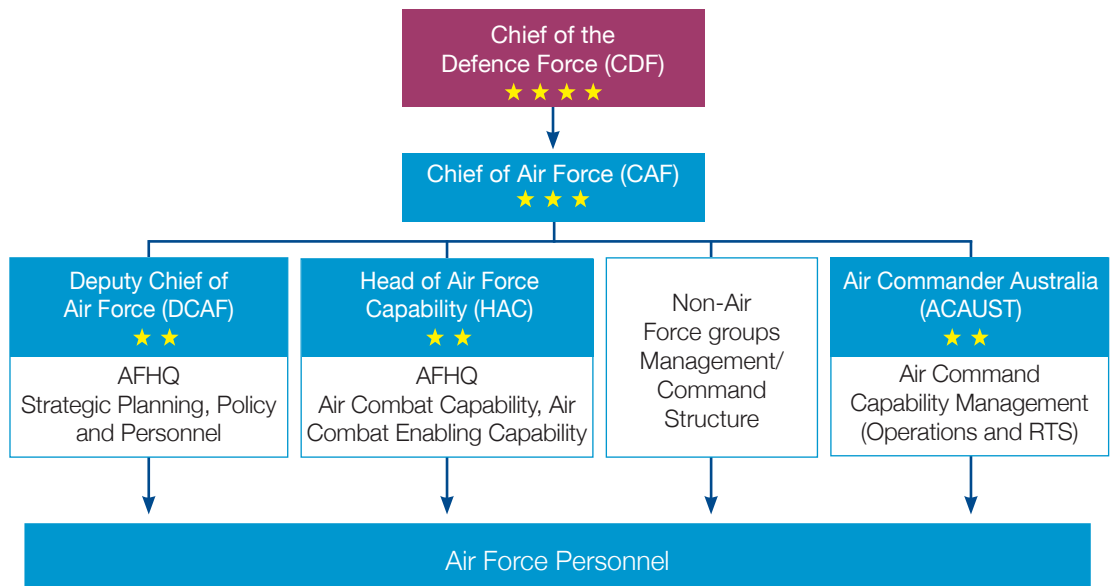


Figure 5: CAF's Principal Executives and Command Chain

Formation		Commander			Rank
Australian Defence Force		CDF			Air Chief Marshal
Air Force		CAF			Air Marshal
Air Force Headquarters	Headquarters Air Command	DCAF	HAC	ACAUST	Air Vice-Marshal
Branch	Force Element Group	Director General		Commander	Air Commodore
Directorate or Centre	Wing	Director		Officer Commanding	Group Captain
Unit or Team	Squadron (Force Element)	Deputy Director		Commanding Officer	Wing Commander
	Flight	Staff Officer		Flight Commander	Squadron Leader
	Section			Officer-in-Charge	Flight Lieutenant

Table 1. Formations, Commanders, and Ranks

Deploying Air Force's Air Power

The broad range of Air Force personnel and systems required to conduct and support air operations means that Air Force is unlikely to deploy forces for operations as a single squadron, or elemental formation. Rather, Air Force contribution will generally comprise a force drawn from across a range of formations to provide a contextual operational and support capability for the circumstance. For example, a force deployed for air combat operations generically requires air combat aircraft and a range of other elements including air base operating and security personnel, surveillance and control aircraft, air-to-air refuelling aircraft and a range of command and logistics support forces.

Relationships with Non-Air Force Groups

Air Force relies on the support of a number of non-Air Force groups to generate, employ and sustain air power. CAF commands permanent and reserve Air Force members

employed in non-Air Force groups. Air Force has a close relationship with these groups and liaises extensively to maintain a shared understanding of its requirements and to ensure the development and management of the robust support mechanisms that are essential to sustain air power operations in peace and conflict.

Common Joint Staff System

When Air Force members are assigned to work within a joint or operational level headquarters, the Common Joint Staff System, depicted in Table 2, provides titles for staff positions and functional divisions of responsibility. The letter designator at the start of the title indicates the environment of the headquarters. The first digit after the letter designator indicates the branch in which the member works. Subsequent digits indicate functions and individual staff positions within a branch.

Staff Appointment	Headquarters Environment				
	Joint	Naval	Ground	Air	Special Operations
Commander	J00	N00	G00	A00	SO00
Chief of Staff	J01	N01	G01	A01	SO01
Deputy Commander	J02	N02	G02	A02	SO02
Resource/Financial Adviser	J05	N05	G05	A05	SO05
Senior Legal Officer	J06	N06	G06	A06	SO06
Senior Health Officer	J07	N07	G07	A07	SO07
Senior Chaplain	J08	N08	G08	A08	SO08
Personnel	J1	N1	G1	A1	SO1
Intelligence	J2	N2	G2	A2	SO2
Current operations	J3	N3	G3	A3	SO3
Logistics	J4	N4	G4	A4	SO4
Plans	J5	N5	G5	A5	SO5
Communications and Information Systems	J6	N6	G6	A6	SO6
Doctrine and training	J7	N7	G7	A7	SO7
Force structure and development	J8	N8	G8	A8	SO8
Civil/Military Cooperation (CIMIC)	J9	N9	G9	A9	SO9

Notes:

- Some branches may be merged, for example personnel and logistics branches are commonly merged and use the title J1/4 in a joint headquarters.
- Army battalion-level headquarters staff use the letter designator S.
- In communications outside of the headquarters organisation, the title of a position is followed by the name of the headquarters (eg J01 HQJOC).
- The appointment title may also be followed by an abbreviation to indicate functional responsibility (eg J31 AIR, G52 ARTY or N43 TPT).

Table 2. Joint Staff appointment designations.

Air Force Headquarters

AFHQ Function

Air Force Headquarters (AFHQ) is responsible for the overall management of the personnel element of Air Force capability and provides capability management, strategic planning for current and future resources, force structure and facilities/infrastructure planning, policy advice and development of philosophical air power doctrine. AFHQ and its agencies also manage and conduct the interaction between Air Force, the other Services, other Defence groups, industry and contractors, other government agencies and Government.

The AFHQ organisation includes the agencies that are responsible for safety, airworthiness, and aviation capability improvement. These directorates and agencies have dual responsibilities to Air Force and ADF.

AFHQ Organisation

Office of Chief of Air Force. The Chief of Air Force (CAF) is responsible for the delivery of Air Force capability for the defence of Australia and its interests. This includes the delivery of aerospace capability, enhancing the Air Force's reputation, and positioning the Air Force for the future. CAF is also appointed as the Defence Aviation Authority with accountability to the Chief of the Defence Force and Secretary of the Department of Defence for the regulation and oversight of all aspects of Defence Aviation. The Office of CAF also supports the following Air Force executive appointments:

- **Deputy Chief of Air Force (DCAF).** DCAF is responsible to CAF and manages the AFHQ executive sub-group, Air Force

doctrine, policy and planning for current and future Air Force activities; and decisions on Air Force priorities.

- **Head Air Force Capability (HAC).** HAC is responsible to CAF for conceptualising and shaping the needs and future requirements of the Air Force through strategic management of Air Force capabilities and programs under the Capability Life Cycle work stream.
- **Warrant Officer of the Air Force (WOFF-AF).** WOFF-AF is responsible for advising and assisting the Chief of Air Force and Commanders on the morale, work-life, and general welfare of airmen and airwomen.

Strategy and Planning. Director General Strategy and Planning–Air Force (DGSP-AF) is responsible for providing advice and staff support to Air Force in regards to corporate governance, future organisational structure and force designs, air and space power concepts, testing and experimentation of new concepts and capability options and the overseas engagement programs for managing international airmen-to-airmen relationships. DGSP-AF is also responsible for the Air Power Development Centre outputs for delivering education, information, doctrine, and future outlooks for air and space power technology.

Air Combat Capabilities. Director General Air Combat Capabilities–Air Force (DGACC-AF) is responsible to HAC for providing advice on the Air Force outcomes with current Air Force capabilities and the strategic management of Air Force capabilities, including major air combat systems, supplies, and support. DGACC-AF implements Government, Defence and Air Force policy for delivering timely and responsive advice on the implications of such policies. In respect of Air Force and military capabilities for the force-in-being and the

future force, DGACC-AF is also responsible for the recommendation of affordable options to meet the requirements of today's Air Force needs and the needs of the future Air Force. DGACC-AF liaises extensively with other Defence programs, Capability Acquisition & Sustainment Group, Defence Science Technology Group, and Defence Industry.

Air Combat Enabling Capabilities. Director General Air Capability Enablers - Air Force (DGACE-AF) reports to HAC. DGACE-AF complements DGACC-AF as one of two Air Force Program Sponsors responsible for managing all of the capability programs that CAF is the Capability Manager for under the Capability Life Cycle work stream. DGACE-AF liaises extensively with other Defence programs, Capability Acquisition & Sustainment Group, Defence Science Technology Group, and Defence Industry.

Logistics. Director General Logistics - Air Force (DGLOG-AF) manages the Directorates of Supply and Technical Capability. These Directorates are jointly responsible for the planning, coordination and evaluation of Air Force supply, engineering and maintenance management and governance functions. The Logistics Branch role includes:

- Developing and maintaining Air Force engineering, maintenance and supply support doctrine.
- Developing policy and defining Air Force's logistic requirements.
- Providing advice on infrastructure and Defence estate.
- Overseeing infrastructure development, planning and support for all Air Force bases, estate and properties of interest to Air Force.
- Providing oversight of strategic planning for operations through life support of Air Force's systems.

Personnel. Director General Personnel-Air Force (DGPERS-AF) is responsible for providing an integrated full-time and part-time, military and civilian workforce for Air Force to meet Australia's air power capability requirements. The Personnel Branch function includes:

- Planning to ensure the future workforce has the requisite skills; developing and managing Air Force personnel and career management policies.
- The allocation of Permanent and Reserve personnel to constrained establishments internal to Air Force and wider groups.
- Professional development.
- The refinement of Air Force personnel policies and systems, appointments, promotions and postings.

Finance. The role of the Assistant Secretary Finance - Air Force (ASF-AF) is to provide financial and business advice to CAF, DCAF and the wider Air Force. ASF-AF is also responsible for managing Air Force resources to achieve the best outcome for Air Force and Defence. Air Force resources are broken into two sub groups - Combat and Executive. ASF-AF coordinates the two groups and is the financial manager for the Executive Sub-Group on behalf of DCAF.

Chief of Staff. Chief of Staff (COS) Branch underwrites the staff work, capability planning and resource management framework within and across AFHQ. The Chief of Staff is responsible for controlling AFHQ staff effort in support of DCAF and HAC, and integrating that effort across HQAC and AFHQ. This role includes: oversight for corporate and community relations such as incident management and on-line engagement; events management such as air shows and conferences; strategic communications and public

affairs, including branding and reputation management; heritage management; Air Force uniforms and entitlements; legal; management of No 28 Squadron; and Air Force improvement programs.

Chaplaincy. Director General Chaplaincy-Air Force (DGCHAP-AF) is responsible for ensuring a quality chaplaincy presence within Air Force. The Director General's roles include capability management, organising, supporting and working with churches to identify future chaplains, as well as constantly working at up-skilling the chaplaincy service. The Director General works closely with Air Force, Defence agencies and various faith groups to influence policy and services to provide for the welfare and wellbeing of Air Force people and their families.

Health Services. Director General Air Force Health Services (DGAHHS) provides specialist health advice to the Air Force senior leadership team.

Health Reserves. The Director General Health Reserves - Air Force (DGHLTHRES-AF) is responsible to CAF, and the Surgeon General ADF Reserves, for the management of the Air Force Health Reserve capability, including the recruitment and sponsorship of members.

Australian Air Force Cadets. Cadets Branch-Air Force (CB-AF) is responsible for the administration of the Australian Air Force Cadets (AAFC) on behalf of CAF. The AAFC is an aviation-focused youth organisation sponsored by Air Force, and has a heritage that can be traced to the 1940s. Activities undertaken by the AAFC include flying, field craft, adventure training, firearms safety training, drill and ceremonial, service knowledge, aeromodelling, navigation and gliding. The contemporary aim of the AAFC

is to foster qualities that will enable cadets to become responsible young adults, who will make a valuable contribution to the community.

History and Heritage. The Director General History and Heritage-Air Force (DGHH-AF) is responsible for the collection, study, and the preservation and management of records, artefacts and estate from the Australian Flying Corps to today's Air Force. These activities are to enhance capability and reputation, while meeting Government and community expectations, as seen with the static aircraft shown on permanent public display around at some air bases, Air Force Heritage Centres, or in the many proud Air Force history books.

Defence Aviation Safety Authority. Defence Aviation Safety Authority (DASA) is responsible for enhancing and promoting the safety of military aviation. This objective is primarily achieved through implementation of a Defence Aviation Safety Program (DASP) that supports compliance with statutory safety obligations and assures the effective management of aviation safety risks.

Air Force 2021. On 31 March 2021, the Air Force will mark 100 years as an independent service. During 2021, Air Force will conduct a program of selected events and initiatives to reflect on our enduring contribution to Australia's national security.

Air Command

Air Command Function

Air Command is responsible for generating and supporting Air Force capabilities for employment on operations, and developing and delivering the capability to command and control air operations. ACAUST commands Air Command through two one-star deputies: Deputy ACAUST (DACAUST) and Director-General Air Command Operations (DGACOPS), who are each responsible for performing separate assigned functions in air command activities.

Office of Air Commander Australia

ACAUST is responsible to CAF for managing the operational air capabilities of Air Force. ACAUST commands Air Force operations, and is responsible for the activities necessary to Raise, Train & Sustain (RTS) forces to be prepared and ready to deliver effective air and space power when assigned to ADF joint operations. ACAUST exercises command of Air Command through HQAC.

ACAUST reports directly to CAF on all aspects relating to the delivery of Air Force capability to meet tasks directed by CAF and Chief of Joint Operations (CJOPS). ACAUST and DCAF both coordinate and synchronise their responsibilities to ensure that the desired Air Force capability and operational outcomes are realised. ACAUST is also responsible for peacetime national tasks for which the Air Force has enduring responsibility. Such tasking includes VIP air transport, Air Force Air Traffic Control (ATC) services, through to supporting domestic aviation activities and specific surveillance operations.

