Australian Air Publication
AAP 1000–D

# The Air Power Manual

Sixth Edition

Air Marshal Geoff Brown, AO
Chief of Air Force

Air Force Headquarters
Canberra

September 2013

First edition published 1990

Second edition 1994

Third edition 1998

Fourth edition 2002

Fifth edition 2007 (Reprinted with corrections May 2008)

Sixth edition 2013 (Reprinted with corrections May 2014)

**National Library of Australia Cataloguing-in-Publication**

| | |
|---|---|
| Author: | Australia. Royal Australian Air Force. Air Power Development Centre. |
| Title: | The air power manual / Royal Australian Air Force. |
| Edition: | 6th Edition |
| ISBN: | 9781920800901 (paperback) |
| Subjects: | Air power--Australia. Aeronautics, Military--Australia. |

Dewey Number: 358.4030994

**Published by:**

Air Power Development Centre, Department of Defence, PO Box 7932,
CANBERRA BC ACT 2610, AUSTRALIA

**Telephone**: + 61 2 6128 7041 | **Facsimile**: +61 2 6128 7053

**E-mail**: airpower@defence.gov.au | **Website**: www.airforce.gov.au/airpower

# Foreword

Our doctrine is more than simply a statement of the central beliefs and key ideas regarding the principles of air power. Rather, it is a living document, a vital and evolving articulation of what we hold to be the collective and authoritative wisdom of over 90 years of air operations. It is a clear statement of who we are as an air force, what we value, how we employ air power within the joint context to create precise effects, and how we contribute to Australia's national security. Our doctrine reflects our identity as professional airmen in the complex and dynamic security circumstance we find ourselves in today. It is a forward-looking document that acknowledges our past achievements and the lessons we have derived from experience to project our vision of how Australian air power will be generated, employed and sustained in the years ahead.

Air Force has been engaged in operations almost continuously since 1999 and there is much that we have learned in this period regarding generating, employing and sustaining air power. So too have we seen the emergence of critical new capabilities and technologies that fundamentally shape the way we do business. The importance of cyberspace is just one example. Likewise, the growing importance of intelligence, surveillance and reconnaissance, and unmanned aerial systems to the conduct of modern operations are clear signposts to the way ahead.

Further, after a decade of operations in irregular conflict in Asia and the Middle East, we can reflect on how air power can play a crucial role in joint, combined and coalition operations in complex and dynamic situations in which the adversary is not always clearly distinguishable from the general population. These operations have highlighted the necessity of a whole-of-government approach to security and stability, in which the military is just one player in a complex and constantly evolving matrix of government and non-government actors involved in defending national interests.

This sixth edition of *The Air Power Manual* consolidates these lessons into the existing body of knowledge of air power. It also elaborates on the national security context in which Australian air power is generated, employed and sustained, recognising that as airmen we need to develop a deep and sophisticated understanding of the context in which we operate, the purposes for which air power is employed, and the many factors that shape air power within the Australian Defence Force.

As much as anything *The Air Power Manual* is an educative tool. We use it to educate our force as to the fundamentals of air power, our central tenets and our core beliefs. We also use it to explain to our fellow Services and other government agencies how Air Force thinks about force in the third dimension, where air power fits into the whole-of-government effort, and why we structure, train and develop our force as we do. *The Air Power Manual* sets the foundation for Air Force action and it establishes the underlying rationale for Australian air power advocacy as a vital part of the joint force.

*The Air Power Manual* is our capstone doctrine statement. It is the basis of our understanding of professional mastery and it is essential reading for all Air Force members. I encourage you to take the time to study this work. Reflect on how the ideas contained in these pages shape your daily activities and shape the Air Force of today. But most importantly, challenge the ideas and views it espouses. Test them against your reality and your context. Remember doctrine is authoritative guidance—it is not dogma. It requires active participation in the form of thoughtful judgement in application, and that is your role as airmen in the Royal Australian Air Force.

Air Marshal Geoff Brown, AO
Chief of Air Force

# Contents

# List of Figures

# The Air Power Manual

*Air Power for National Security*

# 1

## Executive Summary

*Doctrine states the fundamental principles by which military forces guide their actions to achieve desired objectives. It is authoritative but not prescriptive and requires judgement in its application.*

*Air Force recognises three levels of doctrine:*

*a.* ***philosophical****,*

*b.* ***application****, and*

*c.* ***procedural****.*

# Doctrine

## Introduction

1.1 Doctrine states the fundamental principles by which military forces guide their actions to achieve desired objectives. It contains the central beliefs regarding the application of military power and principles regarding the most effective conduct of operations. Military doctrine is authoritative but not prescriptive, in that it requires considered judgement in its application. It is, by design and historic practice, intended to assist military practitioners approach complex, dangerous and unfamiliar situations with clarity of thought and practical and useful guidance. In sum, military doctrine is an authoritative statement of fundamental principles, based on rigorous analysis and underpinned by historic experience and lessons learned, designed to guide the actions and thinking of military commanders and practitioners in the application of military force.

## Air Force's Air Power Doctrine

1.2 The Australian Air Publication (AAP) 1000–D—*The Air Power Manual* (Sixth Edition) is a professional guide to assist Air Force personnel, members of other Services, and our partners in national security to gain the understanding necessary to generate, employ and sustain military air power. It provides foundational knowledge about air power, a guide for

professional judgement in the generation, employment and sustainment of air power, and a stimulus for professional mastery in the planning and execution of air operations. *The Air Power Manual* is not a set of rules for employing air power that must be followed without question. Such a dogmatic approach would have little relevance as a basis for mastery of the complexity and challenges inherent in employing and commanding air power in the national security context.

1.3 *The Air Power Manual* is also a foundation for the ongoing critical examination of the roles of air power as an integral part of joint military operations conducted within a whole-of-government approach to national security. A sophisticated understanding of air, land and sea power is required across all Services and Government in order to effectively integrate military force into national security operations. This understanding is especially important when air and surface forces must operate in a highly integrated and coordinated fashion using synchronised and harmonised joint manoeuvre to achieve operational effect. *The Air Power Manual* describes the employment of Air Force's air power within the context of integrated operations with the other Services, with other national agencies and with the forces of allies and partner nations.

1.4 *The Air Power Manual* explicitly recognises the inherently joint and whole-of-government nature of Australian military operations, and is supported by the Australian Defence Force (ADF) doctrine series. *The Air Power Manual* draws, where appropriate, from joint doctrine publications; however, detailed content that is presented in the relevant joint doctrine is not repeated here. *The Air Power Manual* describes aspects of air power that are common across most modern air forces, as well as aspects of air power that are tailored to meet the specific requirements of Air Force.

1.5 Air power doctrine is most effective when applied by professional masters who understand its origins in history and theory, and the national security context in which air power is employed. To provide this broad foundation of knowledge, *The Air Power Manual* is published as part one of a two-part thematic set that describes Air Force's air power. The publications that comprise this set are:

a. **AAP 1000–D—*The Air Power Manual* (Sixth Edition), and**

b. **AAP 1000–H—*The Australian Experience of Air Power* (Second Edition).**

## Hierarchy of Air Force Doctrine

1.6 Consistent with ADF doctrine, air power doctrine is developed to provide philosophical, application and procedural guidance and can be viewed as a hierarchy structured broadly across the levels of armed conflict. However, the levels are neither rigid nor mutually exclusive. The three levels of Air Force doctrine are:

a. **philosophical,**

b. **application, and**

c. **procedural.**

1.7 Examples of each type of Air Force doctrine are shown in Figure 1–1.

### Philosophical Doctrine

1.8 Philosophical doctrine explains broad fundamental principles. *The Air Power Manual* is the capstone philosophical air power doctrine of Air Force. It draws on higher strategic and joint guidance to describe the factors and conditions that shape the force and determine the Government's options for its employment. It provides the basic understanding of the

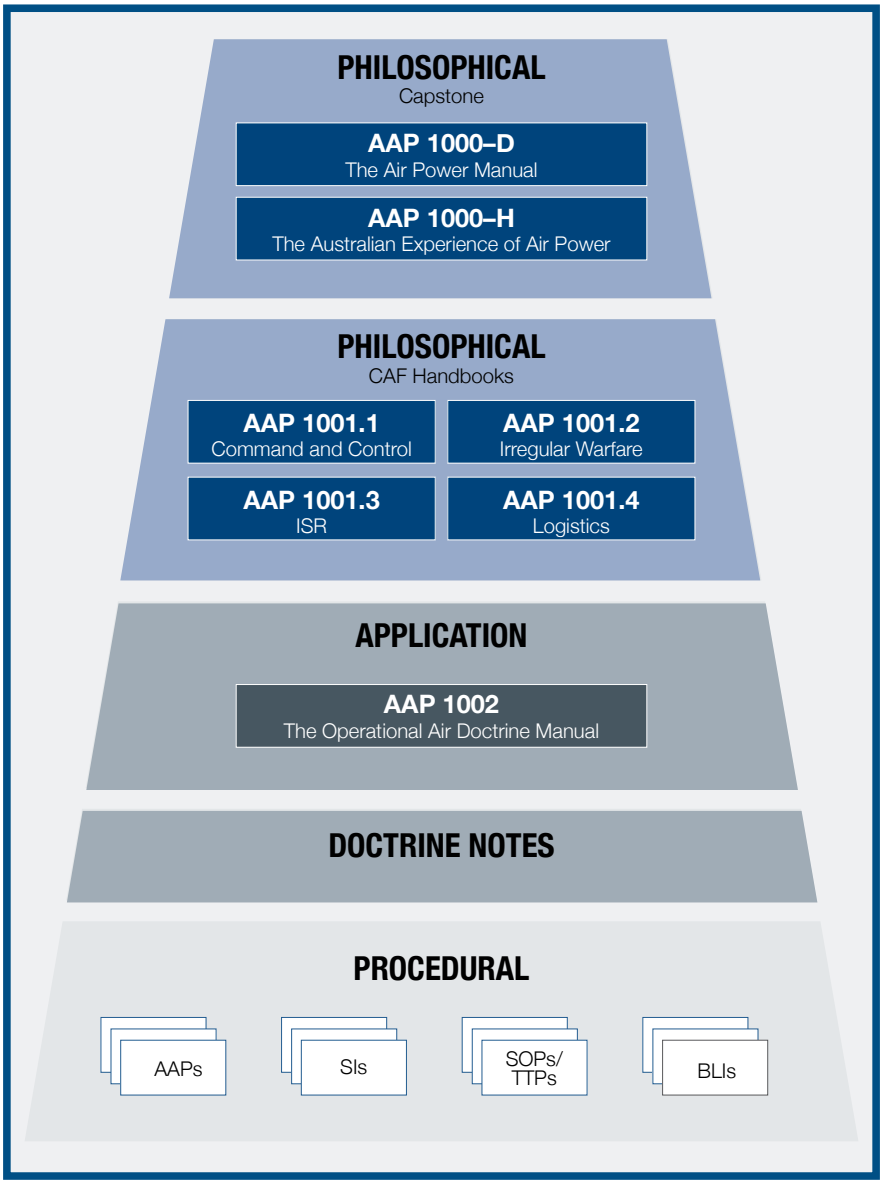



**Figure 1–1: The Air Force Doctrine Hierarchy**

critical contributions of Air Force to national security, what air power does, and how it should be employed. Some aspects of philosophical doctrine will be explanatory and structured, while much of it will be implicit and broad in scope.

1.9 *The Air Power Manual* guides the development of application and procedural doctrine which provide greater detail on the ways and means that Air Force chooses to generate, employ and sustain air power. It has direct relevance at the strategic, operational and tactical levels of armed conflict and command. Air power doctrine at the philosophical level must be robust yet flexible in employment, maintain a fine balance between written and implicit doctrine, be understood by personnel at the strategic, operational and tactical levels of armed conflict, be complementary to the doctrines of other Services, and be recognised by those organisations with which elements of Air Force must work. It must have sufficient stature to command respect and compliance while at the same time leaving open the space for debate and refinement.

1.10 The AAP 1001 Series provides philosophical doctrine on selected topics and a more detailed discussion of concepts presented in *The Air Power Manual*.

## Application Doctrine

1.11 Application doctrine explains the use of fundamental air power principles. AAP 1002—*The Operational Air Doctrine Manual*[1] is the keystone application doctrine of Air Force. It derives operational doctrinal content from principles described in *The Air Power Manual*. *The Operational Air Doctrine Manual* provides a basis for generating, employing and sustaining air power to achieve the desired joint objectives

1 Royal Australian Air Force, Australian Air Publication 1002—*The Operational Air Doctrine Manual*, Second Edition (AL 1 to Revision 1), Directorate of Development, Headquarters Air Command, Glenbrook, 2009.

through effective air campaigning. Application doctrine is usually more prescriptive than philosophical doctrine, but it still aims to allow subordinate commanders flexibility and initiative in its interpretation and employment.

1.12 Doctrine Notes seek to inform and promote discussion on a specific Air Force doctrinal subject, particularly when guidance is required on emerging issues, terminology or areas of contention. The life of a Doctrine Note is expected to be 12 months, after which it will be reissued, withdrawn or integrated into a new or existing Air Force doctrine publication.

### Procedural Doctrine

1.13 Procedural doctrine encompasses detailed drills and tactics, techniques and procedures (TTPs) to ensure effectiveness as well as standardisation and interoperability. Most of this guidance is directive, although the use of initiative at the tactical level is encouraged. Wing and squadron tactical procedures manuals, standing instructions (SIs), standard operating procedures (SOPs) and bench level instructions (BLIs) are examples of procedural doctrine.

## Levels of Armed Conflict and Doctrine

1.14 Doctrine publications are written to provide philosophical, application or procedural guidance to roughly match the levels of armed conflict. Each level of doctrine has a relationship with the others and can be applied across all levels of armed conflict, as depicted in Figure 1–2. Although philosophical doctrine is applicable across all levels of Air Force, it is more relevant at the strategic level. Application and procedural doctrine are more specific to operational and tactical levels, respectively. Additionally, philosophical doctrine influences and is influenced by both

application and procedural doctrine and, through these, influences the operational and tactical employment of air power.

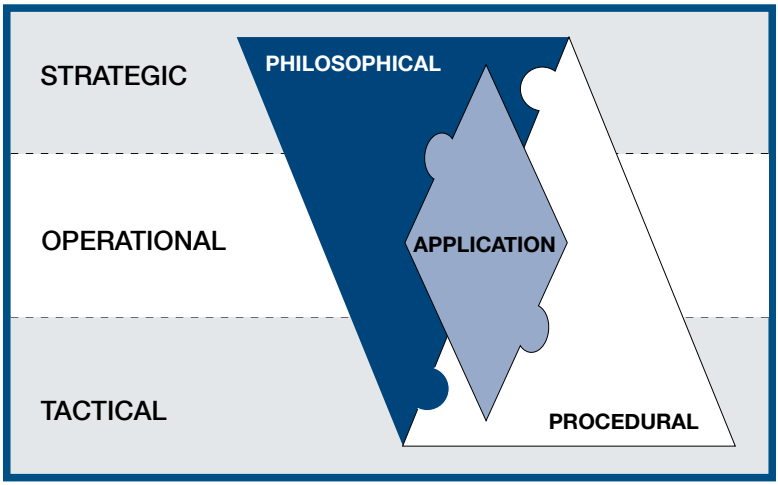



**Figure 1–2: Levels of Armed Conflict and Doctrine**

## Single Service Doctrine

1.15 Similar to Air Force, Navy and Army both produce doctrine publications that cover the fundamental principles of operating in the maritime and land domains, respectively. It is important to recognise that both of these Services operate air arms through rotary wing aircraft and unmanned aerial systems (UAS) to provide specialist and highly capable organic air power.

1.16 A clear understanding of air power is required across all Services to achieve the high levels of integration and synchronisation necessary to create effective operational advantage in the joint campaign. While *The Air Power Manual* describes Air Force doctrine, it also provides a basis for a critical examination of air power as a vital and integral part

of joint military operations. In the prevailing geo-strategic environment, there is a high likelihood that any major operation involving Air Force will be conducted within a coalition. *The Air Power Manual* enhances Air Force's interoperability in these coalitions by ensuring that, wherever possible, Air Force's doctrine is aligned with the doctrines of the air forces of Australia's major allies and partners.

## Conclusion

1.17 Doctrine represents the distillation of collective national military experience and lessons learned, and is updated periodically in response to innovations and changing circumstances. *The Air Power Manual* is Air Force's highest level of doctrine, and describes the employment of air power in conjunction with other Services, national agencies and the forces of allies and other partner nations.


A30-005
AIR FORCE
R FORCE

# 2

## Executive Summary

*Air power is an essential component of Australia's national military power.*

*Australia's national security is premised on a whole-of-government approach across the national security community.*

*The elements of shape, deter and respond form the conceptual framework for Air Force's contribution to Australia's military strategy.*

*Air Force has an enduring responsibility to generate, employ and sustain air power to secure Australia and its national interests.*

*Air power plays a key role in the ADF's ability to pursue an effects-based approach to national security.*

*Legal, moral and ethical principles govern how Australia employs its military capabilities.*

# Air Power in National Security

## Introduction

2.1 Air power is an essential component of Australia's national military power. Together with land and sea power, it makes a vital contribution to the national effort to provide for the security of our nation, our people and our interests. Air power's contribution to national security is an enduring one that, regardless of technological advances or changes in our security circumstance, performs a number of essential roles that enhance and support activities of other elements of Australia's national power. In order to clarify the role and place of air power in Australian national security, this chapter outlines the concept of national security, details the factors that affect elements of national power, describes Australia's enduring strategic interests, and explains Australia's whole-of-government approach to ensuring national security. It also briefly describes Air Force's contribution to Australia's military strategy, the ADF's approach to warfare, the central role of an effects-based approach (EBA) to Australian national security and the legal framework of Australian military operations.

## The Concept of National Security

2.2 Every nation has fundamental and enduring security imperatives and interests that it seeks to protect and promote. In their simplest expression, these interests include the nation's right to defend its territorial sovereignty and integrity, the right to protect its citizens at home or abroad, and the preservation of a way of life acceptable to its citizens. It is an overarching concept that attempts to balance threats, which normally originate externally to the state, and vulnerabilities—such as the erosion of political, economic and social values which are essential to Australian quality of life—that are generated internally.

2.3 In the past few decades the concept of national security has evolved from one that was concerned primarily with the physical defence of national territory, to a far more inclusive concept that includes concerns for human security, transnational criminal and illegal activity, conflict avoidance and securing a wide range of national interests. For example, national interests can include: ensuring national sovereignty and the physical security of the country, its people and territories; safeguarding national institutions and values; and enhancing the economic and social wellbeing of its people. Today most nations consider that their own interests are increasingly linked to those of their allies and partners and that these, in turn, are progressively influenced by the broader global responsibilities of the international community. National security interests in turn may be considered a subset of national interests, and while the fundamental aspects of national security are largely durable, they are responsive to changes in the international security environment.

2.4 National security interests, therefore, flow from the desire of a state to preserve its unique freedoms, characteristics, identity and values. Any threat to the fundamental identity of a nation is generally considered a legitimate basis for state action in order to defend that identity. Consequently, preserving a nation's capability for independent decision-

making, and thus ensuring its existence as a sovereign state, is a national security interest.

2.5 In order to promote and protect Australia's national interests, the Government formulates and pursues a set of national objectives. This is a matter of national policy and their explicit articulation is found in the National Security Statement.[1] Policy objectives relate to national security interests in political, diplomatic, social, economic and defence outcomes. It is this national policy that dictates the application of a whole-of-government approach to national security.



1 Department of Prime Minister and Cabinet, *Strong and Secure: A Strategy for Australia's National Security*, Department of Prime Minister and Cabinet, Canberra, 2013.

## National Power

2.6 National power is the total capability of a country to achieve its national objectives, devoid of external constraints and without being subject to coercion. It describes the capacity of a nation to enact its policies and its ability to face and defeat threats to its security and stability.

2.7 Further, it is a collective feature of the state and comprises an array of interrelated capabilities, built on the state's foundational strengths. These capabilities are referred to as the elements of national power and include diplomatic, information, military and economic elements. These four elements are, in turn, influenced by a number of factors. The main ones are:

a. **Strategic geography**

(1) Geography—including size, terrain, geo-strategic location, water supply and availability, and access to the sea.

(2) Natural resources—including strategic and commercial value of available resources, level of exploitation, and diversity.

(3) Exclusive economic zone (EEZ)—including the ability to protect the nation's EEZ.

(4) Demography—including size of population, distribution of population by age, education, employment levels, and ethnic and cultural diversity.

b. **Political structure**—including prevalent political system, social and political stability, political leadership, international relationships and diplomatic status.

c. **Economic development**

(1) Civil infrastructure—both physical and virtual, including transport networks, food production and information technologies.

(2) Extent of development—industry, financial and commercial activity, international trade, investment, and the national economy.

(3) Technological, scientific and educational capacity.

d. **Security and culture**—social cohesion, government stability and international relations.

e. **Military capabilities**—size, sophistication and posture of military forces.


**Figure 2–1: Employing National Power to Achieve National Strategic Objectives**

## Harnessing Australia's National Power, 1939–45

World War II was a total war. During the first two years of the war, the Australian Government relied largely upon the nation's military power—air, sea, and land power—to defend our national interests against German and Italian aggression overseas. The Australian Government greatly expanded its powers in order to better direct the war effort as the economy, trade, public services, employment, industry and politics were influenced more and more by defence considerations. The need to harness Australia's national power increased in importance as the war progressed. Australia's maritime geography also led to a reliance on the global dominance of British sea and air power for our defence. The Royal Navy and the Royal Air Force (supplemented by Australian Navy and Air Force units) maintained this dominance until the start of the Pacific War in December 1941.

When Japan entered the war, Australia was then fighting for its very existence. After Singapore was lost in February 1942, Australia turned towards the United States (US) for military support. Our strategic geography had not changed, but it was the US Navy and US Army Air Forces (with Australian Navy and Air Force support) that primarily defended our maritime interests at home and overseas until Japan was defeated. Prime Minister Curtin called for an 'all-in' effort and all Australians—men, women and children—were urged to put their backs into the war effort. Indeed, the adult population was mobilised for war.

The nation's resources were reallocated to meet the demands of war, while mutual aid arrangements were made with the US to better integrate each nation's war effort. Australia's civil infrastructure and transportation networks were enhanced, particularly in the north. Rationing of food and clothing was introduced. Women took new roles in essential industries working in what had previously been male-dominated areas. The war was central to government decision-making on the economy, the people, science and industry.

2.8 Consequently, a nation's overall power is not merely the sum of the individual elements and its factors. It is dependent on the combination of these elements and the ability of the nation to integrate them within a coherent national security policy in pursuit of its objectives.

2.9 Air, sea and land power are primarily considered instruments of military power, but under certain conditions they can be employed in a manner that see them directly contribute to the projection of national power. The use of air mobility assets, such as large airlift aircraft, to rapidly provide humanitarian assistance to other countries within the region and further afield, is just such an instance when air power is employed to act as a direct expression of Australia's national power. Similarly, the rapid provision of troops or naval vessels to support disaster relief operations are examples of the use of military forces and capabilities as elements of national power.

## Australia's Enduring Strategic Interests

2.10 Australia's primary strategic imperatives are a direct consequence of its enduring national security interests. Defence policy is directed at the protection of these interests. The policy is not aimed at meeting any particular challenge or threat but is instead meant to accommodate all contingencies, opportunities and risks, and to broadly address the fundamentals of the strategic environment in which Australia sits. Australia's strategic interests are closely influenced by the prevailing international order, which will determine the nation's response to security threats, including the use of force.

2.11 In the pursuit of national security, Australia has based its strategic interests, outlined in successive Defence White Papers, around the following four themes:[2]

a. **A secure Australia**. Australia's overriding national security interest remains its defence against direct armed attack, including attacks by hostile states and non-state adversaries who possess substantial capabilities that can create a strategic impact. Australia must defend against attacks on continental Australia, our maritime territory, our offshore territories and the critical sea lanes in our approaches. Australia's security also includes protection against cyber attack and assured access to space systems.

b. **A secure immediate neighbourhood**. Australia's next most important strategic interest is the security, stability and cohesion of its immediate neighbourhood, which it shares with Papua New Guinea, Timor-Leste and South Pacific states. Although it shares a range of diplomatic, social, educational and economic links with all its neighbours, as a trading nation Australia needs to ensure that its neighbours do not become sources of direct or indirect security threats. Furthermore, it is a priority to ensure that no major power with hostile intentions establishes bases in the immediate neighbourhood.

c. **Strategic stability in the Indo-Pacific region**. Australia has an ongoing interest in the strategic stability of the Indo-Pacific region—the arc extending from India through South-East Asia to North-East Asia, including the sea lines of communication on which the region depends. This strategic interest includes

2 Department of Defence, *Defence White Paper 2013*, Department of Defence, Canberra, 2013, pp. 24–27; and Department of Defence, *Defending Australia in the Asia Pacific Century: Force 2030 – Defence White Paper 2009*, Department of Defence, Canberra, 2009, pp. 41–44.

maintaining strong relationships with countries in the region and preventing the presence of hostile powers that could manoeuvre through the region and project military power against Australia.

d. **A stable, rules-based global security order**. Australia strongly believes that its interests cannot be secure, nor can the region prosper, in an unstable and volatile world. Therefore, it is committed to preserving a rules-based global security order that restrains aggression and manages strategic risks and threats effectively.