Headquarters Air Command

Headquarters Air Command (HQAC) is the operational level headquarters located in Glenbrook, NSW. HQAC is responsible for the overall management of Air Command capability on behalf of ACAUST. HQAC is organised around the common joint staff system (see Table 2). HQAC staff support ACAUST in the execution of relevant command responsibilities for the generation of Australian air power.

DACAUST is responsible for A1-Personnel, A7-Training, A8-Development, A9-Maintenance, A10-Air Base Capability, and acting as ACAUST's Chief of Staff.

DGACOPS is responsible for A2-Intelligence, A3/5-Operations & Plans, A4-Logistics, A-6 Communications and Information Systems, and for air support to Army.

Air & Space Operations Centre

ACAUST also commands the Headquarters Joint Operations Command (HQJOC) Air & Space Operations Centre (AOC). The AOC controls daily Air Force and joint air operations. This includes planning, coordinating, controlling, monitoring, reporting and supporting the generation and the employment of air and space power on behalf of CJOPS; maintaining an overview of all Air Command flying or ground activities and monitoring Air Force RTS activities.

DGACOPS appointment serves a dual-hatted responsibility as both Director General Air (DGAIR) within the HQJOC staff under the CJOPS and as DGACOPS within the HQAC organisation under ACAUST. The AOC is the primary portal between AFHQ, HQAC, and HQJOC for matters relating to the assignment of Air Force elements to CJOPS and the subsequent employment

and sustainment of assigned Air Force elements for operations and exercises.

The AOC is located within HQJOC in Bungendore, New South Wales.

Air Command Organisation

Air Command comprises a headquarters that provides command over Air Force combat elements that have been organised into six Force Element Groups (FEGs), as summarised in Table 3 and described in more detail later in this guide.

- Air Combat Group (ACG)
- Air Mobility Group (AMG)
- Surveillance and Response Group (SRG)
- Air Force Training Group (AFTG)
- Combat Support Group (CSG)
- Air Warfare Centre (AWC)

Force Element Groups

The Air Force disposition of capabilities is organised into a hierarchical structure based on assigning discrete capabilities to separate units as Force Elements, which in turn are aggregated into Force Element Groups, as depicted in Table 3 over page:



AIR COMBAT GROUP Roles: control of the air and strike Headquarters ACG RAAF Base Williamtown (WLM)	AIR MOBILITY GROUP Role: air mobility Headquarters AMG RAAF Base Richmond (RIC)	SURVEILLANCE AND RESPONSE GROUP Roles: surveillance, reconnaissance, airspace management, maritime response Headquarters SRG RAAF Base Williamtown (WLM)
<p>No 78 Wing</p> <ul style="list-style-type: none"> Headquarters RAAF Base Williamtown No 4 Squadron (PC-21 FAC) RAAF Base Williamtown No 76 Squadron (Hawk 127) RAAF Base Williamtown No 79 Squadron (Hawk 127) RAAF Base Pearce No 278 Squadron (Technical Training) RAAF Base Amberley <p>No 81 Wing</p> <ul style="list-style-type: none"> Headquarters RAAF Base Williamtown No 2 Operational Conversion Unit (F/A-18A/B Hornet) RAAF Base Williamtown No 3 Squadron (F-35A Lightning II) RAAF Base Williamtown No 75 Squadron (F/A-18A/B Hornet) RAAF Base Tindal No 77 Squadron (F/A-18A/B Hornet) RAAF Base Williamtown <p>No 82 Wing</p> <ul style="list-style-type: none"> Headquarters RAAF Base Amberley No 1 Squadron (F/A-18F Super Hornet) RAAF Base Amberley No 6 Squadron (EA-18G Growler) RAAF Base Amberley 	<p>No 84 Wing</p> <ul style="list-style-type: none"> Headquarters RAAF Base Richmond No 35 Squadron (C-27J Spartan) RAAF Base Amberley No 37 Squadron (C-130J Hercules) RAAF Base Richmond Air Mobility Training Development Unit (AMTDU) RAAF Base Richmond <p>No 86 Wing</p> <ul style="list-style-type: none"> Headquarters RAAF Base Amberley No 33 Squadron (KC-30A) RAAF Base Amberley No 34 Squadron (VIP) (737 BBJ, Falcon 7X) Defence Establishment Fairbairn No 36 Squadron (C-17A) RAAF Base Amberley <p>Air Mobility Division</p> <ul style="list-style-type: none"> Air Mobility Control Centre (AMCC) RAAF Base Richmond 	<p>No 41 Wing</p> <ul style="list-style-type: none"> Headquarters RAAF Base Williamtown No 1 Remote Sensor Unit RAAF Base Edinburgh No 3 Control & Reporting Unit RAAF Base Williamtown No 114 Mobile Control & Reporting Unit RAAF Base Darwin Surveillance and Control Training Unit, RAAF Base Williamtown <p>No 42 Wing</p> <ul style="list-style-type: none"> Headquarters RAAF Base Williamtown No 2 Squadron (E-7A) RAAF Base Williamtown No 10 Squadron (Triton, due 2023) RAAF Base Edinburgh <p>No 44 Wing</p> <ul style="list-style-type: none"> Headquarters RAAF Base Williamtown Headquarters No 452 Squadron (Air Traffic Control) RAAF Base Darwin Headquarters No 453 Squadron (Air Traffic Control) RAAF Base Williamtown <p>No 92 Wing</p> <ul style="list-style-type: none"> Headquarters RAAF Base Edinburgh No 11 Squadron (P-8A) RAAF Base Edinburgh No 292 Squadron (Operational Conversion) RAAF Base Edinburgh

Table 3. Air Command comprises six Force Element Groups.

AIR FORCE TRAINING GROUP Role: personnel training Headquarters AFTG RAAF Base Williams (WIL)	COMBAT SUPPORT GROUP Role: air base operation support services Headquarters CSG RAAF Base Amberley (AMB)	AIR WARFARE CENTRE Role: deliver integrated air warfighting solutions for superior combat effectiveness Headquarters AWC RAAF Base Edinburgh (EDN)
Ground Academy <ul style="list-style-type: none"> Headquarters Ground Training Wing, RAAF Base Williams Defence Explosive Ordnance Training School (DEOTS) Orchards Hills, NSW RAAF School of Administration & Logistics Training (RAAFSALT) RAAF Base Wagga RAAF Security & Fire School (RAAFSFS) RAAF Base Amberley RAAF School of Technical Training (RAAFSTT), RAAF Base Wagga Headquarters RAAF College (HQRAAFCOL) No 1 Recruit Training Unit (1RTU), RAAF Base Wagga Officers' Training School (OTS), RAAF Base East Sale School of Postgraduate Studies (SPS), RAAF Base Wagga Air Force Band (AFBAND), RAAF Williams, Laverton Air Academy <ul style="list-style-type: none"> Headquarters Air Training Wing, RAAF Base Williams No 1 Flying Training School (1FTS), RAAF Base, East Sale No 2 Flying Training School (2FTS) (PC-21), RAAF Base Pearce Air Mission Training School, RAAF Base, East Sale No 32 Squadron (KA 350), RAAF Base, East Sale Central Flying School (CFS), RAAF Base, East Sale Combat Survival Training School (CSTS), RAAF Base Townsville RAAF Museum, RAAF Base Point Cook School of Air Traffic Control (SATC), RAAF Base, East Sale 	No 95 Wing <ul style="list-style-type: none"> Headquarters RAAF Base Amberley Nos 1, 2 and 3 Security Forces Squadrons (RAAF Bases Williamtown, Amberley & Edinburgh resp.) No 1 Combat Communications Squadron (RAAF Base Richmond) No 65 Squadron (Air Base Recovery) No 295 Squadron (Operational Conversion) Nos 381, 382 and 383 Squadrons (Contingency Response) (RAAF Bases Williamtown, Amberley & Townsville) No 96 Wing <ul style="list-style-type: none"> Headquarters RAAF Base Amberley No 13 Squadron, Darwin No 17 Squadron, Tindal No 19 Squadron, hosted by RMAF Butterworth, Malaysia No 20 Squadron, Woomera No 21 Squadron, Melbourne No 22 Squadron, Sydney No 23 Squadron, Brisbane No 24 Squadron, Adelaide No 25 Squadron, Perth No 26 Squadron, Newcastle No 27 Squadron, Townsville and Scherger No 29 Squadron, Hobart No 30 Squadron, East Sale No 31 Squadron, Wagga Wagga Health Services Wing <ul style="list-style-type: none"> Headquarters RAAF Base Amberley Nos 1 and 2 Expeditionary Health Squadrons (RAAF Bases Amberley & Williamtown) No 3 Aeromedical Evacuation Squadron (RAAF Base Richmond) Health Operational Conversion Unit (RAAF Base Amberley) Combat Support Control Centre <ul style="list-style-type: none"> Headquarters RAAF Base Amberley 	Test and Evaluation Directorate <ul style="list-style-type: none"> Headquarters RAAF Base Edinburgh Aircraft Research and Development Unit (ARDU), RAAF Base Edinburgh Air Warfare Engineering Squadron (AWE SQN), RAAF Base Edinburgh Institute of Aviation Medicine (IAM), RAAF Base Edinburgh Aeronautical Information Service – Air Force (AIS-AF) Victoria Barracks, Melbourne Information Warfare Directorate <ul style="list-style-type: none"> Headquarters RAAF Base Edinburgh Joint Electronic Warfare Operational Support Unit (JEWOSU) RAAF Base Edinburgh No 87 Squadron (Mission Intelligence) RAAF Base Edinburgh No 460 Squadron (Targeting) Russell Offices, Canberra No 462 Squadron (Cyber) RAAF Base Edinburgh Air Intelligence Training Unit RAAF Base Edinburgh Distributed Ground Station - Australia - (DGS-AUS) RAAF Base Edinburgh Air Force Ranges Directorate <ul style="list-style-type: none"> Headquarters RAAF Base Edinburgh Air Force Air Weapon Ranges (AWR) Live, Virtual and Constructive (LVC) Air Force Test Range Squadron Tactics and Training Directorate <ul style="list-style-type: none"> Headquarters RAAF Base Williamtown No 88 Squadron (Integrated Tactics Development) RAAF Base Williamtown Air Warfare School (Advanced Warfare Training) RAAF Base Williamtown

Air Combat Group

Function

Air Combat Group (ACG) is responsible for delivering Australia's capability to control the air and conduct precision strike and electronic attack. To achieve this, ACG operates a fleet of modern air combat and training aircraft, supported and employed by a highly trained team of air power specialists.

ACG employs approximately 1850 personnel, including aircrew and aircraft technical maintenance personnel at air bases across Australia. The group is responsible for Air Force aircraft squadrons of F/A-18A/B Hornet, F/A-18F Super Hornet, EA-18G Growler, Hawk 127 Lead-In

Fighter, F-35A Lightning II, and the PC21 Forward Air Control training aircraft.

As shown in figure 6, ACG units are based at RAAF Bases Williamtown, Amberley and Tindal.

Organisation

Headquarters ACG, located at RAAF Base Williamtown, commands:

- **No 78 Wing** that conducts operational training using the Hawk 127 aircraft at Nos 76 and 79 Squadrons, including the conduct of Lead In Fighter training for air combat aircrew. No 278 Squadron provides ground training and simulator training and maintenance personnel at Air Force bases across Australia. No 4 Squadron trains Forward Air and Joint



Figure 6. Air Combat Group organisation and disposition.

Terminal Attack Controllers, provides CAS training to Army units, and is the home of Air Force's CCT capability which is an advance force element which integrates air power effects for Special Operations Command units.

- **No 81 Wing** consists of No 3 Squadron, operating the F-35A Lightning, and Nos 75, and 77 Squadrons, operating the F/A-18A/B Hornet. The wing also includes No 2 Operational Conversion Unit which provides training for aircrew converting to the Hornet and conducts other air-combat-related courses.
- **No 82 Wing** consists of No 1 Squadron, operating the F/A-18F Super Hornet multi-role aircraft, and No 6 Squadron which operates the EA-18G Growler electronic attack aircraft.

Future Capability

ACG will continue transitioning from the F/A-18A/B Hornet to the F-35A Lightning until 2022. The new air combat aircraft involves a shift to modernised facilities in Williamtown and Tindal, and will change the way ACG delivers and supports air combat capability.

No 78 Wing has assumed a Tactical Air Wing role, to focus on tactical integration of air power in support of land forces. No 78 Wing will assume responsibility for the force generation of Battlefield Air Controllers in close co-operation with Surveillance and Response Group. No 78 Wing will also be responsible for the integration of armed, remotely piloted aircraft with land forces from 2022.



Air Mobility Group

Function

Air Mobility Group (AMG) is responsible for providing primary ADF air mobility capability. AMG roles include air logistics support (ALS), airborne operations (ABNOPS - moving combat forces into and within combat areas), air-to-air refuelling (AAR) and aeromedical evacuation (AME) missions. With over 1420 personnel, AMG operates all of the Air Force C-17A Globemaster III, KC-30A Multi-Role Tanker Transport (MRTT), C-130J Hercules, C-27J Spartan, B737 Boeing Business Jet (BBJ), and Falcon 7X (F7X) aircraft.

As shown in figure 7, AMG units are based at RAAF Bases Richmond and Amberley

and Defence Establishment Fairbairn, in Canberra, Australian Capital Territory.

Organisation

Headquarters AMG, at RAAF Base Richmond, commands two operational wings and the Air Mobility and Control Centre (AMCC):

- **No 84 Wing** conducts medium and battlefield air mobility and training. No 35 Squadron provides the ADF with a battlefield airlift capability with the C-27J Spartan. No 37 Squadron operates the Lockheed C-130J providing tactical and operational air mobility capability. Air Mobility Training Development Unit (AMTDU) improves the Air Force's air mobility capability through the certification of current and new ADF



Figure 7. Air Mobility Group organisation and disposition

equipment for air transport and aerial delivery. It also develops improved systems for airborne delivery and provides Army air logistics training.

- **No 86 Wing** conducts heavy air mobility, AAR and VIP transport. No 33 Squadron operates the KC-30A MRTT aircraft delivering AAR capability as well as a highly effective, strategic-airlift and VIP capability. No 34 Squadron transports VIP and senior ADF leaders in 737 BBJ and Falcon 7X aircraft and No 36 Squadron operates C-17A Globemaster III heavy-lift transport aircraft providing global air mobility for the ADF.
- **Air Mobility Control Centre** is responsible for the effective application of available ADF air mobility resources through the

planning, organisation, control and monitoring of air mobility missions.