## A National Maritime Strategy

2.12 As an island nation, Australia is dependent on international trade for its continued economic stability and prosperity. The vast majority of this trade is conducted through maritime routes in the Indian and Pacific Oceans. As a consequence, any disruption to Australia's maritime approaches or its sea lines of communication could have immediate and dire consequences for the national economy and pose a critical vulnerability to the nation's security.

2.13 Our neighbours in South-East Asia sit astride Australia's northern approaches and the major sea lanes that connect Australia to much of the region. The security of South-East Asia, therefore, is central to Australia's continued national prosperity.[3] These factors impose the reality that Australia must be able to control its air and sea approaches and contribute to the security and stability of regional and global maritime commons.

2.14 Australia's maritime strategy[4] aims to deter, deny or defeat adversary actions that would threaten the maritime commons and sea lines of communication upon which the nation is so dependent. This strategy can only be enacted through adequate and credible air and maritime capabilities, supported by land forces. In essence, Australia's security hinges on a proactive 'maritime strategy' achieved through an optimum mix of air, sea and land power projection capabilities to control the air and sea approaches to the continent.

2.15 Australia's maritime security is substantially underpinned by Air Force's ability to control the air, permitting friendly surface operations. Further, Air Force's capabilities contribute to shaping the operational environment, providing a visible deterrent capability and the capacity to

3 Department of Defence, *Defence White Paper 2013*, pp. 23–29.
4 ibid., p. 28.

respond to adversary actions. Air Force has the ability to undertake these activities as part of a joint force or as a single Service, depending on the prevailing circumstances.

2.16 In sum, air power is critical to ensuring control of the air and sea approaches to Australia, which in turn is crucial to the implementation of a maritime strategy. In order to maintain control over the approaches to our nation, and to shape the regional maritime environment, Air Force must be a balanced force with the capability to respond in a timely manner and with the capacity to react with sufficient weight of attack to deter, deny or defeat emerging threats.

## A Whole-of-Government Approach to Australia's Security

2.17 A change in the complexity and uncertainty in the strategic environment together with the growth of military capabilities within Australia's region and further afield could threaten Australia's interests. Australia's potential adversaries range from individuals acting on opaque agendas, unscrupulous non-state elements driven by political, religious or ideological agendas through to conventional state-based military forces. Such adversaries have the ability to threaten many aspects of Australia's national security. To create a cohesive response to these evolving threats, Australia has adopted a security strategy based on the integrated contribution of all elements of national power—a whole-of-government approach. This approach requires the harmonisation of all elements of national power and their coordinated application to achieve the desired objective. This harmonisation can only be achieved at the national level with government direction expressed as national security policy and strategy.

## Air Power in a Maritime Strategy, 1920–30s

Australia's maritime strategy in the 1920s and 30s was focused on contributing to the British Imperial Defence Plan. Any conflict in the region likely to threaten British or Australian interests would be dealt with by the Royal Navy with the support of Australian naval and military forces. As Air Force was formed on the explicit basis of providing support to both the Navy and Army, it had, from its very beginning, an underlying but at times poorly-articulated mission to assist the Navy in pursuing a maritime strategy for the defence of Australia. In 1923 Flight Lieutenant Henry Wrigley, the Training Officer at RAAF Headquarters, drafted an essay in which he detailed the impact of aircraft on maritime operations, and in mounting a seaborne invasion in the face of joint naval and air forces. Clearly, Air Force saw its part in any maritime strategy as being more than just a supporting element for naval and military forces.

In 1925, a memorandum on Australia's air defence drafted by the Chief of the Air Staff, Air Commodore Richard Williams, reinforced this view while also highlighting the role aircraft could play in securing sea control—insisting that air power had become an important element in any future response to threats against Australia. Williams' proposed contribution of aircraft in gaining control of the maritime approaches to Australia, was in fact more analogous with the 1987 'Defence of the Air-Sea Gap' policies than it was with the contemporary strategies contained in the 'Singapore Strategy' of the Imperial Defence Plans.

Williams' views were in part supported in a 1928 report by visiting Royal Air Force officer, Air Marshal Sir John Salmond. In the report, Salmond argued that the superior mobility of the Australian Air Force should be employed as Australia's primary defensive weapon, supplemented when needed by other elements of defence. As Australia rearmed in the years prior to World War II, the capability it developed conformed with these prevailing views. Aircraft such as the Anson, Beaufort and Sunderland were all acquired with a view to their employment in Australia's maritime environment.

2.18 National strategy guides the application of national power in any given situation and directs the integration of the elements of national power to achieve the desired outcomes. From this one overarching strategy subsidiary strategies are derived that guide the contribution of the individual elements of national power.

2.19 A whole-of-government approach demands the highest levels of coordination, understanding and cooperation between agencies to ensure the achievement of positive and long-lasting national strategic outcomes. These agencies typically comprise a range of government organisations but may also include a variety of other public and private sector actors as well as non-government organisations, industry and the commercial sector. Orchestrating the efforts of these agencies to create the necessary effects to achieve national security outcomes requires careful planning and a common basis for focusing activities. In the Australian context, a partnership between Government and the broader national security community is considered the most effective means of achieving the required outcomes.

## Air Power and Australia's Military Strategy

2.20 The development of military strategy is a continuous process involving the alignment of military objectives, methods and means with national security objectives. Australia's military strategy reflects government intent, defines ADF preparedness, forms the basis for contingency planning and rules of engagement (ROE), and influences capability development considerations.

2.21 The primary task of the ADF is to defend Australia against direct armed attack.[5] This requires the ADF to be able to control the air and sea

5 ibid., p. 24.

approaches to Australia to the extent necessary to safeguard its territories, critical sea lanes, population and infrastructure. The ADF must, therefore, be able to shape the environment in which its interests lay, deter potential adversaries and, where necessary, respond adequately to defeat emerging threats. The elements of shape, deter and respond form the conceptual framework for Air Force's contribution to Australia's military strategy.

## Shape

2.22 Air Force's contribution to shaping Australia's security environment is based primarily on the activities it undertakes to engage other nations. These include regular activities such as mutual exercises, exchanges and visits, and our participation in humanitarian and other relief operations. These shaping activities require the application of a broad range of Air Force's air power capabilities. Shaping continues through all phases of conflict, and includes operations in benign, uncertain and hostile security environments. In such environments, shaping will require military personnel to develop relationships whilst exercising a skilful balance of force application and protection measures.

### Deter

2.23 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. Participation in exercises with the forces of other nations enables Air Force to enhance its operational capabilities whilst demonstrating its ability to deploy and apply force wherever and whenever necessary to secure national interests. The deterrence provided by a credible force and military posture will have the greatest effect when supported by a demonstration of the Government's resolve to use appropriate force when necessary.

2.24 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 remains prepared at all times to apply military force in armed conflict.

2.25 Maintaining the force's readiness for armed conflict and other high-end operations gives Air Force a latent ability to apply force. In the current security environment, this latent capability is of particular value as a deterrent to prevent lower-level operations from escalating into some form of conflict.

### Respond

2.26 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 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 could involve armed conflict or one of the broad range of operations conducted to coerce an adversary towards our preferred outcome through controlled use of force short of armed conflict. This may involve the establishment of an overt military presence to deter further adversary action, enforcement of sanctions or providing support for coercive 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. The nature of the security environment is such that even peaceful operations can have the potential to escalate into low-intensity conflict or even major conventional conflict. Preparing forces for the most challenging of these operations ensures they can respond appropriately to such transition.

## Operation *Pacific Assist* in Japan, 2011

On 11 March 2011 a powerful earthquake and devastating tsunami ripped through the Tohoku region in north-east Honshu, Japan. Three days later, a C-17A Globemaster from No 36 Squadron arrived in the early hours at Yokota Air Base, west of Tokyo, bringing an Emergency Services Task Force (ESTF) to help with urban search and rescue work. The ESTF encapsulated Australia's whole-of-government approach to the relief operation, being made up of police, fire and ambulance personnel from NSW, the ACT and Queensland. The aircraft remained in Japan for two weeks before returning on 25 March. During that period it undertook 23 sorties, providing intra-country airlift of vital stores and equipment. More than 450 tonnes of cargo, including 41 vehicles and 135 passengers, was moved around disaster areas throughout Japan. Two additional C-17s also undertook a mission from Australia, carrying a remotely operated water cannon system (supplied by the Bechtel Corporation at the request of the United States) to assist with efforts to contain radiation leakage from the damaged nuclear reactors at Fukushima.

## Air Power in National Security



2.27 There are clear and enduring connections between a nation's strategic interests, its strategic intent, and the employment of its armed forces. Invariably, military forces are employed to achieve political ends, which at the strategic level equate to national objectives. A nation's military forces are often the most visible element of national power employed as the option of first choice in times of crisis. The armed forces can play a vital role in establishing a nation's relevance in the international community through their demonstrated ability to shape the security environment, deter potential adversaries and respond to national security threats.

2.28 Australia's military strategy aligns government intent, military objectives, methods and means with national security objectives. Specifically, it articulates the ADF's intent in terms of its contribution to the whole-of-government approach. A subset of the military strategy is an air power strategy that guides the employment of Australian air power when and where required as part of a joint, coalition and/or combined campaign. Air power strategy is rarely articulated as a stand-alone product; rather it forms the foundation of the air power contribution to the joint campaign. Air power strategy is in effect the Air Force's plan of how to employ its forces in an air campaign to achieve air power effects. The employment of air power is a multifaceted activity that optimally combines air power characteristics to create air power effects. These air power effects can be achieved through the controlled application of lethal force or through nonlethal engagements, such as humanitarian assistance. The effects created by Air Force's air power must complement the effects created by other arms of the ADF, as well as other elements of national power.

2.29 Air power strategy guides the ways Air Force employs air power to apply controlled kinetic and non-kinetic responses to emerging threats to create tailored lethal and nonlethal effects in direct contribution to achieving a desired end state.

## National Air Power

*National air power is the total ability of a nation to achieve its objectives through the air domain and encompasses all elements of civilian and military aviation.*

2.30 From a national perspective, air power comprises all the different forms of aviation and aviation-related resources that can be employed in the pursuit of national objectives. National air power, therefore, is the total ability of a nation to achieve its objectives through the air domain and encompasses all elements of aviation; including civil and commercial aviation, military aviation, indigenous industry, research and development, support facilities and education. The sources of air power available to a nation are varied and dependent on its broad economic, industrial and knowledge base for their development. Similarly, the generation and sustainment of air power is directly influenced by the prevailing social, political and technological environment.

2.31 Military air power, primarily resident in air forces, is the most important part of national air power. Without adequate and balanced military air power capabilities, the other parts of national air power alone will not be able to achieve national security objectives.

## The ADF Approach to Warfare

2.32 Australia's military strategy is underpinned by the ADF's approach to warfare. This approach is derived from its long adoption of the Western approach to warfare, tempered with a clear understanding of Australia's constitutional framework and geography. Further, this perspective reflects the influence of geopolitics, national identity and culture, as well as lessons learned from past conflicts. The ADF approach to warfighting employs a combination of manoeuvre, interoperability, networking and decision superiority.[6] In addition, the ADF relies on the professional skills of its personnel, underpinned by a tradition of legally and morally sound action and a reputation for lawful and legitimate behaviour, to achieve its desired approach to warfighting.

2.33 For its part, Air Force has an enduring responsibility to the Government of Australia to generate and, when directed, employ and sustain air power in operations to defend the nation and its strategic interests. These operations are conducted jointly and occur within a whole-of-government approach to defending national interests and territorial sovereignty. To meet these responsibilities, Air Force must be capable of effectively and flexibly employing air power across a broad spectrum of operations, in diverse and often complex circumstances, and integrated into a national EBA to national security.

### An Effects-Based Approach

2.34 The concept of resolving crises or conflict by creating effects through the employment of military forces is not new. In fact, historically military forces have always attempted to change an adversary's beliefs

6 Australian Defence Headquarters, Australian Defence Doctrine Publication–D—*Foundations of Australian Military Doctrine*, Third Edition, Defence Publishing Service, Canberra, 2012, p. 6–3.

and behaviour towards their own preferences. The ADF approach to warfare is shaped by its adoption of an EBA to employing military force. This is a key factor in how the ADF thinks about warfighting and how the application of military force might have utility in international relations. An EBA underpins ADF operational thinking, planning and execution and is a cornerstone of Air Force doctrine.

2.35 An EBA is where the effect sought—be that to change an adversary's way of thinking, to alter their behaviour, or to force their actions to comply with your intent, or some other desired outcome—is the driving motive behind the development and implementation of strategy. An EBA is not the simple calculation of how to employ forces against an adversary, nor is it a prescriptive plan to match weapons to targets. In short, an EBA concentrates on outcomes and how they may be achieved, rather than the mechanisms and tools that enact them. An EBA implies a sophisticated way of thinking about how actions will produce the outcomes desired, and this in turn has implications for how the ADF operates within a whole-of-government approach to national security.

2.36 An EBA that facilitates a common understanding of challenges and response options across all agencies of Government is the logical follow-on from the Government's decision to adopt a whole-of-government approach to security. This approach is used to integrate the actions of all elements of Australia's national power to create the desired effects. An EBA provides common ground for collaborative planning and execution of operations to achieve national objectives that ensures the nation's security and the protection of its interests.

2.37 Two factors influence the successful application of an EBA in military operations in a whole-of-government approach. First, commanders and their staff must have an unambiguous understanding of the relationship between the effects created by military actions and those created by the actions of other elements of national power. Second,

military forces must be cognisant of the fact that an EBA requires them to collaborate as widely as possible with other agencies involved in a particular campaign to integrate the effects being created. A combination of these two factors makes the application of an EBA in a military campaign dynamic and complex, but potentially highly effective. This also requires the employment of military power within an EBA to be a continuous cycle of observation, orientation, decision and action.

## Air Power in an Effects-Based Approach

2.38 A fundamental characteristic of an EBA is its flexibility in responding to security challenges. The characteristics of air power make Air Force a natural choice to undertake operations to create effects in a contextual manner. However, an EBA is built on the ability of the appropriate element of national power to assume the lead, which means that the ADF or

Air Force may not necessarily be the lead agency at all times. To operate effectively within this construct, Air Force personnel must have a clear understanding of an EBA and the potential impact of the effects that air power can have on the functioning of other Services and elements of national power. As such, air power plays a key role in the ADF's ability to pursue an EBA to national security.

2.39 Despite technological advances, there remains the potential for military force to create effects that are counterproductive to the desired national outcomes. For example, collateral damage or unintended civilian death occurring as a result of Air Force employing kinetic weapons could prove to be highly counterproductive to the aims and objectives sought by Government in the conflict. This places a high priority on understanding all the possible outcomes of Air Force's actions and orchestrating air power effects and risk management strategies accordingly.

## Legal Framework for Military Operations

2.40 The ADF approach to warfare is also significantly shaped by the legal framework for military operations to which Australia and many other nations adhere, including operations law and the development and implementation of ROE. Operations law includes, but is not limited to the law of armed conflict (LOAC), air law, law of the sea, and legal aspects relating to anti-terrorist and counterterrorist activities, overseas procurement, discipline, pre-deployment preparation, deployment, status of forces agreements, operations against hostile forces, aid to civil authority, border protection and civil affairs operations.

2.41 According to international law and convention, a sovereign nation should only employ its military forces after careful consideration of the moral, legal and political repercussions of doing so. Its determination to employ military force should never be based purely on military feasibility alone. Additionally, the conduct of all military operations is subject to

domestic and international law at all times, although not all participants in conflict adhere to these laws. International law sets the legal parameters for the employment of combat forces and imposes legal accountability on the state's military commanders and combatants. The code associated with the planning and execution of military operations is defined as operations law.

2.42 It is generally understood that the recourse to armed conflict by a state presumes rational decision-making by states, proper purpose, and the ability of the government to exercise control over its military forces. Australia, like every other nation, must also accept limits of action in armed conflict, admit the proposition that the means of warfare are not unlimited, and acknowledge that the concept of legitimacy must prevail in all aspects of armed conflict.

### Law of Armed Conflict

2.43 The system that regulates the conduct of armed conflict is known as the LOAC. It comprises statutory laws and laws of precedence and acts as a broad code of ethics for the profession of arms. Military personnel must assume a higher burden of responsibility than other citizens. This responsibility includes that of upholding a moral compact that may not be specified or formalised but is nevertheless inviolable—and may even be higher than the purely legal position that the LOAC assumes.

2.44 The LOAC is a subset of international law that governs the actions of signatory states when they are engaged in armed conflict. The Australian Government has ratified the Geneva Conventions of 1949 as well as the Additional Protocols of 1977. All members of the ADF are personally responsible, and will be held accountable, for their actions and can expect to be prosecuted where their actions are in breach of the LOAC. Commanders have a special responsibility to ensure that personnel under their command are aware of the LOAC, and must also act to prevent breaches of it. Failure to prevent such breaches may mean that, in turn,

## No 5 Flight in Afghanistan, 2012

Almost every day throughout 2012 Air Force's Heron Detachment, also known as No 5 Flight, conducted missions over Afghanistan in support of coalition forces. The Heron unmanned aerial system often remained airborne in excess of 24 hours while operating at an altitude of 10 000 metres. Its missions included observing 'pattern of life' and monitoring digital signals to identify, track and, when necessary, target insurgents for others. The Heron crews were able to analyse the data displayed on banks of television monitors to identify suspect individuals or activities. Whenever insurgents were positively located they were engaged. Monitoring their movements sometimes led to other members in the terrorist network being identified, the uncovering of an improvised explosive device storage area or factory, or the capture of insurgents. Over time the presence of a Heron overhead provided a measure of security, and a form of limited relief, to the innocent Afghan men, women and children who would otherwise be threatened by the indiscriminate actions of terrorists. In this way, No 5 Flight managed to produce direct and indirect effects in support of the coalition's security mission.

commanders are personally responsible for breaches committed by their subordinates.

2.45 Australia, the ADF and Air Force have an enviable reputation for fairness, honesty, integrity and respect for the rule of law. This reputation, which is a critical factor in shaping the post-conflict environment, could be jeopardised through breaches of the LOAC. Therefore, all ADF and Air Force operations must be conducted with adherence to the LOAC as well as the mandated ROE. Further, all members of the ADF are required to have a thorough understanding of their obligations under the LOAC, including the four fundamental principles of the LOAC—military necessity, distinction, unnecessary suffering and proportionality.[7] These obligations and responsibilities are of specific relevance to those members of Air Force involved directly in the employment of air power in offensive operations.

2.46 The LOAC should not be seen as an impediment to a combatant in the execution of operations. The military mission should be balanced by judgement at the strategic level regarding the extent of permissible collateral damage or incidental injury to non-combatant persons or protected infrastructure. Air power can create devastating effects and failure to employ this power with discrimination and proportionality can have serious adverse consequences for the individual, Air Force and the Government.

### Rules of Engagement

2.47 In accordance with government directions and intent, ROE are instructions issued by the commander that delineate the circumstances and limitations within which force may be applied in order to achieve

7 ibid., p. 5–13.

stated objectives. ROE are issued for operations in both peace and conflict. The high potential for unintended strategic effect from tactical actions could attract restrictive ROE on air operations. It is the responsibility of all personnel involved in the planning and execution of these operations, including weapon and target selection, to ensure that these activities are conducted within the guidelines of the mandated ROE. Equally, in coalition operations, a commander must be cognisant of any differing ROE of partner nations and the implications of this for ADF operations.

## Conclusion

2.48 National security is a broad and overarching concept that attempts to balance threats and vulnerabilities with defending the nation-state and securing its national interests. A nation's ability to provide for its own security is in large part a function of its capacity to harness and employ its national power. National power, in turn, is influenced by a large number of factors, including demographics, levels of education and technology, the political system, military capabilities and culture. Australia's national security interests are clearly defined through Defence White Papers and other government policy documents. To ensure the viability of its security interests, Australia has adopted a whole-of-government approach that coordinates the application of the appropriate combination of the elements of national power to achieve the desired end state. Air power is an essential element of national power and directly contributes to a whole-of-government approach to security. Air power's unique contributions to the ADF and national power are derived from its inherent characteristics and the intelligent command of its flexible and responsive capabilities. Air power, consequently, makes a substantial and important contribution to national security, through its employment within a joint military context and as a direct element of national power.

2.49 The ADF approach to warfare is shaped by Western military tradition and informed by the internationally accepted legal framework for military operations. In turn, it is expressed through an EBA within the whole-of-government construct. The ADF, like most modern military forces, will normally be one of the first elements of national power that the state chooses to employ in times of crises, primarily because of its responsiveness. Increasingly, the spectrum of operations within which the ADF will be required to respond and conduct operations is extremely broad. This context necessitates the maintenance of a balanced breadth of capabilities across the three Services while retaining the ability to

shape, deter and respond in a flexible and agile fashion. Air power is fundamental to the nation's ability to respond rapidly to emerging threats to national security, both in conflict and in times of comparative peace.

2.50 Consequently, when *The Air Power Manual* describes the role and place of air power in national security, it does not mean to infer that air power is, or ought to be, employed on its own outside of the joint context; rather, it describes the distinct air power contribution as part of the larger ADF contribution to national security.

2.51 The next three chapters elaborate on Air Force's roles and missions, the fundamental principles which guide their application, and describes these within the context of Australian national security.

# 3


## Executive Summary

*An air power role is a fundamental and enduring function of Air Force.*

*The four core air power roles and their associated missions are:*

*a.* **control of the air**
*offensive counter air* | *defensive counter air*

*b.* **strike**
*strategic attack* | *close air support* | *air interdiction* | *anti-surface warfare* | *anti-submarine warfare* | *electronic warfare* | *information operations*

*c.* **air mobility**
*air logistic support* | *airborne operations* | *air-to-air refuelling* | *aeromedical evacuation*

*d.* **intelligence, surveillance and reconnaissance.**

# Employing Air Power: The Core Air Power Roles

## Introduction

3.1 Air Force remains the principal ADF Service for the generation, employment and sustainment of Australian military air power in support of national security. This involves performing several key roles in the pursuit of military objectives. Reinforcing the joint dimension of Air Force's air power, its employment can be described through the lens of the six ADF warfighting functions—the related capabilities and activities joint commanders use to integrate, synchronise and direct operations and campaigns.

3.2 This approach supports the actions and effects of air power in a way that is readily translated into the planning of joint campaigns. The ADF warfighting functions are: force application; force projection; situational understanding; command; force protection; and force generation and sustainment.

3.3 A description of these warfighting functions can be found in Australian Defence Doctrine Publication (ADDP)–D—*Foundations of Australian Military Doctrine,*[1] with further detail available in ADDP 3.0—*Campaigns and Operations.*[2] Founded primarily on past and

---

1 ADDP–D—*Foundations of Australian Military Doctrine*, p. 6–7.

2 Department of Defence, Australian Defence Doctrine Publication 3.0—*Campaigns and Operations*, Second Edition, Defence Publishing Service, Canberra, 2012, Chapter 3.

present practice, they are broad, enduring and adaptable to current and future ADF operations. As shown in Figure 3–1, the four core air power roles align with three ADF warfighting functions. This chapter focuses on the core air power roles. As well as describing what each role entails, the alignment of these air power roles with the ADF warfighting functions is discussed, and the air power missions generally associated with each role are described.

| Air Power Roles | | ADF Warfighting Functions |
|---|---|---|
| Core | Control of the Air | Force Application |
| | Strike | |
| | Air Mobility | Force Projection |
| | ISR | Situational Understanding |

**Figure 3–1: Core Air Power Roles and ADF Warfighting Functions**

## Air Power Roles

3.4 In the context of *The Air Power Manual*:

a. **an air power role** is a fundamental and enduring function of Air Force.

b. **an air power mission** is an aggregate of military activities that contributes to the achievement of an air power role.

c. **an activity** is an action or task that contributes to the achievement of an air power mission.



3.5 Air Force exists to generate, employ and sustain air power to defend the nation and support its national interests. This is achieved through a variety of air power roles, which are conducted across the spectrum of conflict from the delivery of humanitarian assistance through to wars of national survival. In conflicts tending towards warfighting, air power is usually employed within an air campaign, which is a key component of the larger joint campaign. Air power is employed through the performance of its four core and three enabling roles, either from bases within Australia or from deployed locations in an expeditionary manner. At the lower end of the conflict spectrum, air power roles may be employed outside the context of an air campaign.

3.6 Air power roles are fundamental and enduring functions that balanced air forces have performed, and military air power has provided to operations since the beginning of military aviation. It is important to

note that the air power roles can be complementary and the effectiveness of any one role may depend on the effectiveness of another. The integration of air power roles and effects with those delivered by sea and land power ensures the most effective employment of air power.

3.7 The four core air power roles are:

a. **control of the air**,

b. **strike**,

c. **air mobility**, **and**

d. **intelligence, surveillance and reconnaissance (ISR)**.