These missions include operations such as humanitarian assistance and disaster relief (HADR), support and participation in exercises, and the provision of air mobility support to ADF.

Future Capability

AMG will operate the current fleet of aircraft for the next 15+ years. A number of upgrades and modifications are planned in order to keep the current fleet effective in their primary roles and provide joint and networked effects to support ADF operations.



Surveillance and Response Group

Function

Surveillance and Response Group (SRG) provides Air Force's core ISR capability. SRG comprises 2300 personnel. The FEG provides the surveillance, reconnaissance, Air Battle Management (ABM), Air Traffic Control (ATC) and Maritime Response Capability for the ADF and Australian aviation industry.

SRG operates the P-8A Poseidon and E-7A Wedgetail aircraft. SRG also provides: battlespace management using the Vigilare command and control system; wide area surveillance using the Jindalee Operational Radar Network (JORN); space surveillance

C-band radar and telescope; and Air Base Air Traffic Services (ABATS).

As shown in figure 8, SRG has assets and detachments located in all mainland Australian states, as well as in Malaysia and other overseas locations. The group's major formations are located at RAAF Bases Williamtown, Edinburgh and Base Darwin.

Organisation

Headquarters SRG, located at RAAF Base Williamtown, commands the following Wings:

- **No 41 Wing** includes all of Air Force's Air Defence Ground-Environment (ADGE) operational and training units. No 1 Remote Sensor Unit (1RSU) operates JORN. No. 3 Control & Reporting Unit (3CRU) operates a Control and Reporting



Figure 8. Surveillance and Response Group organisation and disposition.

Centre (CRC) using networked sensors to provide tactical command and control and ISR of the battlespace. No 114 Mobile Control and Reporting Unit (114MCRU) delivers expeditionary air surveillance and air battle management capabilities in support of integrated air and space defence. Surveillance and Control Training Unit (SACTU) provides both Initial and post employment training for Air Surveillance Operators (ASOPs) and Air Battle Managers (ABMs).

- **No 42 Wing** consists of No 2 Squadron that operates the E-7A Wedgetail Airborne Early Warning and Control (AEW&C) capability. The Wing is also responsible for No 10 Squadron which will operate MQ-4C Triton Unmanned Aircraft System.

- **No 44 Wing** provides military airspace management and ABATS for civil, domestic and international aircraft and battlespace management in support of all ADF elements. Nos 452 and 453 Squadrons manage all military ATC flights across Australia and the ATC technical workforce.
- **No 92 Wing** consists of No 11 Squadron that operates the P-8A Poseidon aircraft that performs undersea (Anti-Submarine Warfare) and surface (Anti-Ship) warfare, maritime surveillance, overland ISR, naval fleet support and search and survivor supply missions. No 292 Squadron conducts simulation and training for Poseidon air and ground crews.



Air Force Training Group

Function

AFTG is responsible for the provision of training to members of Air Force, as well as some personnel from Navy, Army and overseas defence forces. AFTG uses best practice training and education philosophies, methods and tools to deliver innovative training that supports and promotes Air Force.

As shown in figure 9, AFTG units are based at RAAF Bases Williams, Amberley, East Sale, Pearce, Point Cook, Townsville, Wagga, and Defence Establishment Orchard Hills.

Organisation

Headquarters AFTG, located at RAAF Base Williams, is responsible for providing policy guidance, support and strategic planning.

- **Air Academy** is responsible for conducting basic and instructor training for pilots, mission aircrew and air traffic controllers. It also provides aircrew combat survival training for Air Force and other Australian Defence Force personnel. The Air Academy manages: No 1 Flying Training School (1FTS); No 2 Flying Training School (2FTS); No 32 Squadron; Air Mission Training School (AMTS); Central Flying School (CFS); Combat Survival Training School (CST); RAAF Museum; and School of Air Traffic Control (SATC).

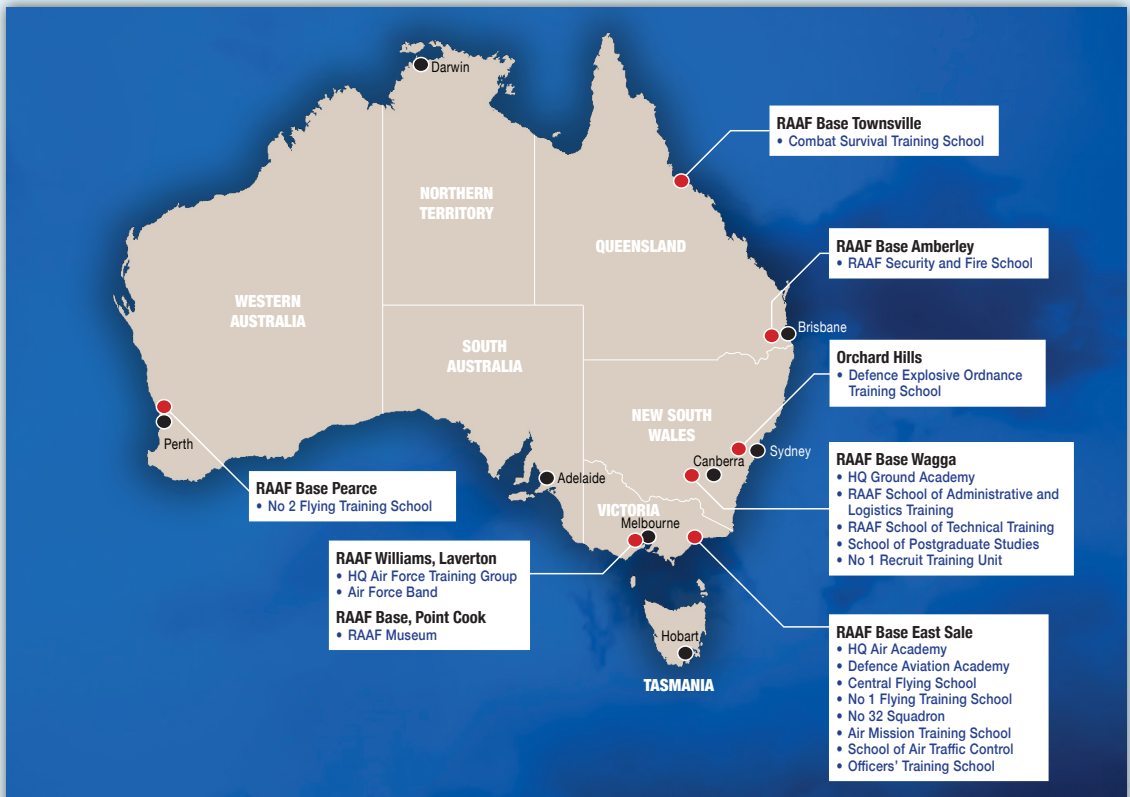


Figure 9. Air Force Training Group organisation and disposition.

- **Ground Academy** provides entry level and specialist training across a broad range of ground-based musterings and specialisations including security, fire and ground defence, administration and logistics, technical trades, and explosive ordnance. Ground Academy manages: No 1 Recruit Training Unit (1RTU); Air Force Band; Defence Explosive Ordnance Training School (DEOTS); Officer Training School (OTS); School of Administrative and Logistics Training (SALT); Security and Fire School (SFS); School of Technical Training (STT); and School of Postgraduate Studies (SPS).

Other Capabilities

Air Force Roulettes. Pilots selected for the Roulettes are drawn from the Qualified Flying Instructor staff posted to CFS, located at RAAF Base East Sale, Victoria. The Roulettes demonstrate technically demanding, spectacular aerobatics displays to the public.

Air Force Balloon. The Canberra-based hot-air balloon is flown by pilots who are posted to “D Flight” at CFS. The balloon team often travels to regional or remote communities that do not have an airport. These visits provide public relations opportunities for members of the community to meet Air Force personnel, introduce young people to aviation, and inspire an interest in the Air Force.



Combat Support Group

Function

Combat Support Group (CSG) provides air base support services which enables Air Force roles including command and control, force protection, and force generation and sustainment. With over 5400 personnel, CSG is the largest Air Force Force Element Group. As shown in figure 10 and is located across Australia and other overseas locations. CSG major formations are located at RAAF Bases Amberley, Williamtown, Richmond, Townsville and Edinburgh.

Structure

Headquarters CSG, located at RAAF Base Amberley, commands the Combat Support Division (CSD) and three wings.

- **No 95 Wing** provides expeditionary combat air base support capability. Nos 1, 2 and 3 Security Force Squadrons provide security and airbase defence. No 381, 382 and 383 Squadrons provides a short notice to move airbase operational capability. No 1 Combat Communications Squadron provides communications and information systems in domestic and deployed environments. No 65 Squadron provides air base recovery support to expeditionary air operations via explosive hazard reduction and airfield engineering effects. No 295 Squadron is the primary provider for individual operational conversion, collective training, standardisation and preparedness for CSG personnel.
- **No 96 Wing** provides air base support at permanent and bare bases across Australia,

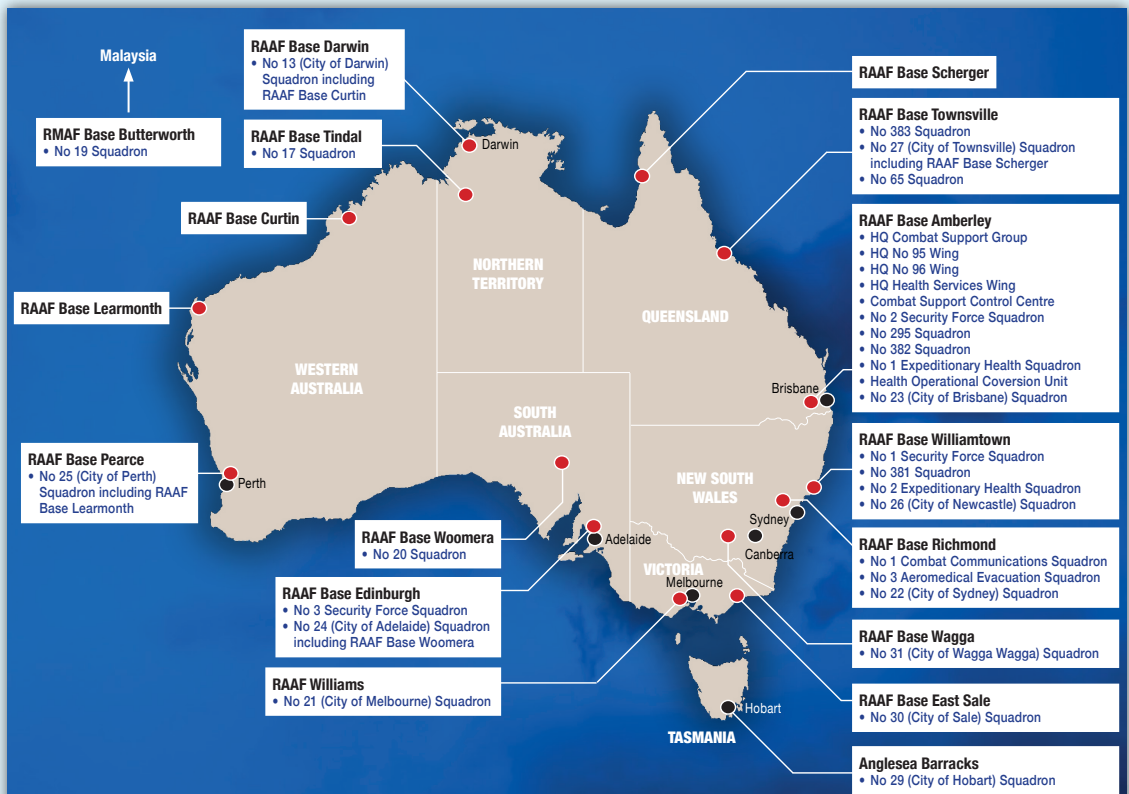


Figure 10. Combat Support Group organisation and disposition.

these include the following squadrons: Nos 13, 17, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30 and 31; and No 19 Squadron at RMAF Base Butterworth, Malaysia.

- **Health Services Wing** provides deployable operational health support. Nos 1 and 2 Expeditionary Health Squadrons provide deployable health support to air operations. No 3 Aeromedical Evacuation Squadron provides an ADF domestic and expeditionary aeromedical evacuation capability. Health Operational Conversion Unit provides military health education and training.
- **Combat Support Division (CSD)**. CSD is an operational level division of the Air Operations Centre (AOC) which injects combat support considerations into operational level immediate and deliberate

planning. CSD provides a link between operational level planning conducted by HQJOC, Air Command and the AOC and tactical level planning conducted by CSG Wings and Squadrons.

Future Capability

Future CSG support to Air Force formations will involve some of the latest technology and innovation. New Striker air transportable firefighting vehicles will provide an aircraft firefighting capability. New surveillance systems will ensure effective coverage into the next decade. A new suite of deployable camp infrastructure is being procured, including: shelters, ablutions, laundry and power generation. Unmanned ground vehicles have been trialled as a delivery vehicle or as a mobile sensor/surveillance capability.



Air Warfare Centre

Function

The Air Warfare Centre (AWC) enables the capabilities of the other warfighting FEGs and joint capabilities and also promotes warfighting integration across the ADF and through collaboration with our coalition partners. AWC outputs comprise: mission intelligence, target Intelligence, defensive cyber, and Electronic Warfare support; flight test and evaluation, Aeronautical Information Services, and Aviation Medicine training and services.

Organisation

Headquarters AWC is located at RAAF Base Edinburgh and commands four directorates.

- **Test and Evaluation Directorate (TED)** consists of: Aeronautical Information Service–Air Force (AIS-AF) that provides ADF and Air Services Australia with tailored, accurate and current aeronautical information; Aircraft Research and Development Unit (ARDU) provides flight test expertise for ADF; Air Warfare Engineering Squadron (AWE SQN) designs and develops non-standard modifications to support ground and flight tests; RAAF Institute of Aviation Medicine (IAM) conducts research and training of ADF aircrew to understand and manage the physiological challenges of flight.
- **AF Ranges Directorate (AFRD)** provides Air Force air weapon ranges and simulation. These include: Woomera Test Range (WTR); and Air Weapon Ranges (AWR)



Figure 11. Air Warfare Centre organisation and disposition.