3.8 In addition to the four core air power roles, Air Force recognises three enabling air power roles, namely: command and control (C2); force protection; and force generation and sustainment. These are discussed in Chapter 4.

3.9 The air power pyramid in Figure 3–2 illustrates the air power roles and missions generally associated with the generation, employment and sustainment of air power effects in a joint campaign. Although individual air power missions have been identified with a specific air power role, it must be understood that one or several air power missions can contribute separately or concurrently to the realisation of one role. Conversely, a single air power mission can also support several air power roles.

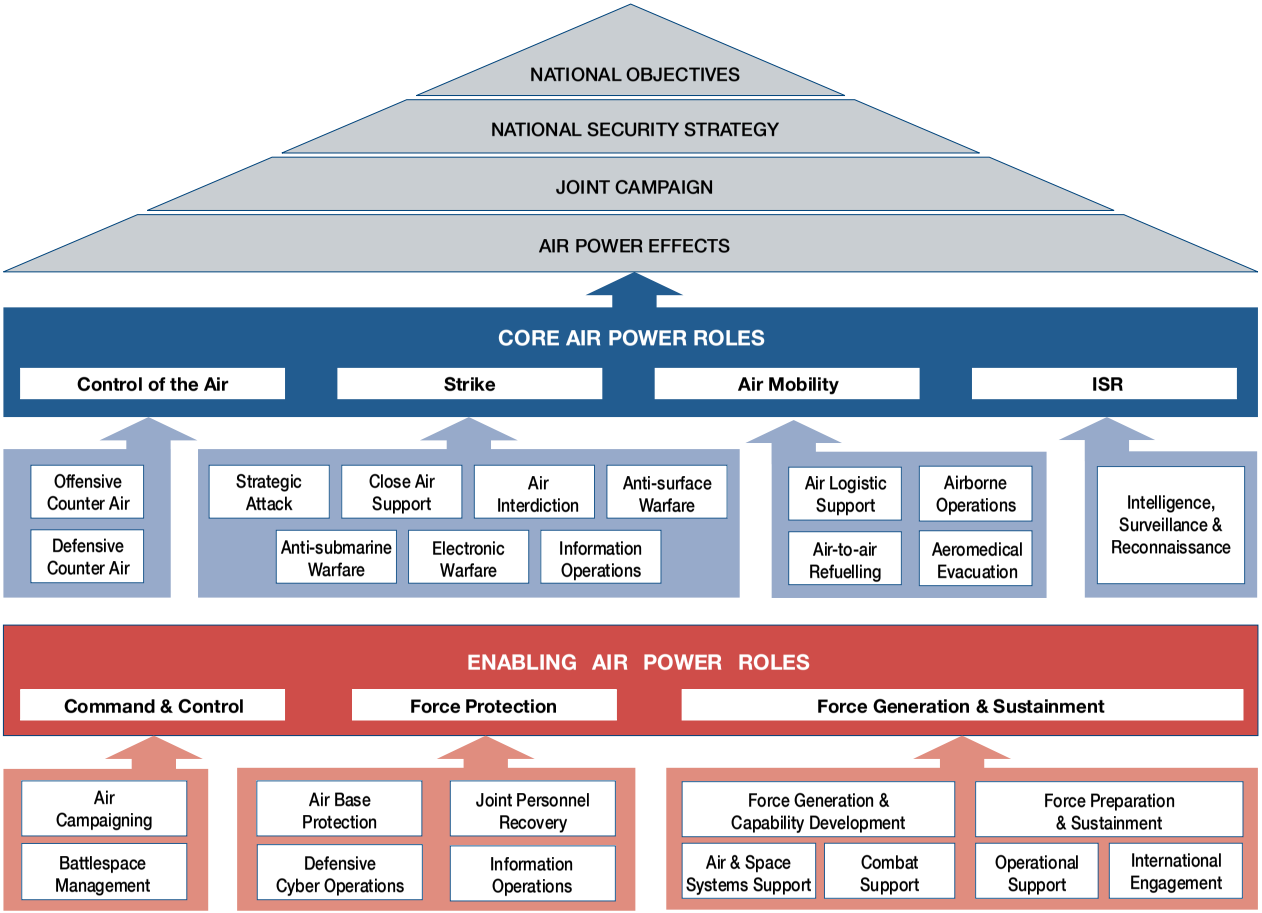



Figure 3–2: The Air Power Pyramid

## Control of the Air

*The ability to conduct operations in the air, land and maritime domains without effective interference from adversary air power and air defence capabilities.*

3.10 The core air power role of control of the air aligns with the ADF warfighting function of force application. Identified as the primary purpose of the ADF, force application gains and retains the initiative. Control of the air is the ability to conduct operations in the air, land and maritime domains without effective interference from adversary air power and air defence capabilities. It provides freedom from attack, freedom to attack and freedom of manoeuvre, and is achieved through the destruction, degradation or disruption of an adversary's air power and air defence capabilities. Failure to achieve adequate control of the air will constrain the conduct of friendly operations and place them at risk of adversary attack. Having control of the air does not guarantee success in a joint campaign, but failure to achieve adequate control of the air in situations where a credible adversary air threat exists will constrain or preclude the conduct of air, land or maritime activities.

3.11 Since the end of the Cold War in the 1990s, Western air power has been a dominant force capable of eliminating or suppressing adversary air power and air defences sufficiently to prevent adversary air strikes on friendly forces and enable near-uncontested use of the adversary's airspace for friendly air forces. This dominance represents a key asymmetric advantage. Although in recent times control of the air has tended to be taken for granted by Western forces, joint campaign planning must put sufficient emphasis on achieving and maintaining appropriate control of the air as a prelude to all other operations. Consequently, Air Force will normally lead the operations to achieve control of the air, although land and maritime forces can assist by attacking adversary aircraft and bases as well as by suppressing their air defences.

3.12 **Categories of control of the air**. Where control of the air domain is contested, air forces will have to fight for and achieve control of the air. This, while always desirable, may not be necessary and at times unachievable. In these circumstances achieving control of the air at the required location and for the necessary duration may be sufficient. Joint force planners and, in particular, airminded planners, must be able to identify the category of control of the air to successfully conduct friendly operations. Control of the air is either achieved or not achieved. In each instance the air situation can be further divided into one of two categories.



3.13 When control of the air is achieved, the air situation falls into one of two categories:

a. **Air supremacy**. Air supremacy exists when adversary air power and/or air defence capabilities are incapable of effective interference, unbounded by time and location.

b. **Air superiority**. Air superiority exists when operations can be conducted at a given location for the desired duration without effective interference by adversary air power and/or air defence capabilities.

3.14 When control of the air is not achieved, one of the following two categories will apply:

a. **Air parity**. Air parity exists when control of the air is being contested and no force has been able to obtain an air power advantage and/or air defence dominance over another.

b. **Unfavourable air situation**. An unfavourable air situation exists when operations can expect to encounter prohibitive interference from adversary air power and/or air defence capabilities.

## Control of the Air Missions

3.15 Force application through the control of the air role is primarily realised by two air power missions:

a. **offensive counter air**, and

b. **defensive counter air**.

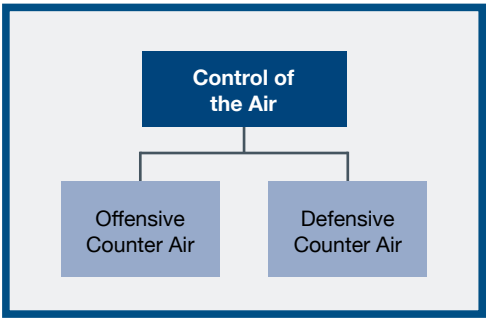



Figure 3–3: Control of the Air Missions



## Offensive Counter Air

3.16 An offensive counter air (OCA) mission is an offensive air activity conducted to destroy, degrade, neutralise or disrupt adversary air power, or to contain it as close to its source as possible. OCA missions can involve fighter sweep and the suppression of enemy air defences (SEAD). Destroying adversary air power and air defence threats on the ground is traditionally regarded as the most effective way to conduct OCA missions.

## Defensive Counter Air

3.17 A defensive counter air (DCA) mission utilises active or passive defensive measures to detect, identify, intercept, destroy or neutralise the effectiveness of adversary air activity and to prevent the adversary from achieving control of the air. These missions are normally conducted over or close to friendly territory, and aim to avoid or minimise the damage to friendly forces whilst inflicting the maximum attrition on the adversary.

3.18 DCA consists of active or passive measures:

a. **Active DCA**. Active DCA is action taken by air and surface forces to inflict attrition on or deter the adversary and neutralise the effectiveness of adversary air activity. This can involve fighter aircraft flying combat air patrols (CAP).

b. **Passive DCA**. Passive DCA includes those measures, other than active DCA, taken to minimise the effectiveness of adversary air activity by enhancing the survivability of friendly forces and installations. This can include camouflage, deception and dispersal.

## Air Defence for National Events

In recent years, control of the air has become a critical security component for national events. For example, Air Force is now regularly tasked to secure the airspace around events such as the 2002 Commonwealth Heads of Government Meeting at Coolum, Queensland; the 2003 visit by US President George W. Bush to Canberra; the 2006 Commonwealth Games in Melbourne; the 2007 meeting of the Asia Pacific Economic Cooperation (APEC) Forum in Sydney; and the 2008 Papal Visit.

During the 2007 APEC meeting, a Temporary Restricted Area (TRA) was established over a 45 nautical mile radius of Sydney Airport. The effectiveness of the system was tested when a small civilian aircraft accidentally intruded into the TRA, necessitating its interception by two F/A-18 Hornets. The interception, coordinated by the Air and Space Operations Centre, ensured the light aircraft was positively brought under civilian air traffic control. Not only was this an air defence activity, it also served as a 'show of force' deterrence action.

## Achieving Control of the Air Over Guadalcanal, 1942

Achieving control of the air was central to the success of maritime operations during the Guadalcanal Campaign in 1942. After the landing, Admiral Frank Jack Fletcher's carrier fleet was withdrawn due to the presence of Japanese air power. United States (US) marines were left behind on Guadalcanal without naval support. Eleven days later Henderson Airfield became operational, and almost immediately American aircraft acheived control of the air. From that time, US air power was decisive in defeating the Japanese Navy whenever it approached Guadalcanal during the day. However, the American aircraft at that time were not capable of night fighting and so they were unable to control the air after dark. Using this capability gap to advantage, the Japanese sent reinforcements by sea at night, dubbed the 'Tokyo Express', and for several months the struggle on land remained a war of attrition.

## Strike

*The ability to attack with the intention of damaging, neutralising or destroying a target.*

3.19 The core air power role of strike aligns with the ADF warfighting function of force application. Strike is the ability to attack with the intention of damaging, neutralising or destroying a target. Strike can employ lethal or nonlethal, and kinetic or non-kinetic means to create the desired physical and/or cognitive effect on the adversary. It has particular value for the use of air power as a broader deterrent or coercive instrument. The demonstrated capability to strike an adversary allows the application of a range of strategies, such as a diplomatic warning or show of force, through to the actual use of force. Strike can therefore be used to deter or coerce the adversary, degrade, neutralise or destroy an adversary's war-making capabilities, or disrupt or deny courses of action. Strike missions are proactive and offensive in nature and may be used to take the initiative, gain surprise and minimise opposition to friendly operations. Like all air power roles, strike can achieve synergistic effects when employed in combination with other roles.

3.20 Australia's employment of precision weapons permits it to conduct strike with a high degree of accuracy, effectiveness and lethality. Precision weapons provide commanders with the ability to apply decisive military force with discrimination while minimising collateral damage and unnecessary loss of human life. This precision strike capability, when combined with air power's inherent characteristics of perspective, speed and reach, provides the Government with a unique politico-military instrument that can be used to swiftly and directly apply military power when and where required creating the greatest strategic effect. However, strike can also create unintended effects. Although kinetic weapons have become increasingly precise, technical malfunctions or targeting

errors can result in collateral damage that may have undesired political, diplomatic and military repercussions.

3.21 Strike can be either deliberate or dynamic. Deliberate strike missions are conducted as part of a line of operation to shape the operational environment to enable joint manoeuvre, subsequent military engagements and/or directly achieve desired strategic, operational or tactical objectives. Accordingly, strike is normally focused on critical vulnerabilities that underpin an adversary's strategic and/or operational centre of gravity. In order to maximise effectiveness, deliberate strikes attack selected and prioritised targets in a synchronised manner. In contrast, dynamic strike missions are conducted in short-term anticipation of, or in reaction to, emerging targets.