- **Information Warfare Directorate (IWD)** centralises Air Force's tactical information warfare elements and consists of: Joint Electronic Warfare Operational Support Unit (JEWOSU) provides electronic warfare support to Defence; Distributed Ground System – Australia (DGS-AUS) will improve real time multi-sensor and multi-platform ISR data-to-decision maker capability for ADF and allied forces; No 87 Squadron is responsible to Air Force for the provision of intelligence for decision superiority and the delivery of precision effects; No 462 Squadron exploits the information domain and supports operations; No 460 Squadron is Air Force's targeting squadron; Air Intelligence Training Unit (AITU) develops and delivers air intelligence training.
- **Tactics and Training Directorate (TTD)** focuses on the development of multi-discipline, high-end integrated tactics and training across Air Force and consists of: No

88 Squadron whose aim is to design and facilitate integrated tactics; Air Warfare School (AWS) provides advanced training for AWC specialist staff and ADF warfighting practitioners.

Future Air Warfare Centre Capability

Woomera is being upgraded with modern networked deployable systems. Delamere is being enhanced by introduction of a Mobile Threat Training Emitter System (MTTES) that can be employed at a number of prepared sites. Joint Survivability and Tactics Validation Unit (JSTVU) was established to increase survivability of ADF maritime and Land platforms. From January 2021, JSTVU will be combined with JEWOSU's current Air CMD&V functions, and command and control will transition to Commander AWC. Australian, Canadian, UK Reprogramming Lab (ACURL) provides both the RAAF and UK with a sovereign Mission Data Reprogramming capability to support the introduction to service and future evolution of F35.



AIR FORCE PEOPLE

Air Force Professional Mastery

Achieving professional mastery through learning is critical for the transformation to a genuinely fifth-generation Air Force because the advanced technology is only a part of the capability that needs to be realised. Air Force has successfully introduced new and technologically advanced air power systems in order to modernise Air Force capabilities. However, without a skilled and innovative workforce, these modernised systems will not realise their full potential for the joint force. Accordingly, in addition to attracting and retaining high-quality personnel, Air Force must organize and develop them as masters of their profession.

Air Force People

An important factor in the generation of air power is Air Force's people. It takes more than just aircrew to generate air power and Air Force is comprised of a multitude of people in various trades which Air Force organises into employment categories (airmen musters and officer specialisations). The logistics officer and the aircraft technician are just as important to the successful application of air power as the fighter pilot. In addition to skilled personnel in uniform, Air Force requires appropriately skilled public service, contractor and industry personnel employed where necessary to complement the uniformed workforce.

Over the next decade the number of people leaving employment will be much more than



the number of people joining the workforce. Additionally, the Australian workforce is facing a skills shortage that is creating strong competition for people for the workforce.

The challenge for Air Force is to attract and retain the people, in the right numbers to provide greater workforce flexibility and agility. This is fundamental to the sustainment of the Air Force's future capability.

The Total Workforce System (TWS) introduces versatile service arrangements which enables Air Force to draw on the skills and experiences of Service Categories. A core component of the TWS is the service spectrum of casual, part-time and permanent service categories and work options.

As well, the TWS provides commanders and managers with a workforce which has the agility to ascribe labour to tasks based on the nature, frequency and duration of work.

Service Categories (SERCAT)

SERCAT 7 is a permanent employee, SERCAT 6 is a permanent employee working on a part time basis, SERCAT 5 is a part time employee, SERCAT 4 is a part time employee on high readiness for exercise or operational deployment, SERCAT 3 is a casual employee (annualised) and SERCAT 2 is an ex-serving member no longer active but still on standby for mobilisation.

Air Force Job Families

The Air Force job family structure has been principally instituted for the purpose of employing a 'job family' approach to allow employment groups who have similar roles/work to be grouped together for analysis purposes. The Air Force job families and each family's list of employment categories are listed below.

Air & Operations

- Air Surface Integration Officer/Combat Control Officer (ASIO/CCO)
- Combat Controller (CC)
- Crew Attendant (CREWATT)
- Flight Engineer (FLTENG)
- Loadmaster (LOADM)
- Airborne Electronics Analyst (AEA)

Air Technical

- Aeronautical Life Support Fitter (ALSFITT)
- Armament Technician (ARMTECH)
- Aircraft Structural Technician (ASTTECH)
- Aviation Support Technician (*Gap Year only*) (AVSUPTECH)
- Aircraft Surface Finisher (ASURFIN)
- Aircraft Systems Technician (ASYSTECH)
- Aircraft Technician (ATECH)
- Avionics Technician (AVTECH)
- Avionics Systems Technician (AVSYSTECH)
- Non-Destructive Inspection Technician (NDITECH)
- Systems Technician (SYSTECH)

Engineering

- Aerospace Engineer Officer-Aeronautical (AERO)
- Aerospace Engineer Officer-Armament (ARM)
- Aerospace Engineer Officer-Electronics (ELECTR)
- Airfield Engineer (AFENG)

Force Protection and Discipline

- Air Base Protection (ABP)
- Airfield Defence Guard (ADG)
- Air Force Police (AFPOL)
- Air Force Security (AFSEC)
- Fire Fighter (FIREFTR)
- Ground Defence Officer (GRDEF)
- Security Policy (SECPOL)



Ground Technical

- Communications Electronic Systems Technician (CESYSTech)
- Communications Electronics Technician (CETech)
- Ground Mechanical Engineering Technician (GMETech)
- Grounds Support Equipment (GSE)
- Surveillance Technician (STech)

Health

- Dental Assistant (DENTASST)
- Dental Officer (DENT)
- Environmental Health Officer (ENVH)
- Laboratory Officer (LAB)
- Laboratory Technician (LABTECH)
- Medical Assistant (MEDASST)
- Medical Officer (MED)
- Nursing Officer (NURS)
- Pharmacist (PHARM)
- Radiographer (RADIOG)
- Senior Dental Assistant - Preventative (SDAP)
- Specialist Reserve Health (SR HEALTH)

Infrastructure Technical

- Carpenter (CARPENTER)
- Electrician (ELEC�)
- Plant operator (PLANTOP)
- Plumber (PLUMBER)
- Works supervisor (WKSSPVR)

Intelligence and Information Systems

- Air Intelligence Analyst (AIA):
 - Geospatial Intelligence (GEOINT)
 - Operational Intelligence (OPINT)
 - Signals Intelligence (SIGINT)
- Air Surveillance Operator (ASOP)
- Communications Information Systems Controller (CISCON)
- Intelligence Officer (INTELO)
- Cyber Warfare Officer (CWO)
- Cyber Warfare Analyst (CWA)
- Network Technician (NETECH)
- Network Engineer (NETENG)

Logistics

- Logistics Officer (LOGO)
- Cook (COOK)
- Movements (MOV)
- Motor transport driver (RAAF Active Reserve only) (MTD)
- Supply (SUP)

Officer Aviation

(managed as a family of streams)

- Air Battle Manager (ABM)
- Airborne Electronics Officer (AEO)
- Air Traffic Controller (ATC)
- Air Mobility Officer (AMO)
- Fast Jet Pilot (FJP)
- Fixed Wing Pilot (FWP)
- Remote Pilot (RP)
- Maritime Patrol and Response Officer (MPRO)
- Weapon Systems Officer (WSO)
- Operations Officer (OPS)

Support Operations

- Air Force Imagery Specialist (AFIS)
- Chaplain (CHAP)
- Legal Officer (LEGALO)
- Musician (MUSICIAN)
- Personnel Capability Officer (PCO)
- Personnel Capability Specialist (PCS)
- Personnel Psychologist (PERS PSYCH)
- Physical Training Instructor (PTI)
- Training Systems Officer (TSO)
- Public Affairs Officer - Specialist Reserve (PAO-SR)

Future Air Force People Capability

In a rapidly changing world, the Air Force has embarked on an unprecedented capability modernisation program. This will be achieved through the introduction of new capabilities such as the Integrated Air and Missile Defence system, remotely piloted aircraft and a world class Battle Management System. Air Force must be prepared by recruiting and upskilling its people as these capabilities come online.

Along with delivering Air Force's capability modernisation program, delivery of supporting capabilities such as Cyber, Intelligence, Air Traffic Control and Space will place a great demand on the current workforce. Timely and accurate workforce planning has never been more critical in ensuring the Air Force personnel are ready and able to transition to the changed operating environment.

Air Force Reserves

The Air Force Reserves operate across the continuum of Air Force functions and missions performing day-to-day support and mobilisation roles in peacetime, warlike, contingency, domestic and humanitarian emergencies. The Reserve's primary focus has shifted from a purely strategic role to a day-to-day support role whilst retaining its requirement to provide a workforce surge capability in the event of a major contingency. Since 2006, Reserve members have been fully integrated within Air Force, tri-Service units and non-Service organisations across Australia.

The Reserves are a component of the integrated workforce that enhances the capacity for commanders to sustain operations and meet surge requirements. The Air Force intent is integrating Reserves into the workforce so there is no distinction between the Reservist and Permanent Air Force member. Ideally, this combined contribution, in an integrated workforce, will deliver a richer and enhanced capability to the Air Force team outcome, noting that many Reservists have a diverse range of skills, academic qualifications and experience not usually held by someone at their Service rank.



Reserve personnel are a direct enabler to Air Force capability by providing niche support on a part-time basis in roles that do not require a full-time person allocated to a task. The employment of Reservists in this manner provides greater flexibility to the Air Force and at the same time meets the unique individual requirements of many Reserve personnel.

Australian Air Force Cadets

The Australian Air Force Cadets (AAFC) is a community based, youth oriented organisation with a military and aviation focus that is administered and actively supported by Air Force. The AAFC was originally established in 1941 as the Air Training Corps and was a part of the Empire Training Scheme. Its original aim was to provide pre-entry training for air and ground crews for the RAAF during the Second World War.

The AAFC evolved from the ATC as an effective and popular youth development organisation for girls and boys between the ages of 13 and 18 years of age who are Australian citizens and who are physically able to participate in some of the many and varied activities on offer. The cadets, and volunteer officers and instructors of the AAFC, are organised into separate Wings established in each state and territory.

Cadets attend weekly parades, and school holiday encampments. Cadets follow a set training syllabus with activities such as flying, fieldcraft, adventure training, firearms safety training, drill and ceremonial, service knowledge, aeromodelling, navigation, and gliding. The training imparts new knowledge and the cadets acquire valuable life skills and develop qualities such as leadership, self-reliance, self-discipline, self-

respect, good communication, teamwork and citizenship. AAFC also provides opportunities for cadets to apply for the International Air Cadet Exchange Program (IACE) and the Duke of Edinburgh Awards scheme.

Future Australian Air Force Cadets Capability

In order to align with a contemporary, integrated Air Force, the AAFC aims to bring an awareness to cadets of the range of Australian Defence aerospace industry opportunities, both military and civilian. In association with this aim, and along with the traditional aviation skills and experiences, the AAFC actively supports the Air Force's 'Science, Technology, Engineering and Mathematics' (STEM) initiatives through STEM-focused youth activities, such as remote piloted aircraft programs, rocketry, cyber activities and science-based community competitions. Air Force recognises the potential inherent in the AAFC and has committed considerable resources towards supporting the AAFC through the provision of a fleet of new DA-40NG light aircraft and a fleet of DG1000 gliders, which provides cadets with a range of aviation experiences, from a simple flying experience, through to a solo pilots licence.

Australian Defence Force Ranks and Insignia

The Air Force rank and insignia system forms a part of the backbone of the Australian Defence Force and indicates a member's role and degree of responsibility. Historically, the Air Force ranks are based on those used by the Royal Air Force, going back to the Second World War, although there are some differences in the insignia, as shown on the following page.

AUSTRALIAN DEFENCE FORCE BADGES OF RANK AND SPECIAL INSIGNIA

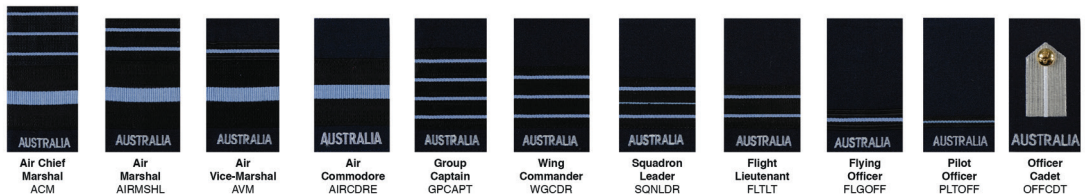
NAVY



ARMY



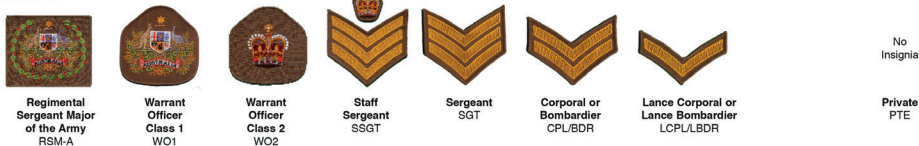
AIR FORCE



NAVY



ARMY



AIR FORCE



PART 2 - AIR FORCE CAPABILITIES



INTRODUCTION

This section describes the air combat systems that generate the capabilities Air Force operates today and into the near future. Air Force operates a wide variety of complex technological systems that enable it to apply potent and effective air power effects required by joint force commanders at the direction of Government.

Air Force's systems are able to employ a variety of weapons to achieve different effects to meet operational requirements. Given the number and diverse nature of Air Force's systems, at any one time some will be evolving, some will be undergoing upgrade, some will be nearing the end of service life and replacement, and some

new capabilities will be in the process of selection or introduction.

Having the required skilled people and ensuring all requirements of the FIC are met are essential to the generation, employment, and sustainment of air power. Actual air power effects are provided, however, by the technological systems that Air Force employs in order to provide response options for the Australian Government across the full range of operations. A full range of operations covers humanitarian assistance/disaster relief efforts and other missions along the spectrum of conflict up to, and including, high-end conventional warfighting.



SUMMARY OF AIR FORCE CAPABILITIES

The tabulated list below shows a summary of Air Force capabilities and roles, aggregated into Force Element Groups, which are described in more detail later in this guide.

Air Combat Group

- **F-35A Lightning II**
multi-role fighter
- **EA-18G Growler**
airborne electronic attack
- **F/A-18F Super Hornet**
multi-role fighter
- **F/A-18A/B Hornet**
multi-role fighter
- **Hawk 127 Lead-in Fighter**
introductory fighter aircraft conversion
- **Pilatus PC-21**
forward air control
- **Combat Control Team**

Surveillance and Response Group

- **P-8A Poseidon**
maritime patrol and response
- **MQ-4C Triton Unmanned Aircraft System**
maritime patrol and surveillance
- **E-7A Wedgetail**
air battlespace management
- **MC-55A Gulfstream**
electronic warfare
- **Defence Air Traffic Control**
- **Jindalee Operational Radar Network**
- **Mobile Control and Reporting Centre**
- **Vigilare**
- **Space Surveillance Radar**
- **Space Surveillance Telescope**

Air Mobility Group

- **C-17A Globemaster III**
strategic airlift
- **C-130J Hercules**
tactical airlift
- **C-27J Spartan**
battlefield airlift
- **KC-30A Multi-Role Tanker Transport**
air-to-air refuelling and strategic airlift
- **737 Boeing Business Jet**
special purpose aircraft fleet
- **Falcon 7X**
special purpose aircraft fleet

Air Force Training Group

- **Pilatus PC-21**
pilot training
- **KA350 King Air**
training and passenger transport

Combat Support Group

- **Bushmaster**
protected mobility
- **Lightweight G-Wagon**
high-mobility, general-purpose transport
- **Military Working Dog**
security, crime prevention patrols, emergency response, and intruder detection
- **Panther Airfield Fire Truck**
aircraft rescue firefighting and structural rescue firefighting
- **Titan Truck Fire General Purpose**
aircraft rescue and firefighting
- **Woomera Range Complex**
test and evaluation of military systems

AIR COMBAT GROUP

Mission: To deliver Australia's capability to control the air and to conduct precision strike



F-35A Lightning II

Operational Characteristics

Manufacturer:	Lockheed Martin
Speed:	Mach 1.8 (2200 km/h)
Airframe:	15.7 m long, 4.40 m high, 10.7 m wingspan
Ceiling:	Above 45 000 ft (13.72 km)
Ferry Range:	2220 km (extended with air-to-air refuelling)
Combat Radius:	740 km (with weapons load)
Crew:	Pilot
Weapons:	AIM-120 AMRAAM radar missiles and AIM-9X Sidewinder missiles; Small Diameter Bomb; AGM-154 JSOW; Mk-80 series GP bombs; GBU-12 laser-guided and GBU-31 GPS-guided bombs; and 25-mm cannon.

Operational Employment

The F-35A Lightning II is the Australian Defence Force's first fifth-generation air combat capability. The F-35A is a fifth-generation fighter, with advanced survivability, lethality and supportability to ensure Australia maintains a capability edge against current and emerging threats. The F-35A incorporates comprehensive stealth technology, electronic protection, electronic attack and advanced countermeasures to survive in demanding threat environments. It has fused, multi-spectral sensors and advanced networking capabilities for an unprecedented level of situational awareness and when combined with advanced weapons, will deliver increased lethality against heavily defended targets.

The F-35A Lightning II delivers air power effects through control of the air, land and maritime strike and ISR in support of land and maritime forces. Australia has committed to 72 F-35A aircraft for squadrons at RAAF Base Williamtown, and RAAF Base Tindal. In the future, a fourth operational squadron will be considered, for a total of 100 F-35A aircraft.



E/A-18G Growler

Operational Characteristics

Manufacturer:	Boeing
Speed:	Mach 1.8 (2200 km/h)
Dimensions:	18.3 m long, 4.88 m high, 13.62 m wingspan
Ceiling:	Above 50 000 ft (15.24 km)
Ferry Range:	3330 km (extended with air-to-air refuelling)
Combat Radius:	1570 km (fully armed with external fuel tanks)
Crew:	Two (pilot and mission specialist)
Weapons:	AIM-120 AMRAAM radar-guided missiles; AGM-88 anti-radiation missile; AGM-154C JSOW; GPS-guided JDAM; and ALQ-128 wideband receiver, ALQ-99 tactical jamming pods.

Operational Employment

The E/A-18G Growler is a dual-seat, Force-Level Electronic Warfare (FLEW) aircraft capable of a wide range of electronic support and electronic attack actions in contested environments, as well as the ability to disrupt or jam a range of military electronics systems, including radars and communication systems. The E/A-18G utilises the F/A-18F airframe, engines, avionics and sensors with additional unique EW sensors and associated equipment.

Growler provides a new dimension to operations, unique to our region, which increases effectiveness and reduces the risk to ADF forces conducting operations across the land, maritime and air domains. The aircraft has nine weapon stations capable of carrying 13,600 kg of fuel, pods, and/or weapons in various configuration options.

Air Force currently has 11 E/A-18G Growlers operated by No 6 Squadron, based at RAAF Base Amberley, and employed in conjunction with ADF air, land and sea forces.



F/A-18F 'Rhino' Super Hornet

Operational Characteristics

Manufacturer:	Boeing (formerly McDonnell Douglas)
Speed:	Mach 1.6 (1960 km/h)
Dimensions:	18.3 m long, 4.9 m high, 13.6 m wingspan
Ceiling:	Above 50 000 ft (15.24 km)
Ferry Range:	2700 km (extended with air-to-air refuelling)
Crew:	Two (Pilot and Air Combat Officer)
Weapons:	AIM-120 AMRAAM radar-guided missiles, AIM-9X Sidewinder infra-red seeking missile, AGM-84 Harpoon anti-ship missiles, AGM-154C JSOW, conventional and laser-guided bombs, GPS-guided and laser-guided JDAMs, and M61A2 20-mm nose-mounted cannon.

Operational Employment

Larger than the F/A-18A/B 'Classic' Hornet, the F/A-18F 'Rhino' Super Hornet is a dual-seat aircraft that delivers an advanced air combat capability for all air-to-air and air-to-surface operations. The Super Hornet can be armed with both conventional and laser-guided weapons and, with its 11 weapon stations, is capable of carrying 14 515 kg of fuel and/or weapons in various configuration options. The F/A-18F enjoys increased combat survivability through reduced radar signature and an integrated defensive electronic-countermeasures suite. Equipped with APG-79 Active Electronically Scanned Array (AESA) radar, enhanced sensors and high-bandwidth network connectivity, the F/A-18F Super Hornet provides ADF with a true 4.5 generation fighter aircraft capability.

Air Force has 24 F/A-18F Super Hornets, operated by No 1 Squadron at RAAF Base Amberley.



F/A-18A/B 'Classic' Hornet

Operational Characteristics

Manufacturer:	Boeing (formerly McDonnell Douglas)
Speed:	Mach 1.8 (2200 km/h)
Dimensions:	17.1 m long, 4.7 m high, 12.4 m wingspan
Ceiling:	Above 45 000 ft (13.72 km)
Ferry Range:	2700 km (extended with air-to-air refuelling)
Combat Radius:	740 km
Crew:	Pilot (F/A-18A); instructor pilot & student (F/A-18B)
Weapons:	AIM-120 AMRAAM and AIM-132 ASRAAM guided missiles; AGM-84 Harpoon anti-ship missiles; Mk-80 series conventional and Paveway laser-guided bombs; GPS and laser guided JDAM; AGM-158 JASSM; and 20-mm nose-mounted cannon.

Operational Employment

The F/A-18A (single seat) and F/A-18B (twin seat) Hornets are multi-role fighter aircraft that first entered service with Air Force in the mid-1980s. Hornets have the ability to attack air, ground and maritime targets by employing a range of integrated systems, including precision guided weapons using a radar and infrared pod for sensing and targeting. The Hornet is capable of offensive and defensive counter air operations, strategic attack, anti-surface warfare, close air support of ground troops, and air interdiction.

Nos 3 and 77 Squadrons (operational squadrons) and No 2 Operational Conversion Unit (a training squadron) at RAAF Base Williamtown operate the F/A-18A/B Hornet. The aircraft is also operated by No 75 Squadron (an operational squadron) at RAAF Base Tindal. Air Force has 71 F/A-18A/B Hornets.



Hawk 127 Lead-In Fighter

Operational Characteristics

Manufacturer:	BAE Systems
Speed:	1207 km/h
Dimensions:	11.95 m long, 4.08 m high, 9.39 m wingspan
Ceiling:	50 000 ft (15.24 km)
Ferry Range:	1200 km
Crew:	Two (pilot instructor and student)
Weapons:	Air Intercept Missile (AIM)-9M infra-red missiles; practice, conventional and laser-guided bombs; and 30-mm cannon.

Operational Employment

The Hawk 127 aircraft prepares qualified Air Force aircrew for operational conversion onto the F/A-18A/B Hornet and F/A-18F Super Hornet. While not an operational aircraft, the Hawk 127 can fly night and day missions to train fast-jet aircrew in air-to-air and air-to-surface operations. The aircraft also provides lower-cost, fast-jet, close-air-support training and Navy air-defence training. The Hawk 127 is a training and support aircraft that will be upgraded to ensure it can meet future aircrew training requirements for the F/A-18F Super Hornet and the F-35A Lightning II.

The Hawk 127 is operated by No 76 Squadron at RAAF Base Williamtown and No 79 Squadron at RAAF Base Pearce.



Pilatus PC-21 Forward Air Control

Operational Characteristics

Manufacturer:	Pilatus
Speed:	685 km/h
Dimensions:	11.2 m long, 3.8 m high, 9.1 m wingspan
Ceiling:	25 000 ft (7.62 km)
Range:	1333 km
Crew:	Pilot & Forward Air Controller

Operational Employment

Based at RAAF Base Williamtown are four modified PC-21 (forward air control variant) aircraft in grey paintwork, fitted with smoke grenade dispensers for target marking. They are used to train ADF Joint Terminal Attack Controllers (formerly forward air controllers) who coordinate air support to troops on the ground.

No 4 Squadron at RAAF Base Williamtown operates four PC-21 aircraft for forward air controller training.



Combat Control Team

Operational Characteristics

Combat Effects: Joint Terminal Attack Control
Assault Zone
Reconnaissance
Advanced Force Operations
Weather Observation
Planning and Liaison
Pilot & Forward Air Controller

Operational Employment

The role of the Combat Control Team is to integrate, synchronise and control the elements of air and space power at the tactical level that enable the execution of precision attack and military advance force operations. It is an extension of Air Force's tactical command and control of air power to enable survivable, sustainable and credible operations in a non-permissive environment due to either enemy ground action or environmental considerations. Combat controllers contribute to capability through the provision of air power application within the Joint Operations Command, Air Command and Special Operations Command environments. Combat controllers provide the application of the following effects:

Combat controllers work either individually with other units or in small, discrete teams with a high degree of autonomy for decision-making founded on maturity and sound judgement when under significant environmental and physical stress.

SURVEILLANCE AND RESPONSE GROUP

Mission: Observe, inform, and control the battlespace through networked surveillance, battlespace management, and maritime warfighting capabilities



P-8A Poseidon

Operational Characteristics

Manufacturer:	Boeing
Speed:	907 km/h
Dimensions:	39.5 m long, 12.8 m high, 37.6 m wingspan
Ceiling:	41 000 feet (12.5 km)
Range:	2200 km combat radius with four hours on station
Ferry Range:	7500 km (extended with air-to-air refuelling)
Endurance:	10 hours (extended with air-to-air refuelling)
Crew:	Air Force pilots and mission aircrew (up to ten crew) are assigned to meet the mission needs.
Weapons:	Mark 54 torpedoes, AGM-84 Harpoon anti-ship missiles, and self-protection measures.

Operational Employment

The P-8A Poseidon provides an advanced and manned Maritime Intelligence Surveillance Reconnaissance & Response (MISRR) capability including anti-surface and anti-submarine warfare, maritime and overland ISR, electronic support, and search and survivor assistance.

The P-8A is capable of receiving air-to-air refuelling from the boom of tanker aircraft, such as Australia's KC-30A, pushing its endurance out to over 20 hours, making it possible to patrol Australia's isolated Southern Ocean territories.

RAAF Base Edinburgh is the main operating base for the P-8A Poseidons, operated by No 11 Squadron. The Government has committed to acquiring 15 P-8A Poseidon aircraft. Of these, 12 P-8A Maritime Patrol Aircraft have been approved for acquisition, and three are subject to normal Government Defence acquisition approval processes.



MQ-4C Triton Unmanned Aircraft System

Operational Characteristics

Manufacturer:	Northrop Grumman
Speed:	613 km/h
Dimensions:	14.5 m long, 4.6 m high, 39.9 m wingspan
Ceiling:	50 000 feet (15.24 km)
Range/Endurance:	24+ hours
Crew (on ground):	Flown by pilots from a ground station, supported by a co-pilot. ISR and data will be analysed by aircrew, intelligence and operations officers, engineers, and logisticians (depending on mission needs).
Equipment:	ISR sensor suite that provides a 360-degree view of its surroundings to over 2000 nautical miles.

Operational Employment

The MQ-4C Triton is a remotely piloted type of Unmanned Aircraft System (UAS) that Air Force will operate alongside the P-8A Poseidon. Triton, together with P-8A Poseidon, will provide Australia with an advanced maritime patrol and surveillance capability.

It is a high-altitude, long-endurance aircraft capable of all-weather surveillance and reconnaissance tasks over maritime and land environments. Reinforcements to the airframe and wing, along with de-icing and lightning protection systems allow the Triton to descend through cloud layers to gain closer views of ships and other targets at sea. With Australia's maritime area of operational interest covering over one-seventh of the world's oceans, the MQ-4C Triton will be a critical complement to Poseidon for Australian air power to contribute to maintain a credible national level of maritime awareness.

Up to seven MQ-4C Tritons will be stationed at RAAF Base Edinburgh, with a forward operating base at RAAF Base Tindal.



E-7A Wedgetail

Operational Characteristics

Manufacturer:	Boeing
Speed:	Maximum 870 km/h, cruise 760 km/h
Dimensions:	33.6 m long, 12.6 m high, 34.3 m wingspan
Ceiling:	41 000 feet (12.5 km)
Ferry Range:	5600 km (extended with air-to-air refuelling)
Endurance:	10 hours (without air-to-air refuelling)
Crew:	Pilots and mission aircrew are assigned depending on the mission needs.
Equipment:	MESA radar; EW self- protection including infra- red countermeasures, chaff, and flares; and radio systems, datalink and satellite communications.