## Strike Missions

3.22 Force application through the strike role is realised by the following air power missions:

a. **strategic attack**,

b. **close air support**,

c. **air interdiction**,

d. **anti-surface warfare**,

e. **anti-submarine warfare**,

f. **electronic warfare, and**

g. **information operations**.

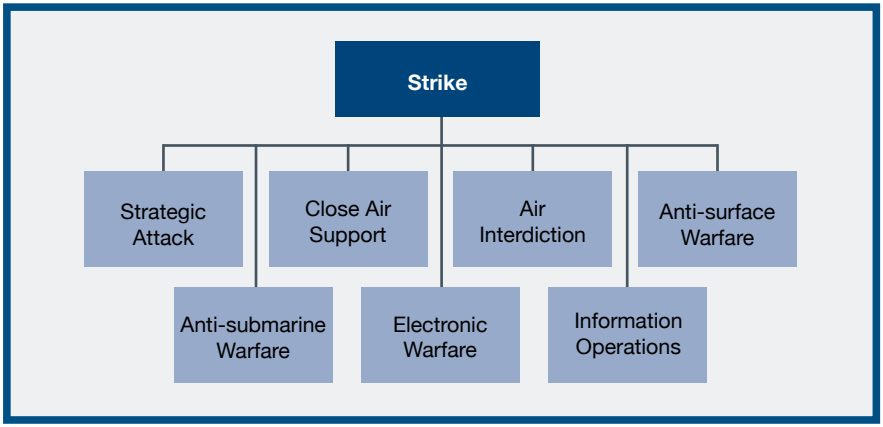



Figure 3–4: Strike Missions

### Strategic Attack

3.23 A strategic attack (SA) mission is an offensive air activity designed to employ air power to create specific strategic effects that damage, neutralise or destroy an adversary's will, warfighting capabilities or any other capacity opposed to one's interests. Air Force's SA capability can shape the operational environment, deter possible aggressors, and where necessary, deliver a timely and decisive response. Maintaining this capability with a numerically small force requires a careful mix of effective C2 networks, support systems and weapons system technology. The proliferation of modern air defence systems places such stringent demands on platform survivability that only highly capable weapon systems, at or near the leading edge of technology, can provide a credible SA capability against a capable adversary.



3.24 The strategic assessment that shapes SA is complex, and will be guided by political intent and constraints. Decisions to carry out SA are normally taken at the highest political level, as SA carries a possible risk of creating unintended and undesired effects. If not well managed, such effects have the potential to adversely change the conduct and outcomes of a campaign, which may detract from achieving the strategic goals of the Government.

3.25 In sum, SA is a defining mission for air forces with the independence to choose their own organisation and force structure to generate, employ and sustain air power. It is an integral part of the joint military campaign, and can make a decisive contribution in an EBA.

### Close Air Support

3.26 A close air support (CAS) mission is an air activity conducted against hostile targets that are in close proximity to friendly forces. The aim of CAS is to destroy, suppress, neutralise, disrupt or delay the adversary who is engaged with or about to engage with friendly ground or amphibious forces. CAS requires the highest degree of coordination and integration between air and surface forces because of the immediacy of the threat, the close proximity of friendly forces and the risk of fratricide in both the kinetic and non-kinetic environments.

### Air Interdiction

3.27 An air interdiction (AI) mission is an air activity conducted to divert, disrupt, delay, degrade or destroy an adversary's capability before it can be brought to bear effectively against friendly forces. Although AI is an integrated process, it is conducted at such distance from friendly forces that detailed coordination of AI missions with the fire and manoeuvre of friendly forces is not normally required.

### Anti-surface Warfare and Anti-submarine Warfare

3.28 An anti-surface warfare (ASuW) mission is an air activity conducted with the intention of denying the adversary effective use of their surface vessels in the maritime domain.

3.29 An anti-submarine warfare (ASW) mission is an air activity conducted with the intention of denying the adversary the effective use of their submarines and/or unmanned underwater vehicles in the maritime domain.

3.30 ASuW and ASW missions are typically integrated with operations of friendly naval forces seeking to maintain a desired degree of control of the sea, but can also be conducted as independent air operations within the joint, combined or coalition campaign.

## Electronic warfare

3.31 Electronic warfare (EW) is military action to exploit the electromagnetic spectrum (EMS), encompassing: the search for, interception and identification of electromagnetic emissions; the employment of electromagnetic energy, including directed energy, to reduce or prevent hostile use of the EMS; and actions to ensure its effective use by friendly forces.[3]

3.32 EW is divided into three categories:

a. **Electronic support**. Electronic support (ES) involves actions taken to search for, intercept, locate, record and analyse radiated electromagnetic energy for the purpose of exploiting such radiations in support of military operations. EW information is required to conduct electronic attack (EA) and electronic protection (EP) and to enable other air power missions.

b. **Electronic protection**. EP involves actions taken to protect personnel, facilities, and equipment from effects of the use of the EMS that degrade, neutralise, or destroy friendly combat capability. EP is also considered a form of force protection.

c. **Electronic attack**. EA involves the use of electromagnetic energy or directed energy to attack personnel, facilities or equipment with the intent of degrading, neutralising or destroying adversary combat capability.

3.33 Force Level EW (FLEW) integrates traditional EW with strategic and tactical ISR, and battlespace management capabilities. FLEW assets can conduct air power missions in isolation or provide real-time tactical support to other platforms to improve mission effectiveness across the air, land, maritime, space and cyberspace domains.

---

3 Australian Defence Headquarters, Australian Defence Doctrine Publication 3.5—*Electronic Warfare*, Second Edition, Defence Publishing Service, Canberra, 2013, pp. 1–5 to 1–9.

### Information Operations

3.34 Information is an essential element of military operations. As information and cyber share a synergy rather than an identity, the nature of information operations (IO) differs from cyber operations. IO, as a strike mission, involves the operational level planning and execution of information activities to influence the decision-making and actions of a target audience. It seeks to neutralise, destroy or degrade the will and capability of an adversary in order to affect understanding and thereby perception and behaviour.

3.35 IO can affect the physical, functional, temporal or psychological characteristics of targets and target audiences, and create effects at the strategic, operational and tactical levels of operations. It can be kinetic or non-kinetic in nature and can be directed at adversary, multinational, neutral and uncommitted audiences. IO is integral to all Air Force and joint operations and must be integrated in the same manner as traditional air power capabilities. In some cases IO may require whole-of-government coordination.

3.36 IO actions done correctly can produce strategic effects and greatly decrease the necessity for kinetic action. Employed incorrectly, they can produce negative effects that, in the modern context, have the potential to overshadow all other military activities and successes.

## Operation *Allied Force*, Kosovo, 1999

The North Atlantic Treaty Organisation (NATO) air campaign Operation *Allied Force* was launched in March 1999 to halt the humanitarian catastrophe unfolding in Kosovo. Despite challenges, the NATO Alliance held together during 78 days of air strikes in which more than 38 000 sorties—10 484 of them strike missions—were flown without a single allied fatality. After first targeting the Federal Republic of Yugoslavia's air defences, NATO gradually escalated the campaign using the most advanced, precision guided systems. This included targeting high-value, military and dual use targets within Serbia, with a number of attacks upon targets in the capital Belgrade. Unfortunately, on 7 May, NATO aircraft hit the Chinese Embassy due to incorrect target information from the United States Central Intelligence Agency. Following diplomatic efforts on 3 June by Russia and the European Union, a Military Technical Agreement was concluded between NATO and the Federal Republic of Yugoslavia on 9 June. On the following day, after confirmation that the withdrawal of Yugoslav forces from Kosovo had begun, NATO announced the suspension of the air campaign.

## Japanese Air Strike sinks British Battleships, December 1941

The sinking of the British ships *Repulse* and *Prince of Wales* in December 1941, by Japanese land-based torpedo and bomber aircraft, was a devastating attack that crushed British hopes of defending Singapore. The air strike occurred while they were underway and in open water—something which some Defence advisers had stated would never happen. After their loss, the Japanese Navy exercised air superiority and control of the sea throughout much of South-East Asia and the Indian Ocean. They used this advantage to project military power across the region in what has been labelled a Japanese *blitzkrieg*.

## Air Mobility

*The ability to move personnel, materiel or forces using airborne platforms.*

3.37 The core air power role of air mobility aligns with the ADF's warfighting function of force projection. Force projection is the timely deployment or movement of joint forces within the operational environment by any means to achieve objectives. The ability to project force is critical to exploiting the operational environment while denying it to an adversary.

3.38 Air mobility is the ability to move personnel, materiel or forces using airborne platforms. It provides the capability to rapidly deploy, sustain and redeploy personnel, materiel or forces to, from or within a theatre by air. This air power role enables the conduct of other ADF operations and has utility across the full spectrum of conflict. Notably, air mobility is often the transportation of choice when speed, reach, and obstacle and surface threat avoidance are required. In some cases, air mobility can be the only means to create the desired effect.

3.39 The recent introduction of faster long-range aircraft for the air mobility role has provided Air Force with a significant global airlift capability. These aircraft afford Air Force a credible inter-theatre air mobility capability that is vital to enabling the ADF to conduct expeditionary operations in support of Australian national security objectives in the broader geo-strategic environment. Meanwhile, intra-theatre air mobility is vital to facilitating rapid air movement of forces and supplies within a theatre, which enables a numerically small force to dominate a large geographical area. Where integral military assets are insufficient or unsuitable to meet the airlift requirements of the ADF, civil charter aircraft may be employed to meet some operational requirements.

## Air Mobility Missions

3.40 Force projection through the air mobility role is realised by the following air power missions:

a. **air logistic support**,

b. **airborne operations**,

c. **air-to-air refuelling, and**

d. **aeromedical evacuation**.

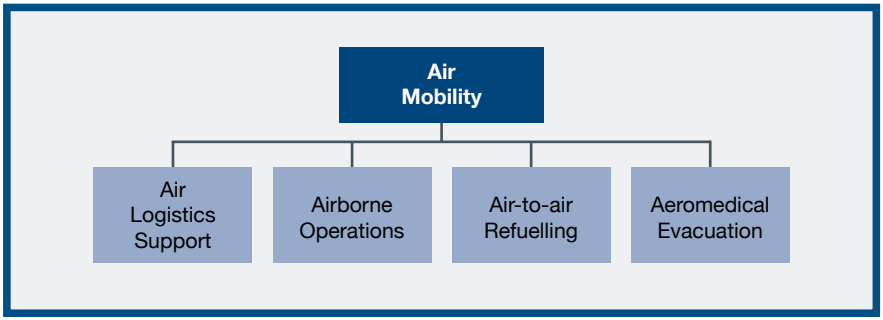



Figure 3–5: Air Mobility Missions

## Air Logistic Support

3.41 An air logistic support (ALS) mission is an air activity, other than airborne operations, air-to-air refuelling or aeromedical evacuation, conducted to deploy, distribute or recover personnel, materiel or forces. ALS also includes special purpose airlift and the transport of VIPs in a secure travel environment. ALS missions may be inter-theatre or intra-theatre and can use a traditional 'hub and spoke' logistics delivery model as well as providing direct access to smaller and/or austere airfields.

## Airborne Operations

3.42 An airborne operations (ABNOPS) mission is an air activity conducted to deliver personnel, materiel or forces into a contested objective area. This may be achieved by airdrop or airland from aircraft. ABNOPS can also be conducted to deliver Special Forces in enemy-controlled or politically sensitive territories. The degree of risk, both physical and political, inherent in these operations and the challenging environment in which they may be conducted require detailed, integrated planning and organisation, and usually require specially trained crews.



### Air-to-air Refuelling

3.43 An air-to-air refuelling (AAR) mission is an air activity conducted to refuel one aircraft from another in flight. A key enabler to force projection, AAR can augment a number of other air power missions by enhancing the range, endurance and payload of receiver aircraft.

3.44 The use of AAR to support aircraft operating beyond their unrefuelled range introduces an additional level of vulnerability. This should be mitigated by the provision of dedicated force protection for both AAR and receiver aircraft. The level of protection required depends on the category of control of the air that exists.

### Aeromedical Evacuation

3.45 An aeromedical evacuation (AME) mission is an air activity conducted to transport ill or injured personnel under medical supervision to appropriate medical treatment facilities. AME capabilities make it possible for personnel to receive critical care from the point where they embark, thereby providing more than just a transport capability.