Operational Employment

Entering service in 2009, Australia's 'eyes in the sky'—the E-7A Wedgetail—represents a new capability for ADF. It provides a key surveillance component of the networked defence force, fusing and disseminating information to air, maritime and land forces to enhance their effectiveness and survivability. The Wedgetail detects and identifies vehicles within the battlespace and provides command and control direction for airborne assets as well as support and situational awareness of the battlespace to surface-based and land-based anti-air warfare elements.

Air Force has six E-7A Wedgetail aircraft, operated by No 2 Squadron at RAAF Base Williamtown.



MC-55A Gulfstream

Operational Characteristics¹

Manufacturer:	Gulfstream
Speed:	904 km/h
Dimensions:	29.4 m long, 7.8 m high, 28.5 m wingspan
Ceiling:	51 000 feet (15.5 km)
Ferry Range:	12 501 km
Endurance:	12 hours
Crew (on ground):	Air Force pilots and mission aircrew, assigned to meet mission needs.
Equipment:	Electronic warfare support suite.

Operational Employment

From the early 2020s, Defence will acquire up to five long-range electronic warfare support aircraft based on the Gulfstream G550 airframe with additional and modified systems. This capability will substantially enhance electronic warfare support to naval, air, and land forces for operations in electromagnetic environments manipulated by hostile forces, with the operating cost, range and endurance benefits of a commercial airframe.

The aircraft will be incrementally upgraded to maintain interoperability with the US-developed systems.

¹ Based on Original Equipment Manufacturer's specifications for Gulfstream G550.



Defence Air Traffic Control

Operational Characteristics

ADF Airspace Management (ASM) and military Air Traffic Control (ATC) service are delivered by the RAAF Air Traffic Control (ATC) officer workforce and the Australian Defence Air Traffic System (ADATS) capability. In addition to providing safe, efficient and flexible ASM and Air Base Air Traffic Services (ABATS) for military aircraft at home and deployed locations, the ATC workforce contributes an integral component of the national Air Traffic Management (ATM) architecture by providing ABATS for civilian aircraft operating in military-controlled airspace surrounding Defence controlled air bases.

Operational Employment

The objectives of the Defence Air Traffic Control (ATC) organisation are to:

- prevent collisions between aircraft;
- prevent collisions between aircraft and obstructions on air bases;
- expedite and maintain an orderly flow of air traffic;
- provide advice and information useful for the safe and efficient conduct of a flight;
- notify and assist relevant organisations regarding aircraft in need, as required;

- liaise with Airservices Australia and other organisations to ensure the safe and efficient operation of ADF aircraft in Australian airspace; and
- contribute to Air Battle Management (ABM).

The RAAF ATC workforce provides ASM and ABATS for humanitarian aid and disaster relief in Australia and overseas, as well as ASM, ABATS and battlefield airspace control (includes de-conflicting aircraft and battlefield weapons in combat environments such as amphibious and land operations). The deployable ATC capability includes a tactical air surveillance radar, control cabin, and tactical air operations tower.

Under a whole-of-government approach, the military ATC is integrated into the national ATM network to contribute to the national recognised air picture. The military ATC facilities provide a limited back-up for civilian ATC operations. ATC permanent positions exist at RAAF Bases Amberley, Darwin, Edinburgh, East Sale, Pearce, Richmond, Tindal, Townsville, and Williamtown, and RAAF Gin Gin (35 km northwest of RAAF Base Pearce), Naval Air Station Nowra, and Army Aviation Centre Oakey.



Jindalee Operational Radar Network

Operational Capability

Australia's Jindalee Operational Radar Network (JORN) comprises three Over-The-Horizon-Radar (OTHR) sites located at:

- Longreach, Queensland;
- Laverton, Western Australian; and
- Alice Springs, Northern Territory.

JORN comprises six large remote sites - transmit and receive sites separated by 150km, for each of the three OTHR radars - eleven unmanned sounder sites that span Northern Australia, and the JORN Coordination Centre located in 1RSU at RAAF Base Edinburgh.

Operational Employment

OTHR utilises the refractive properties of the ionosphere to refract or bend transmitted HF electromagnetic waves back to Earth. When these refracted HF waves hit a radar reflective (metal) surface of sufficient size

— either airborne or maritime — some of the energy is reflected back along the transmission path to the OTHR receiver. Sophisticated computer systems then process the received energy to discern objects within the radar's footprint.

JORN provides wide-area surveillance of Australia's northern approaches at ranges of 1000 to 3000 km from the radar sites and is used to conduct air and maritime surveillance in support of Australia's national surveillance effort. However, the extent of available JORN coverage and actual system performance is highly variable and principally dependent on the state of the ionosphere (ie the upper layers of the atmosphere).

JORN was designed to detect air targets equivalent in size to the Hawk 127 aircraft or larger, and objects on the surface of the water equivalent in size to a Navy patrol boat or larger. Conversely, the detection of small wooden vessels is highly improbable, given the typical size, construction and speed of such vessels.



Mobile Control and Reporting Centre

Operational Characteristics

Capability: TPS-77 Air Surveillance Radar

Operational Employment

Garrisoned at RAAF Base Darwin, the Mobile Control and Reporting Centre (MCRC) provides a deployable and persistent air surveillance, information management, command and control capability in support of directed joint and combined operations. Deployable for several weeks or longer, it provides options to the Government as an enabler to the networked force, including the planning and execution of coalition and allied air operations.

The existing capability entered service in the 1980s and has been deployed on operations within Australia and overseas. An Air Force mobile control and reporting centre and tactical air defence radar system were deployed to Kandahar Airfield in Afghanistan to provide control for military aircraft throughout Afghanistan from 5 August 2007 to 7 July 2009. Operating 24 hours-a-day, seven days-a-week for nearly two years, 75 personnel have supported more than 196 000 aircraft movements.



Vigilare

Operational Characteristics

Capability: Vigilare capability represents a highly networked command and control capability for the RAAF, combining surveillance, airspace battle management and provision of the Recognised Air Picture (RAP) to higher Defence headquarters and the joint force.

Operational Employment

Vigilare provides the ADF with an integrated command, control and communications system within the RAAF air defence ground environment. This is an enabler for Air Battle Management providing control of military air operations for the joint force in an area of operations and may include the control and coordination of defensive counter air, offensive counter air, strategic attack, close air support and other warfighting or supporting air activities.

Vigilare provides the ADF with a fixed and persistent—24 hours-a-day, seven days-a-week—surveillance and battlespace management capability. It is designed to provide an integrated defence systems communications network and produces a comprehensive picture of air and surface activity over Australia and throughout the near region. Teams of mission controllers, air intelligence staff, and air surveillance operators exchange surveillance information and battle management instructions to military forces operating across Australia.

The RAAF has two regional operations centres located in the Northern Regional Operations Centre (NORTHROC) at RAAF Base Tindal, Northern Territory, and the Eastern Region Operations Centre (EASTROC) located at RAAF Base Williamtown, New South Wales.



Space Surveillance Radar

Operational Characteristics

Capability: Space situational awareness

Operational Employment

C-Band Space Surveillance Radar seeks to improve Space Situational Awareness (SSA) for Defence by utilising a US-owned space surveillance radar and radar control system. The sensor is based at Naval Communications Station Harold E. Holt (HEH) and operates as an additional sensor in the US global Space Surveillance Network.

The ADF is embarking on two joint initiative projects with the US to introduce a SSA capability. This is a recently acquired capability which will grow and provide ADF with an increased awareness of objects and activities in the orbital space environment.

The radar, operated by Australia on behalf of the US, contributes to the US Global Space Surveillance Network, which provides warnings to all satellite operators of potential collisions with other satellites or debris.



Space Surveillance Telescope

Operational Characteristics

Capability: Wide aperture electro-optical telescope

Operational Employment

The ADF is embarking on two joint initiative projects with the US to introduce a space situational awareness (SSA) capability. This is a new capability which will grow and provide ADF with an awareness of activities in space.

The Space Surveillance Telescope (SST) improves the ADF's ability to monitor space over the southern hemisphere. This highly advanced technology will enable the observation and detection of objects in space out to 36 000 km above the Earth in geostationary orbit. The SST is established at the Naval Communications Station Harold E Holt.

The US-owned wide aperture electro-optical telescope—which is operated by Australian crews at 1RSU, located at RAAF Base Edinburgh, on behalf of the US—will contribute to the US Global Space Surveillance Network.

The new Space Surveillance Telescope facilities will further strengthen the Australia-US partnership towards a global surveillance capability and the ADF's space surveillance capability.

AIR MOBILITY GROUP

Mission: Prepare for and conduct air mobility operations to meet ADF force projection requirements



C-17A Globemaster III

Operational Characteristics

Manufacturer:	Boeing
Speed:	830 km/h
Dimensions:	53.0 m long, 16.8 m high, 51.8 m wingspan
Ceiling:	45 000 ft (13.7 km)
Range:	10,389 km carrying 18,143 kg payload (extended by air-to-air refuelling)
Crew:	Pilot, Co-pilot, and Loadmaster
Capacity:	102 troops; 54 ambulatory and 36 stretcher patients; or 77.5 tonnes of cargo, depending on mission needs.

Operational Employment

Eight C-17A Globemaster III aircraft provide a responsive global heavy airlift capability to allow the rapid deployment of troops, supplies, combat vehicles, heavy equipment and helicopters anywhere in the world.

The C-17A can carry approximately the equivalent of three C-130J Hercules or four semi-trailer loads of humanitarian aid.

Since delivery, the C-17A has flown an air bridge supporting Australian operations in the Middle East; provided rapid humanitarian assistance to New Zealand, Japan and Pakistan and assisted the civil community in Australia. For example, the C-17A Globemaster III was instrumental in providing support to Bundaberg airport, after the Queensland floods in January 2013, including the re-supply of the aviation fuel reserves depleted by the relentless rescue efforts of Army and civilian helicopters. In 2011, two C-17s deployed to Japan to support search and rescue efforts after an 8.9 magnitude earthquake and tsunami.

Air Force has eight C-17A Globemasters, operated by No 36 Squadron based at RAAF Base Amberley.



C-130J Hercules

Operational Characteristics

Manufacturer:	Lockheed Martin
Speed:	625 km/h
Dimensions:	34.4 m long, 10.1 m high, 40.4 m wingspan
Ceiling:	Above 40,000 ft (12.2 km)
Range:	5100 km with 18,155 kg payload
Crew:	Pilot, Co-pilot, and Loadmaster
Capacity:	128 troops, 74 paratroops, aeromedical evacuation kit, or 80 stretcher patients plus medical staff.

Operational Employment

The C-130J is the latest generation of Hercules to provide tactical and strategic transport of people, supplies, vehicles and equipment. The C-130J provides medium to long-range transport with an excellent short field and semi-prepared airfield capability. Much like previous models, the C-130J has built on a legacy of airlift support to ADF throughout the world, fulfilling roles such as search-and-survivor-assistance, aeromedical evacuation and humanitarian aid to Australian and neighbouring civil communities during natural disasters, and in the aftermath of the 2002 and 2005 Bali bombings.

Australia's 12 C-130J Hercules aircraft are operated by No 37 Squadron at RAAF Base Richmond.



C-27J Spartan Battlefield Airlifter

Operational Characteristics

Manufacturer:	Alenia/L3
Speed:	670 km/h
Dimensions:	22.7 m long, 9.6 m high, 28.7 m wingspan
Ceiling:	30,000 ft (9.1 km)
Range:	1700 km (at maximum take-off weight)
Crew:	Pilot, Co-pilot, and Loadmaster
Capacity:	34 passengers/ paratroopers; 21 stretcher patients; or 5000 kg of cargo, vehicles, or combinations.

Operational Employment

The C-27J Spartan is a medium-sized military transport aircraft derived from the Alenia G-222. It is significantly improving the ADF's intra-theatre airlift capability by using a greater range of airfields and threat

environments, both in Australia and in our neighbouring regions.

Equipped with a modern avionics suite and sharing common engineering aspects with the C-130J Hercules, the C-27J features protection against ground fire and electronic warfare self-protection systems that enhance battlefield survivability. The size of the cargo compartment allows rapid transfer of loads—from the C-17A and the C-130J aircraft—for delivery to austere airfields, thus enhancing efficiency in ADF air mobility support to the battlefield or natural disaster zone.

Air Force has ten C-27J Spartan aircraft operated by No 35 Squadron at RAAF Base Amberley.



KC-30A Multi-Role Tanker Transport

Operational Characteristics

Manufacturer: Airbus Military

Speed: 860 km/h

Dimensions: 59.0 m long, 17.4 m high, 60.3 m wingspan

Ceiling: Above 41,000 ft (12.5 km)

Range: 14,800 km (extended by air-to-air refuelling)

Crew: Pilot, Co-pilot, Air Refuelling Operator, Mission Aircrew, and Crew Attendants, assigned as needed by the mission

Capacity: 270 passengers, 34,000 kg of cargo, or various combinations of both.

Operational Employment

The KC-30A Multi-Role Tanker Transport (MRTT) is an Airbus A330 with military modifications designed by Airbus Defence and Space for air-to-air refuelling (AAR) and long-range transport. Major modifications

to the aircraft include the installation of two wing pods for hose/drogue refuelling, an aerial refuelling boom system and military avionics, including mission planning computers and communications equipment. Able to remain on station up to 1800 km from base and offload 50 tonnes of fuel over four hours, the KC-30A is a force multiplier for other air power capabilities such as the F/A 18 Hornet, Growler, and Super Hornet. The KC-30A can also carry cargo loaded on military or civilian pallets and up to 270 passengers.

No 33 Squadron operates a fleet of five KC-30A aircraft from RAAF Base Amberley. An additional two A330-200 aircraft were purchased from Qantas and are undergoing modification to KC-30A standard in Spain. In September 2014, one KC-30A aircraft deployed to the Middle East under Operation Okra to provide AAR for RAAF and coalition aircraft. The aircraft has flown at least one mission each day and has offloaded approximately 36 tonnes of fuel on each sortie.

Air Force has six KC-30A aircraft based at RAAF Base Amberley.



737 Boeing Business Jet

Operational Characteristics

Manufacturer:	Boeing
Speed:	850 km/h
Dimensions:	33.6 m long, 12.5 m high, 35.8 m wingspan
Ceiling:	41,000 ft (12.5 km)
Range:	11,390 km
Crew:	Two pilots and up to four crew attendants, assigned as needed by the mission.
Capacity:	Thirty passengers in VIP configuration.