#### Operation *Anode*, Solomon Islands, 2003

Australia's Defence contribution to the multinational Regional Assistance Mission to Solomon Islands (RAMSI), intended to restore law and order was known as Operation *Anode*. The ADF contingent to RAMSI was airlifted to Honiara by C-130H Hercules aircraft of No 36 Squadron between 24 and 29 July 2003. Air Force's contingent of two Caribou transport aircraft and personnel from No 38 Squadron was deployed to the Solomons to help provide mobility in country—a task that was particularly onerous due to it being a nation composed of nearly 1000 islands and reliant upon the sea for communications. Four Iroquois helicopters, from the Australian Army, working alongside four New Zealand Army Iroquois, complemented the Caribous in the air mobility role. The Royal Australian Navy also supported operations ashore with Sea King helicopters operating from HMAS *Manoora (II)*. An element of No 386 Expeditionary Combat Support Squadron provided air base support to the Caribou detachment as well as limited services to RAMSI. The initial success of the RAMSI operation allowed the number of military personnel, including Air Force's contingent, to be largely withdrawn in July 2004, although Hercules aircraft continued to provide support to the multinational RAMSI over the next few years.

## Intelligence, Surveillance and Reconnaissance

*ISR synchronises and integrates the planning and operation of sensors, assets, and processing, exploitation and dissemination systems in direct support of current and future operations.*

3.46 ISR can be understood as an air power role, an air power mission, a process, a capability and an enterprise—subject to the context in which it is viewed. A more detailed description of ISR is provided in AAP 1001.3—*The Air Force Approach to ISR*.[4]

3.47 As a core air power role, ISR enables the other core roles and is aligned with the ADF warfighting function of situational understanding. In addition to providing a combined picture of the operational environment, situational understanding involves the interpretation of a situation and is facilitated by awareness, analysis, knowledge, comprehension and judgement, thereby enabling timely and accurate decision-making.

3.48 ISR synchronises and integrates the planning and operation of sensors, assets, and processing, exploitation and dissemination (PED) systems in direct support of current and future operations. The fundamental objective of ISR is to enable decision superiority by providing key pieces of data, information and intelligence that assist Air Force and the ADF in achieving battlespace awareness and understanding, information superiority, and thus, decision superiority. In basic terms, this involves getting the right information and intelligence to the right people, in the right format, at the right time. The synergistic effect of ISR also provides the best possible intelligence to the commander, producing 'actionable' and predictive intelligence that can be quickly used to make operational decisions.

---

4 Royal Australian Air Force, Australian Air Publication 1001.3—*The Air Force Approach to ISR*, Air Power Development Centre, Canberra, 2011.



3.49 ISR combines both physical and cognitive activities and relies on the successful integration of technology with human processes. It is generally characterised as a technological process, given its critical dependence on technological factors such as sensors, platforms and processing networks interconnected through a communications system. ISR is also an inherently human process where knowledge, human initiative, thinking, judgement and decisions enable timely information collection, processing, analysis and dissemination of data, information and intelligence. Moreover, the principle effect of ISR is a cognitive one.

3.50 ISR is used to direct, plan, collect, process, exploit and disseminate data, information and intelligence in support of not just Air Force but also the broader ADF and joint communities. Likewise, Air Force ISR uses data and information collected by other ADF and government elements to enhance its ISR product. In military operations, ISR will be synchronised with, and contribute to, the joint campaign. In this context, ISR is not only critical to operations in the air domain but also to operations in the

other domains. ISR capabilities are not inherently strategic, operational or tactical; they can be used to acquire data, information, and intelligence at all levels of command, often simultaneously. ISR exploits the collection of information from all domains in which it operates and is therefore domain neutral. It includes all of the ISR collection disciplines, including the collection aspects of EW, and also recognises the contribution made by air and space battle management (ASBM) capabilities.

3.51 ISR is increasingly considered a single term, rather than an acronym. ISR provides a single synchronised and integrated process that synergises tasking collection and PED. This effectively recognises the holistic nature of the activities involved with ISR. Consequently, there is greater relevance in collectively referring to operations and missions that collect data and information, and their seamless transition into intelligence, simply as ISR. Because ISR cannot be broken down into sub-elements without compromising its utility, it is also considered an integrated air power mission.

3.52 ISR should be viewed and understood and planned as an integrated network of systems, including sensors, platforms and PED, that functions across all domains of the operational environment and all command levels, interfacing with diverse sub-systems comprising sensors, platforms, humans and weapons. ISR missions are conducted by people, systems and platforms across a range of capabilities, including those not dedicated to ISR.

3.53 The development of ISR concepts and doctrine has paralleled the exponential growth in technology. Likewise, as technology has increased the capability of platforms, sensors and PED systems, collection capacity has continued to exceed PED capacity. PED is key to transforming data into information, and information into intelligence, to enable information and decision superiority. The high demand for ISR means that its activities should be prioritised and managed as a single integrated activity with

the appropriate level of centralised control. Furthermore, the ubiquity and demand for ISR encourages smaller air forces, such as Australia's, to consider all assets as potential data and information collectors.

3.54 Air Force will invariably conduct its operations in a joint context with allies and coalition partners. Consequently, Air Force's ISR enterprise must possess the appropriate level of interoperability. As the context of domestic and expeditionary operations expands to encompass non-traditional partners, the complexity of information sharing and security needs will increase, as will the required supporting resources.



3.55 Like the other air power roles, ISR is effects driven. It enables decision superiority over the adversary through obtaining the intelligence required to enable the commander and warfighter to make better informed decisions at a tempo faster than the adversary's decision cycle. Decision superiority enables commanders and their forces to quickly adapt and re-orient campaign plans and operations as needed to exploit fully the ADF's flexibility while denying an adversary's ability to make the decisions necessary to continue effective operations. This can create an effect in its own right, and also enables other kinetic and non-kinetic effects against the adversary.

3.56 While ISR is particularly important during military operations in conflict, it should be viewed as a continuous activity throughout the spectrum of peace and conflict, with ISR operations during peacetime building the foundations for decision superiority during operations. ISR achieves this by enabling joint and Air Force peacetime intelligence functions, such as maintaining preparedness, monitoring the region, providing routine situational awareness, maintaining intelligence databases, guiding tactics development, assisting capability development, and providing indicators and warnings (I&W) analysis. During periods of escalating tension, Air Force ISR enables joint intelligence preparation of the battlespace, I&W, threat warning and broader situational awareness.

3.57 ISR missions are conducted to collect data for the purpose of producing information and intelligence to enable operational environment awareness, information superiority and decision superiority. Such missions can be conducted by aircraft with dedicated ISR sensors or aircraft with non-traditional ISR capacity.

## ISR Operations in Iraq

The experience of AP-3C Orion aircraft missions in Operations *Catalyst* and *Slipper* in the Middle East Area of Operations has demonstrated the diverse and networked nature of ISR missions. In 2006, an aircraft was tasked to conduct a mission in Iraq in support of a counter-improvised explosive device operation by surface forces. An hour prior to take-off the aircraft was urgently re-tasked to provide support over a city where coalition troops had been killed by a rocket propelled grenade. The local population had rioted and a curfew had been established.

Towards the end of the on-task period the AP-3C was requested to provide route clearance for coalition forces exiting the area by road. On completing the route clearance, the crew were further tasked to provide route clearance for a coalition command element exiting the area over water. The AP-3C crew provided the necessary overwatch and clearance and also advised the command element of suspicious activity both on the water and on the land in the vicinity of their watercraft. After ensuring that the command element had safely reached their destination, the aircraft was again tasked to provide support to coalition surface forces that were under fire in a city about 80 kilometres away. On their transit back to base, the crew imaged a static maritime rig to ensure that there were no vessels threatening the maritime task force. During this single mission the AP-3C undertook several ISR activities—both sequentially and simultaneously, both over land and water. Indeed, the AP-3C undertook a single ISR mission from take-off to landing—against different targets and for different requirements.

## Conclusion

3.58 Typically, no single air power role is conducted in isolation but is integrated with one or more of the other roles. Performance of the core air power roles—control of the air, strike, air mobility and ISR—provides air power effects that contribute to the joint campaign and national security. They remain central to what Air Force does. Individual air power missions can contribute separately or concurrently to the realisation of one or more roles due to the way the roles are performed within an interoperable and balanced force. How air power roles have been performed has evolved over time and this will continue as skills, experience and technologies, such as UAS and cyber operations, advance, mature and are exploited.

3.59 Critical to the performance of the four core air power roles are a diverse range of air power missions that form the enabling air power roles. These three roles are explained in Chapter 4.

# 4

## Executive Summary

*The three enabling air power roles are:*

***a. command and control,***
***b. force protection,*** *and*
***c. force generation and sustainment.***

*The Air Force foundation represents the organisational basis upon which Air Force develops its capability to employ air power. The three components of the Air Force foundation are:*

***a. people,***
***b. technology,*** *and*
***c. knowledge.***

# Employing Air Power: The Enabling Air Power Roles

## Introduction

4.1 Air Force employs air power by performing four core and three enabling air power roles. These air power roles are fundamental and enduring and have been performed by balanced air forces in military operations since the beginning of military aviation. Air Force applies the four core air power roles—described in the preceding chapter—in carefully crafted and harmonised combinations with the three enabling air power roles.

4.2 To fully understand the breadth and importance of the enabling air power roles, this chapter describes these roles and the air power missions that are generally associated with each of them. It concludes by discussing the foundations of Air Force's organisation that underpin the generation, employment and sustainment of air power.

4.3 Similar to the alignment of the core air power roles, the three enabling air power roles align with the three ADF warfighting functions of the same or a similar name, as depicted in Figure 4–1.

| | Air Power Roles | ADF Warfighting Functions |
|---|---|---|
| Enabling | Command and Control | Command |
| | Force Protection | Force Protection |
| | Force Generation and Sustainment | Force Generation and Sustainment |

**Figure 4–1: Enabling Air Power Roles and ADF Warfighting Functions**

## Command and Control

*The process and means for the exercise of authority over, and lawful direction of, assigned forces.*

4.4 The key enabling air power role of C2 is aligned with the overarching ADF warfighting function of command. Command is exercised across strategic, operational and tactical levels. These levels reflect the distribution of responsibilities for planning and directing resources allocated to the management of the operational environment. Although developed with war in mind, the levels of command can apply to all military activity across the spectrum of conflict.

4.5 C2 is the process and means for the exercise of authority over, and lawful direction of, assigned forces.[1] It unites the people, systems and processes used to make policy, develop capability, enact operational decisions and prepare forces for operations to achieve national objectives.

4.6 C2 utilises a complex system that involves personnel, platforms, information management technology, communications networks, and decision support and operational environment awareness tools. Due to the dynamic nature of air operations across large areas, C2 systems need to be flexible and responsive to effectively control and manage air operations within and beyond operational theatres.

4.7 In the context of air power, the C2 role has unique features that reflect the nature of the air domain and the way that professional airmen operate and fight in it. Air Force's C2 comprises mechanisms to manage the raise, train and sustain (RTS) activities of air power through Air Force's organisation and chain of command, and the employment of air power through the Theatre Air Control System. More detailed

1 ADF Warfare Centre, ADDP 00.1—*Command and Control*, First Edition, Defence Publishing Service, Canberra, 2009, Glossary, p.1.

information on Air Force C2 structure, philosophies and processes is contained in Chapter 6.

## Command and Control Missions

4.8 C2 is usually realised by the following air power missions:

a. **air campaigning**, and

b. **battlespace management**.