Operational Employment

Air Force has a fleet of two Boeing Business Jet (BBJ) aircraft, which were introduced in 2002, are part of the Special Purpose Aircraft fleet operated by No 34 Squadron based at Defence Establishment Fairbairn, in the Australian Capital Territory.

The BBJs provide an agile transport capability that can carry Government and staff within Australia and overseas. The aircraft has seating, a meeting room, working space, and communications facilities. The use of Air Force Special Purpose Aircraft allows Government to attend international forums and conduct state visits easily, thus ensuring Australia is represented on the world's stage.

Air Force has a fleet of two BBJs. The BBJ complements the smaller Falcon 7X aircraft, also operated by No 34 Squadron.



Falcon 7X

Operational Characteristics

Manufacturer:	Dassault
Speed:	920 Km/h
Dimensions:	23.3 m long, 7.8 m high, 26.2 m wingspan
Ceiling:	51 000 ft (15.5 km)
Range:	11 000 Km
Crew:	Pilot, Co-pilot, and one crew attendant
Capacity:	14 passengers

Operational Employment

Introduced into service in 2019 the three Falcon 7X aircraft complement the two 737 Boeing Business Jets (BBJ) and will support special purpose air transport for the Governor General of Australia, the Prime Minister, other Government members and visiting heads of state. The Falcon features a high-tech wing, an advanced 'glass cockpit' with a heads-up display and an infrared enhanced vision system. It also

has satellite communications to support Government business while airborne.

The Falcon 7X three-engine design provides additional safety margin, freeing operators from twin-engine operating constraints when flying intercontinental, transoceanic route. The Falcon 7X can also be used for shorter tasks to smaller airfields and will on occasion perform air logistics support.

No 34 Squadron has a fleet of three leased Falcon 7X, operated by No 34 Squadron at Defence Establishment Fairbairn. On 24-hour standby, the Falcon 7X is able to provide between 1200 and 1800 special purpose flights per year.

AIR FORCE TRAINING GROUP

Mission: Deliver essential, effective, and efficient education and training, and promote the RAAF to meet Air Force needs



Pilatus PC-21 Pilot Trainer

Operational Characteristics

Manufacturer:	Pilatus
Speed:	685 km/h
Dimensions:	11.2 m long, 3.8 m high, 9.1 m wingspan
Ceiling:	25 000 ft (7.62 km)
Range:	1333 km
Crew:	Student & instructor pilots

Operational Employment

As part of the new Pilot Training System, the 42 PC-21 aircraft will be based at RAAF Base East Sale in Victoria and RAAF Base Pearce in Western Australia.

The PC-21 is a key element of the new Pilot Training System, which will be able to train more people faster and to a higher standard. The total system comprises advanced aircraft, flight simulators, and an electronic learning environment.



KA350 King Air

Operational Characteristics

Manufacturer:	Raytheon Beechcraft
Speed:	570 km/h
Dimensions:	14.2 m long, 4.4 m high, 17.7 m wingspan
Ceiling:	35 000 ft (10.67 km)
Range:	3400 km
Crew:	Two pilots or one pilot and one mission specialist student
Capacity:	Seven passengers

Operational Employment

The KA350 King Air is a modern twin-engine turboprop, with a normal crew of two pilots and a range of over 2000 km. They have been used to support Australian Defence Force operations overseas in East Timor, Papua New Guinea and the Solomon Islands.

The King Air provides Air Force with a flexible light transport capability, used for training and development of aircrew, and transport of passengers within Australia and the immediate region.

Currently, eight King Airs are operated by No 32 Squadron at RAAF Base East Sale in Victoria. The aircraft are fitted with console-based training and simulation equipment and supported by a suite of ground-based simulators. These are used primarily for navigation training of air combat officers and maritime aviation warfare officers. They can also be used for transport duties, with capacity for seven passengers.

COMBAT SUPPORT GROUP

Mission: Prepare for and conduct flexible combat support operations



Bushmaster Protected Mobility Vehicles

Operational Characteristics

Manufacturer:	Thales
Dimensions:	7.1 x 2.3 x 3.25 m (to top of wire cutters)
Max Road Speed:	100 km/h (limited)
Max Road Range:	800 km
Crew:	up to 10

Operational Employment

The Bushmaster is a four-wheel drive (constant) on-road and off-road vehicle that is designed to transport ten troops including a driver, together with their weapons and equipment. The Bushmaster can itself be transported by road, rail or air. The hull is a fully welded monocoque (or single-shell) structure manufactured from armoured steel plate. Two square hatches and a gun ring with hatch are fitted in the roof, and a single access door is located at the rear of the vehicle. Two mounting points for quick-connect, swing-arm gun mounts are fitted

to the roof and are accessed through the rear hatches. External mounting points are provided for the installation of a grenade launching system.

The power train consists of a Caterpillar diesel engine coupled to a ZF six-speed automatic transmission. The vehicle is fitted with a central tyre inflation system which provides a means of manually or automatically controlling the tyre inflation pressures based on terrain and vehicle speed, and to reduce the likelihood of tyre damage.



Light Weight G-Wagon

Operational Characteristics

Manufacturer:	Mercedes Benz
Dimensions:	4.82 x 1.85 x 2.21 m
Max Road Speed:	As per posted speed limits
Fuel Tank:	95 expandable to 150 litres
Crew:	2

Operational Employment

The G-Wagon provides high-mobility, general-purpose, load transport. Available in several variants, it is an essential component of the support, sustainment, deployment and redeployment structure and can be used to transport combat supplies, materiel and replacement combat systems. The vehicles will accommodate a driver and a co-driver.

It can be used as a mobile command post or converted to an ambulance. Haulmark trailers provide the G-Wagon with extra payload capacity; the single-axle increases payload by 800kg and the tandem-axle provides a payload of 1500kg.



Military Working Dogs

Operational Characteristics

Breeds:	German Shepherd and Belgian Shepherd Malinois
Breeding:	RAAF breeding program (Amberley)
Speed:	20-30 km/h
Crew:	Military working dog handler

Operational Employment

Military working dogs and their handlers are responsible for providing security, crime prevention patrols, emergency response and intruder detection at permanent air bases and deployed locations around the world. Both handlers and their dogs are tested regularly to ensure readiness to deploy at any time.

Dogs and handlers are carefully matched to ensure many years of loyal service. Once matched, handlers and their dogs work together to maintain a high standard of fitness and training. The dogs are often from Air Force's own breeding program, and members of the public can volunteer to foster Air Force puppies.



Panther Airfield Fire Truck

Operational Characteristics

Manufacturer:	Rosenbauer (Austria)
Engine:	Detroit diesel
Dimensions:	11.75 x 3.30 x 3.60 m
Water Tank Capacity:	8500 litres
Crew:	One driver, three firefighters

Operational Employment

The Panther is a high-performance six-wheel-drive vehicle which provides emergency response to aircraft incidents to save life and minimise damage. It is an on- and off-road vehicle with digital controls and an air-conditioned cab for the driver and crew of three. A two-stage centrifugal pump can project water and foam to a range of 70 m. Each truck can project 6200 litres per minute from its roof and bumper-mounted cannons. The Panther is also equipped with a Minimax dry-chemical-powder firefighting system.

A quick-attack hose reel and discharge outlets enable fire fighters to conduct offensive aircraft rescue and firefighting. Fully loaded, the Panther can accelerate to 80 km/h within 35 seconds.



Titan Firefighting Field Truck

Operational Characteristics

Manufacturer:	E-One (US)
Engine:	Detroit diesel
Dimensions:	7.9 m x 3.0 m x 2.9 m
Water Tank Capacity:	2800 litres
Crew:	One driver, three firefighters

Operational Employment

The Titan is a four-wheel-drive vehicle used for aircraft rescue firefighting and structural rescue firefighting at permanent bases and in a deployed environment. Each vehicle is capable of continuous operation given sufficient supplies and personnel, and is capable of stationary firefighting or 'pump and roll' operation using a roof-mounted turret. The Titan carries a crew of four in an air-conditioned cab, with breathing apparatus built into the seating.



Woomera Range Complex

Operational Characteristics

Location:	Defence Practice Area, located north-west of Woomera, South Australia
Area:	124,000 km ² (ie about same size as England)

Operational Employment

The Woomera Range Complex (WRC) is comprised of:

- Woomera Test Range (WTR), including the Woomera Prohibited Area (WPA);
- Woomera Restricted Airspace (above the WPA);
- Nurrungar Test Area (outside WPA); and
- Woomera village including RAAF Base Woomera aerodrome.

The WRC is widely recognised as a unique capability for secure testing of long-range weapons, sensitive weapons systems and Unmanned Aircraft Systems (UAS), in support of Defence and National objectives.

Providing a highly specialised operations environment for the testing of war materiel, the WTR supports the conduct of research, experimentation, test and evaluation of ground-based and air weapons systems, including UAS and future sensitive weapons systems, for Australian and allied forces.

Under Part VII of Defence Force Regulation 35, the WPA is a declared prohibited area for the purposes of 'testing of war materiel'. The WRC is in high demand for weapons testing and other specialised activities, as it is the only range remaining in the western world in which next-generation weapons systems can be tested safely, securely and within the land borders of the range. Defence use of the WPA is now operating under the Hawke Review's new shared-access model which balances Defence and non-Defence use of the WPA. The new shared-access model recognises Defence as the primary user of the WPA.

PART 3 - GLOSSARY



TERMINOLOGY

20mm aircraft ammunition. 20mm aircraft gun ammunition is used by the M61A1/M61A2 aircraft automatic gun system configured in the F/A-18 Classic Hornet.

30mm aircraft ammunition. 30mm Aden aircraft gun ammunition is used by the Mk 127 Hawk Lead-In Fighter.

Air & Space Operations Command & Control Capability System (ASO C2CS). Software applications, deployable systems and specialist military equipment operating within the fixed and/or deployed Defence ICT environment to support the ADF command and control of ADF air operations.

Air Intercept Missile-9M (AIM-9M) Sidewinder. The 2.9 m long, 85 kg AIM-9M Sidewinder is a supersonic, infra-red homing, guided missile that provides the ability to attack from all directions, including head-on. Changes over early models meant an improved capability against infra-red countermeasures, enhanced background discrimination capability and a reduced-smoke rocket motor. These modifications increased its ability to locate and lock-on to a target and decrease the chance of missile detection.

Air Intercept Missile-9X (AIM-9X) Sidewinder. The 3 m long, 85 kg AIM-9X Sidewinder is a supersonic, infra-red homing, guided missile that provides full day and night employment, greatly enhanced manoeuvrability and an improved target acquisition, short-range air-to-air attack capability than earlier models.

Air Intercept Missile-120 (AIM-120) Advanced Medium-Range, Air-to-Air Missile (AMRAAM). The 3.6 m long, 157 kg AIM-120 AMRAAM provides an all-weather, active radar-guided missile with beyond-visual-range, air-to-air attack capability, as well as air defence support. Once the missile closes in on

a target, its active radar guides it to an intercept.

Air Intercept Missile-132 (AIM-132) Advanced Short-Range, Air-to-Air Missile (ASRAAM). The 2.9 m long, 87 kg imaging infra-red homing ASRAAM is designed as a replacement for the AIM-9 Sidewinder. It has longer range (50 km) and higher speed (Mach 3+), but less manoeuvrability than the Sidewinder.

Air-to-Ground Missile-84 (AGM-84) Harpoon Anti-Ship Missile. The Harpoon is a 3.8 m long, all-weather, over-the-horizon, sea-skimming, 519 kg weapon for use against surfaced submarines and ships. It uses active radar homing to locate its target.

Air-to-Ground Missile-88 (AGM-88) High-Speed Anti-Radiation Missile (HARM). The AGM-88E is a tactical, supersonic, air-to-surface missile designed to home in on electronic transmissions coming from a ground-based radar system. Its 66 kg warhead is designed to destroy the transmitter. Air Force EA-18G Growler aircraft will carry a training version of the AGM-88.

Air-to-Ground Missile-154 (AGM-154) Joint Stand-off Weapon (JSOW). The JSOW is a 4.1 m long, 470 kg, medium-range, highly survivable, precision-guided weapon for attacking defended targets from outside the range of standard anti-aircraft defences, to increase aircraft survivability. It is a low-cost, highly lethal, 'launch-and-leave' glide weapon that employs a Global Positioning System (GPS)/Inertial Navigation System (INS) for mid-flight guidance and an infra-red seeker for terminal guidance. It is capable of day/night and adverse weather operation.

Air-to-Ground Missile-158 (AGM-158) Joint Air-to-Surface Standoff Missile (JASSM). The JASSM is a 4.3 m long, 974 kg, semi-stealthy, long-

range (over 370 km), turbojet-powered cruise missile. Its mid-course guidance uses the INS/GPS unit developed for the JDAM and JSOW guided bombs, with either a high-level or low-level (500 m) cruise altitude, followed by a steep dive on to the target using an imaging infra-red seeker.

AN/ALQ-99 Tactical Jamming Pod. This pod is an airborne electronic warfare, integrated jamming system used on EA-18G Growler aircraft. The system is capable of intercepting, automatically processing and jamming received radio frequency signals. The system receivers can also be used to detect, identify and direction-find those signals, providing signals intelligence either automatically or manually.

AN/ALQ-128 Wideband Receiver. This electronic warfare warning set is a countermeasure receiver used to give information through radar warning suites that allows it to provide active jamming against adversary radar threats.

AN/ALR-56M Radar Warning Receiver. This receiver is the component of the electronic warfare system used to detect threat radars and provide situational awareness to the aircrew and improve survivability.

AN/APG-73. This is an all-weather, multi-mode, airborne radar system designed for both air-to-air and air-to-surface operations. It incorporates a variety of search, track and track-while-scan modes to give the pilot a complete look-down/shoot-down capability. The AN/APG-73 is the radar that was fitted to the F/A-18A/B Hornets during the Hornet Upgrade Program.

AN/APG-79. The revolutionary AN/APG-79 AESA radar provides F/A-18E/F aircrews with powerful new capabilities. Entirely new from front-end array to back-end processor and operational software, the system

substantially increases the power of the F/A-18E/F Super Hornet. With more power than the APG-73, the APG-79 has much greater air-to-air detection range and allows tracking of significantly more targets. It also has a much better ability to identify targets and break out those that are closely spaced.

BDU-33 Practice Bomb. The BDU-33 is a 25 lbs practice bomb used in air weapons training. It is designed as a lower-costing, non-explosive alternative to the Mk 80 series general purpose bombs that follow a similar weapon ballistic trajectory.

BLU-109/B Bomb. BLU-109 is a special-purpose 2000 lbs high-explosive warhead that is designed with a strengthened bomb casing to improve its penetration through hardened targets before functioning. It can be configured with fin stabilizers and a guidance control unit for improved precision guidance.

BLU-126 Low-Collateral Damage Bomb (LCDB). BLU-126 LCDB is a variant of the Mk 82 general purpose bomb, with a smaller explosive charge, and configured with JDAM-ER wing kits. It was developed for use in situations where friendly forces or civilians are situated dangerously close to a target planned for an air strike, when other weapon options may not be appropriate.

Bomb. A bomb is an aerodynamically-shaped metal container, usually fin-stabilised, filled with a high explosive, smoke, incendiary or chemical composition designed to be dropped from an aircraft.

Conventional Bomb. A conventional bomb consists of five major parts: an outer casing, the inner explosive material, devices such as fins to stabilize the weapon in flight, one or more fuses to ignite the main charge, and a mechanism for arming the fuse or preparing it to explode. The outer case is most

commonly made of metal and has a point at its nose. The explosive charge usually consists of trinitrotoluene (TNT) or other high explosives in combination. The fin assembly at the tail end of the weapon enables it to fall through the air nose-first, by the same principle as the feathers on an arrow.

Electronic Attack. That division of electronic warfare involving the use of electromagnetic energy, directed energy or anti-radiation weapons to attack personnel, facilities or equipment with the intent of degrading, neutralising or destroying adversary combat capability and is considered a form of fires.

General-Purpose (GP) Bomb. This is an air-dropped weapon intended as a compromise between blast damage, penetration and fragmentation in explosive effect. They are commonly fitted with a guidance kit to create a precision-guided weapon.

Glide Bomb. A glide bomb has aerodynamic surfaces to give it a much flatter, gliding, flight path than that of a conventional bomb without such surfaces. This allows it to be released at a greater distance from the target, allowing a successful attack without the aircraft needing to pass within range of the target's anti-aircraft defences.

Global Positioning System (GPS). GPS is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the surface of the Earth. However, to calculate positional data, the receiver requires an unobstructed line-of-sight to four or more of the system's satellites.

Guided Bomb Unit-12 (GBU-12) Laser-Guided Bomb. A GBU-12 is 225 kg with a laser-guidance kit attached to it. When an operator illuminates the target with a laser designator, the weapon homes to a spot of laser energy reflected from the target.

Guided Bomb Unit-24 (GBU-24) Laser-Guided Bomb. Laser guidance bomb modification kits are used to modify a the Mk-84 general purpose 2000 lbs bomb GBU-24(V)1/B and the BLU-109/B penetrator bomb into the GBU-24(V)2/B. When an operator illuminates the target with a laser designator, the modified weapon is able to home to a spot of laser energy reflected from the target, improving the guidance precision.

Guided Bomb Unit-31 (GBU-31) GPS-Guided Bomb. A GBU-31 is a 900 kg general-purpose bomb fitted with a JDM guidance kit.

Guided Bomb Unit-39 Small Diameter Bomb I (GBU-39 SDB I). This is a 110 kg precision-guided glide bomb for attacking fixed targets but with less collateral damage. The bomb uses GPS/INS guidance to fly to the target. The small size allows an aircraft to carry a larger number of weapons.

Guided Bomb Unit-53 Small Diameter Bomb II (GBU-53 SDB II). This is a 110 kg precision-guided glide bomb that can identify and strike mobile targets from stand-off distances in all weather conditions. The bomb uses GPS/INS system to guide itself into the general vicinity of a moving target with any necessary course corrections provided using a data link. The bomb has three modes of target acquisition: active radar, infrared homing and semi-active laser.

Inertial Navigation System (INS). INS is a navigation aid that uses a computer, motion sensors and rotation sensors to continuously calculate, via dead reckoning, the position, orientation and velocity of a moving object without the need for external references. This system is sometime referred to as an inertial guidance system.

Joint Direct Attack Munition (JDAM). JDAM is a tail kit that contains an INS and a GPS guidance control unit that converts existing

unguided free-fall bombs into accurate, adverse weather 'smart' bombs. It enables employment of accurate air-to-surface weapons against high-priority fixed and relocatable targets from fighter aircraft and can be directed against single or multiple targets on a single pass. Once released from the aircraft, it autonomously navigates to the designated target coordinates, which can be loaded into the aircraft before take-off, manually altered by aircrew before weapon release, or automatically entered during target designation with onboard aircraft sensors. It can be launched from more than 25 km from the target with updates from GPS satellites to help guide the weapon to the target.

Joint Direct Attack Munition – Extended Range (JDAM-ER). JDAM-ER is a tail kit that contains an INS and a GPS guidance control unit that converts existing unguided free-fall bombs into accurate, adverse weather 'smart' bombs. It enables employment of accurate air-to-surface weapons against high-priority fixed and relocatable targets from fighter aircraft and can be directed against single or multiple targets on a single pass. Once released from the aircraft, it autonomously navigates to the designated target coordinates, which can be loaded into the aircraft before take-off, manually altered by aircrew before weapon release, or automatically entered during target designation with onboard aircraft sensors.

Large Aircraft Infra-red Countermeasures (LAIRCM). This is an active countermeasure system designed to defeat the threat missile guidance system by directing a high intensity, modulated laser beam into the missile seeker. It automatically counters advanced infra-red missile systems with no action required by the aircrew.

Laser-Guided Bomb. This is an aerial weapon that uses semi-active laser homing to strike a designated target with greater accuracy than an unguided bomb. It uses on-board electronics to track targets that are designated by laser, typically in the infra-red spectrum, and adjust the weapon's glide path to precisely strike the target. Since it is tracking a light signature, not the object itself, the target must be illuminated by a laser.

Laser Joint Direct Attack Munition (LJDAM). LJDAM is a JDAM tail kit with an added laser sensor giving the LJDAM the ability to attack moving, relocatable and maritime targets. The target must be designated by a laser from a separate source, either by ground forces, by a pod on the attacking aircraft, or by a separate support aircraft.

Link-16. Link 16 is a military tactical data exchange network which allows military aircraft as well as ships and ground forces to exchange their tactical picture in near-real time, as well as supporting the exchange of text messages, imagery data and providing two channels of digital voice.

Link-22. Link 22 is a secure digital radio link in the high-frequency and ultra-high-frequency bands, designed for use by military forces.

M61A1/M61A2 20mm Automatic Gun. This is a hydraulically driven, 6-barreled, rotary-action, air-cooled, electrically fired weapon mounted in the nose of the F/A-18 Hornet, with selectable rates of fire of either 4000 or 6000 rounds per minute.

Mk-46 Air-Launched Lightweight Torpedo. This is a 2.6 m long, 276 kg, air-dropped naval weapon designed to attack high-performance submarines to a maximum depth of 365 m.

Mk-54 Barracuda Torpedo. This is a 2.7 m long, 230 kg naval anti-submarine weapon.

The MK-54 is the next-generation of the MK-46 and can be released from most anti-submarine warfare aircraft or naval ships. The P-8A Poseidon uses a GPS-guided parachute kit to drop the Mk-54 from high altitude to track, classify and attack underwater targets.

Mark 80-series General Purpose Bombs. Air Force employs Mk 82 (500 lbs), Mk 83 (1000 lbs) and Mk 84 (2000 lbs) general-purpose bombs. These bombs may be employed as conventional unguided weapons. These bombs are reconfigurable with aerodynamic fin stabilizers to extend their range and guidance control system for improved precision guidance.

Markers Marine and Sea Markers. Pyrotechnic markers are deployed, from appropriately configured aircraft, to provide a day or night visual reference point on the water surface, especially during anti-submarine warfare and search-and-rescue missions.

Missile. A missile is a self-propelled weapon whose trajectory or course is controlled while in flight.

Practice Bomb. A practice bomb—Bomb Dummy Unit (BDU)—is an inert variant of an operational weapon that has similar mass and flight characteristics as the high explosive variant. BDUs are used to train pilots in the different flight characteristics of an aircraft carrying and releasing a bomb load; the BDU also flies a similar flight trajectory as the high explosive variant in weapons practices.

Precision-Guided Bomb. This is a guided, air-dropped weapon intended to precisely hit a specific target and minimise collateral damage. It is sometimes referred to as a 'smart' bomb.

Smoke Grenade. The PC-21 is configured to carry a Smoke Grenade Dispenser for release

smoke grenades to mark ground targets in a coordinated effort with a Joint Tactical Air Controller (airborne or groundborne) during Forward Air Control training sorties.

Sonobuoy. A sonobuoy is a sonar or acoustic device that is dropped in water and used to detect submerged submarines. When activated, it relays information to the aircraft by radio. It may be active directional or non-directional, or it may be passive directional or non-directional.

Space Surveillance Telescope (SST). The SST meets a capability gap in detecting and tracking satellites on the geostationary orbit situated over the eastern hemisphere. It was designed by the US Defence Advanced Research Projects Agency and is installed at Naval Communications Station Harold E Holt (HEH), located north of Exmouth, Western Australia. It is and operated by Australian space crews in 1RSU.

Space Surveillance Radar. The C-band space surveillance radar is installed at HEH. Its mission is to provide southern hemisphere coverage of resident space objects for catalogue maintenance, space object identification, and support for special events. It is and operated by Australian space crews in 1RSU.

Torpedo. A torpedo is a self-propelled, underwater munition containing explosives that detonate upon impact with the ship or submarine being targeted.

Unguided Bomb. This conventional, aircraft-delivered weapon does not contain a guidance system. When released, it follows a ballistic trajectory to the Earth. It is also called a free-fall bomb or 'dumb' bomb.

ABBREVIATIONS

AAFC	Australian Air Force Cadets	C2	Command and Control
ABATS	Air Base Air Traffic Services	C-27J	Spartan battlefield airlifter
ACAUST	Air Commander Australia	C3ISR	Command, Control, Communications, Intelligence, Surveillance, and Reconnaissance
ACG	Air Combat Group	CAF	Chief of Air Force
ADF	Australian Defence Force	CASG	Capability Acquisition and Sustainment Group
ADGE	Air Defence Ground Environment	CCT	Combat Control Team
AEA	Airborne Electronic Attack	CDF	Chief of Defence Force
AEW&C	Airborne Early Warning and Control	CIMIC	Civil/Military Cooperation
AFHQ	Air Force Headquarters	CJOPS	Commander Joint Operations
AFC	Australian Flying Corps	CSCC	Combat Support Control Centre
AFI	Air Force Improvement Program	CSG	Combat Support Group
AFTG	Air Force Training Group	DCAF	Deputy Chief of Air Force
AGO	Australian Geospatial-Intelligence Organisation	DGACOPS	Director General Air Command Operations
AirA	Air Academy	DGACC-AF	Director General Air Combat Capability-Air Force
ALS	Air Logistics Support	DGACE-AF	Director General Air Combat Enablers-Air Force
AMCC	Air Mobility Control Centre	DGLOG-AF	Director General Logistics-Air Force
AME	Aeromedical Evacuation	DGPERS-AF	Director General Personnel-Air Force
AMG	Air Mobility Group	DGRES-AF	Director General Reserves-Air Force
AMTDU	Air Mobility Training and Development Unit	DGS-AUS	Distributed Ground System-Australia
AMTS	Air Mission Training School	DGSP-AF	Director General Strategy and Planning-Air Force
AOC	Air and Space Operations Centre	DGTA	Director General Technical Airworthiness
AP-3C	Orion maritime patrol aircraft	DPA	Gazetted Defence Practice Area
APDC	Air Power Development Centre	DST	Defence Science Technology
APS	Australian Public Service	E-7A	Wedgetail airborne early warning & control
ASM	Airspace Management	EA-18G	Growler Airborne Electronic Attack
ASW	Anti-Submarine Warfare	EMS	Electromagnetic Spectrum
ASuW	Anti-Surface Warfare		
ATC	Air Traffic Control		
ATM	Air Traffic Management		
AWC	Air Warfare Centre		
BFTS	Basic Flying Training School		
C-17A	Globemaster III heavy-airlift aircraft		
C-130J	Hercules medium-airlift aircraft		

EWBM	Electronic Warfare Battle Management	MISRR	Maritime Intelligence Surveillance Reconnaissance and Response
F-35A	Lightning II fighter/attack aircraft	MQ-4C	Triton Unmanned Aircraft System
F/A-18A/B	Hornet fighter/attack aircraft	MRTT	Multi-Role Tanker Transport Aircraft
F/A-18F	Super Hornet fighter/attack aircraft	MWD	Military Working Dog
FAC	Forward Air Control	OTHR	Over-The-Horizon Radar
FEG	Force Element Group	P-8A	Poseidon maritime patrol aircraft
FLEW	Force Level Electronic Warfare	PC-21	Pilatus PC-21 pilot training aircraft
GPS	Global Positioning System	PED	Processing, Exploitation, and Dissemination (of intelligence)
HAC	Head Air Force Capability	PMET	Professional Military Education and Training
HADR	Humanitarian Assistance and Disaster Relief	PMV	Protected Mobility Vehicle
HQAC	Headquarters Air Command	RTS	Raise, Train & Sustain
HQJOC	Headquarters Joint Operations Command	SBIRS	Space-Based Infra-Red System
INS	Inertial Navigation System	SRG	Surveillance and Response Group
ISR	Intelligence, Surveillance, and Reconnaissance	SSA	Space Situational Awareness
JAISREE	Joint Airborne ISR Exploitation Environment	SST	Space Surveillance Telescope
JEWOSU	Joint Electronic Warfare Operational Support Unit	TWM	Total Workforce Model
JORN	Jindalee Operational Radar Network	UAS	Unmanned Aircraft System
JOC	Joint Operations Command	WRC	Woomera Range Complex
JTAC	Joint Terminal Attack Controller	WOFF-AF	Warrant Officer of the Air Force
KA350	King Air 350		
KC-30A	Multi-Role Tanker Transport		
LIF	Lead-In Fighter		
MC-55A	Gulfstream		
MCRC	Mobile Control & Reporting Centre		
MESA	Multi-role Electronically Scanned Array		