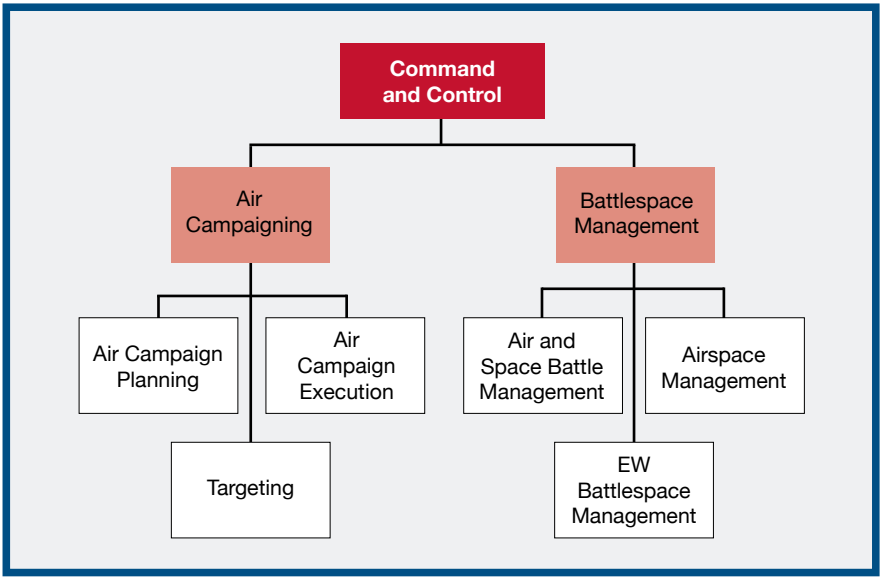



Figure 4–2: Command and Control Missions

## Air Campaigning

4.9 An air campaigning mission includes the planning of the air campaign within the joint campaign, its execution, and the targeting process:

a. **Air campaign planning.** Air campaign planning links national strategy, military strategy and specific air power roles and missions within the joint campaign plan. This planning initiates the EBA and synchronises air operations with those of the other components of military and national power to ensure that proportionate force is applied at the right place and time to achieve outcomes that contribute to strategic objectives. This planning also ensures the most efficient allocation of Australia's numerically limited, but high-capability air power resources. Air campaigning is intitiated by military-strategic direction and guidance drawn from political requirements. Because the nature, complexity and fluidity of likely contingencies may not always permit definitive statements of desired outcomes at the beginning of the crisis, the interface between strategic and operational air campaign planning is critical to ensure that planning can evolve as a crisis or other scenario develops.

b. **Air campaign execution.** Air campaign execution is primarily the responsibility of operational commanders, although interaction and feedback between the strategic, operational and tactical levels will continue for the duration of any air campaign. Execution demands a high degree of professional mastery to create the effects necessary to achieve the objectives of the campaign plan. The execution of air campaigns is based around the air tasking cycle, implemented through the Air and Space Operations Centre (AOC).

c. **Targeting.** Targeting is the process of selecting and prioritising targets and matching the appropriate response to them, taking into

account international and Australian law, national and strategic objectives, and operational requirements and capabilities.[2] The responses selected through the targeting process can be kinetic or non-kinetic and create physical, cognitive and/or information effects. Targeting is intelligence-dependent, and is guided by the effects required to accomplish joint force objectives, with the ultimate intent of changing the behaviour of an adversary. Air power applied without the necessary targeting fidelity has the potential to create unfavourable effects leading to outcomes that can be extremely detrimental to military or national objectives. Targeting fidelity and the precision of engagement are essential in operations, where actions to win the conflict must be carefully balanced against the need to create the preferred environment for the ensuing peace.



2 Department of Defence, Australian Defence Doctrine Publication 3.14—*Targeting*, Second Edition, Defence Publishing Service, Canberra, 2009, p. 1–1.

## Battlespace Management

4.10 Battlespace management includes the management of military air and space operations, airspace and EW.

a. **Air and space battle management.** ASBM is the control of military air and space operations. It encompasses the processes of planning, directing, coordinating and controlling air and space assets in operations. It does not include the command or tasking of air assets. ASBM is an inherently joint activity in which the perspective and reach of air and space-based systems play a key part in the successful command and execution of operations.

b. **Airspace management.** Airspace management is the coordination, integration and regulation of the use of airspace of defined dimensions. It incorporates airspace control and promotes the safe, effective and flexible use of airspace for legitimate military and civilian operations. This activity continues in peace and in times of tension or conflict, and requires a high level of coordination between the military and the civilian agencies responsible for air traffic management. Effective airspace management enables civilian and military operations to be conducted with minimum constraint and ensures valuable assets and personnel are not lost as a result of poor airspace management protocols.

c. **EW battlespace management.** EW battlespace management (EWBM) is the coordination, integration and regulation of the use of the EMS. Effective protection of air power relies on the use of the EMS. When non-kinetic weapons are employed to exploit the adversary's use of the EMS, a high level of coordination is required to ensure friendly activities are not adversely affected.


AIR FORCE

## Force Protection

*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.*

4.11 The ADF describes force protection as a broad concept embracing a range of measures to ensure the physical integrity and morale of the fighting force. Specifically, this warfighting function encompasses all means—except offensive operations to defeat an adversary—taken to protect the capability of a force from operational, environmental and occupational threats.

4.12 Aligned with the ADF warfighting function of the same name, the force protection air power role 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. It is essential in air power operations across the spectrum of conflict and during all phases of an air campaign. Protection of scarce, expensive and fragile air power assets is fundamental for all air operations; hence, air tasking orders should routinely consider force protection requirements. Protection of other valuable assets such as personnel and support systems, particularly when they are vulnerable on the ground, is critical to conducting effective air operations. A force that is unprotected, either at a home base or on expeditionary operations, is open to attack that can disrupt or prevent effective operations. Protection measures undertaken by a variety of means are therefore essential to preserve resources and enable sustained operations.

## Force Protection Missions

4.13 Force protection is usually realised by the following air power missions:

a. **air base protection,**

b. **joint personnel recovery,**

c. **defensive cyber operations, and**

d. **information operations.**

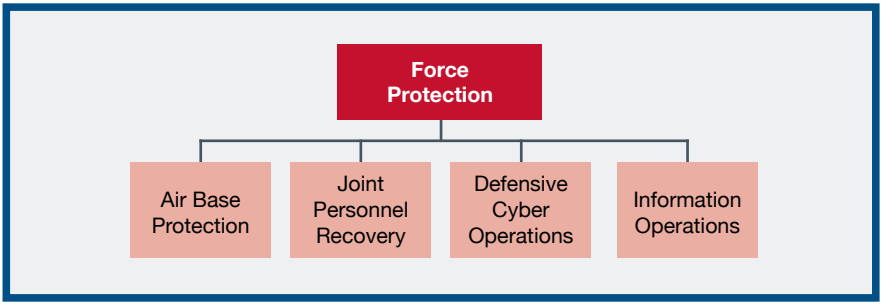



Figure 4–3: Force Protection Missions



## Air Base Protection

4.14 Aircraft are most vulnerable on the ground. Protecting them and the ground-based assets that enable air power is an integral part of employing air power in operations. Air base protection is achieved by a combination of protective air and surface forces, hardening, dispersal, camouflage, concealment and deception. Air base protection also includes measures taken to protect the ground support facilities of space-based systems.


15
AIR FORCE

## Joint Personnel Recovery

4.15 Joint personnel recovery (JPR) missions are the aggregation of military, civil and political efforts to rescue, release or recover personnel from permissive, uncertain or hostile environments, whether they are captured, missing or isolated. Military JPR activities include:[3]

a. **Search and rescue operations** (SAROP): To recover isolated personnel, involving military or civil search and rescue (SAR) in permissive environments.

b. **Recovery operations** (RecOP): To recover isolated personnel during and after combat, conducted in all threat environments and comprising:

   (1) **Combat recovery** (CR): The recovery of isolated personnel during operations;

   (2) **Combat search and rescue** (CSAR): The detection, location, identification and rescue of isolated personnel during conflict in a hostile environment; and

   (3) **Special recovery operations** (SRO): Recovery of friendly or hostile military or civilian personnel or materiel by Special Forces.[4]



## Defensive Cyber Operations

4.16 Defensive cyber operations (DCO) are both passive and active cyber operations undertaken with the intention of preserving the ability to use friendly cyberspace capabilities and protect data, networks and

3 Department of Defence, Australian Defence Doctrine Publication 3.6—*Joint Personnel Recovery*, Second Edition, Defence Publishing Service, Canberra, 2011.

4 Department of Defence, Australian Defence Doctrine Publication 3.12—*Special Operations* (Provisional), Second Edition, Defence Publishing Service, Canberra, 2011, p. 2–5.

## Airfield Defence Squadrons, 1942–75

During the early years of World War II, British forces recognised that their air bases needed dedicated force protection units in addition to the protection provided by Commonwealth army units. As a result, the Royal Air Force Regiment was formed in the UK. After Japan entered the war, the threat to Australia highlighted the fact that Air Force also needed to defend its own airfields, at home and overseas, and that ground defence training was required for selected Air Force personnel. A number of training courses were conducted, and an Air Force Security Guards Unit was formed at Livingston Airfield, Northern Territory, in September 1942. By the end of 1945, and following several name changes, No 1 Airfield Defence Squadron had been deployed around Darwin, and No 2 Airfield Defence Squadron had fought in the Netherlands East Indies (now Indonesia) and at Morotai, as well as at Tarakan, Labuan and Balikpapan in Borneo. Despite their success, these units were disbanded in November 1945.

Although many Air Force National Service recruits received training in ground defence techniques during the 1950s, the new Airfield Defence Guard (ADG) mustering was not established until October 1965. Shortly thereafter, ADG Flights were deployed to South Vietnam, with No 2 Squadron at Phan Rang air base and No 1 Operational Support Unit at Vung Tau. ADGs were also deployed to Ubon air base, Thailand, to assist with the protection of the Air Force detachment based there, including No 79 Squadron. When the Government of South Vietnam collapsed in 1975, the ADGs provided security during the air evacuation of Australian Embassy staff from Saigon. Over 350 ADGs served in Vietnam and six lost their lives during the conflict. ADGs have provided force protection for Air Force air bases and aircraft (while on the ground) ever since and today force protection remains an integral component of all Australian overseas deployments.

net-centric capabilities. As discussed in the previous chapter, the use of EP is also a form of force protection.

4.17 Air Force is critically dependent on its networks, data links and information for operational success. It is therefore imperative that Air Force's information, systems and capabilities are protected from cyber attacks or exploitation.

4.18 DCO are undertaken to protect ADF system vulnerabilities. Cyber operations enable influence across all other domains and they underpin the capability of all air power roles and missions. From airborne platforms to planning systems, support equipment to C2, every air power capability relies on the flow of data through cyberspace. This represents a source of both strength and vulnerability for network enabled operations. Protecting the pathways and components of cyberspace that are relevant to our operations safeguards Air Force's 'neural' networks.



### Information Operations

4.19 IO, as a force protection air power mission, involves the operational level planning and execution of information activities to protect and enhance decision-making and action. It seeks to minimise the vulnerabilities to personnel and operations by achieving an information advantage in order to affect an audience's understanding. IO can also involve activities that enhance Air Force's ability to collect, control, exploit and defend information without effective interference. Examples of IO for force protection include counter-intelligence, deception and operations security.

#### The Empire Air Training Scheme, 1939–44

During World War II, over 38 000 Australians were enlisted into Air Force as part of the Empire Air Training Scheme (EATS). The participation of Australia in this scheme—along with Canada, New Zealand and Rhodesia—made a substantial impact on the conduct of the air war in Europe and it remains a truly unique episode in the conduct of coalition warfare. The scheme was Air Force's principal wartime activity up until the entry of Japan into the war in December 1941. Furthermore, it established within Australia the raise, train and sustain facilities that enabled the rapid expansion of Air Force during the early years of the war. This capability was subsequently crucial to Air Force's ability to protect and meet the Japanese threat in the Pacific.

Under EATS, Air Force was rapidly transformed into an enormous organisation for raising and training aircrews. Some 36 schools were established across Australia, covering not just pilot training but navigation, observation, bombing, gunnery and wireless communications. These schools were established at airfields in every state and became crucial in enabling Air Force to rapidly expand to a peak strength of 182 000 by mid-1944. Coincidentally, many of today's Air Force bases and Australia's regional airports had their origins as EATS training facilities.

## Force Generation and Sustainment

*Generation of the necessary personnel, skills and materiel to conduct and sustain air operations—both domestic and expeditionary—while maintaining the ability to regenerate the force during and after operations.*

4.20 The enabling air power role of force generation and sustainment aligns with the ADF warfighting function of the same name. It focuses on ensuring that the current force has the necessary personnel, skills and materiel to conduct and sustain air operations—both domestic and expeditionary—while maintaining the ability to regenerate the force during and after operations. This role includes concurrent planning for the future Air Force and initiates actions to ensure the acquisition, introduction and sustainment of air power capabilities with adequate support essential to the development of appropriate capability and the generation of air power. As described in AAP 1005—*Air Force Capability Management Manual*, force generation and sustainment activities are conducted across the full range of Air Force's Fundamental Inputs to Capability (FIC), namely: organisation; personnel; collective training; major systems; supplies; facilities and training areas; support; command and management; and financial resources.[5]

4.21 Force generation and sustainment involves an extensive range of activities. Generating the right force in terms of personnel and equipment feeds directly into the ability to optimally employ air power. Attracting, recruiting, training, educating, supporting and retaining a workforce capable of undertaking all air power roles and missions with technical and professional mastery requires a comprehensive and strategic approach



5 Royal Australian Air Force, Australian Air Publication 1005—*Air Force Capability Management Manual*, Directorate of Enabling Capability, Air Force Headquarters, Canberra, 2012, Section 1, Chapter 3, p. 1.

to human resource management (HRM), especially in a competitive employment environment.

4.22 Sustaining the generated force is essential to ongoing operational effectiveness. It affects the depth and duration of campaigns and operations, and is essential to retaining and exploiting the initiative. This involves the provision of maintenance, engineering, supply, combat and operational support, and coordinated international engagements. Effective safety and airworthiness management systems are also critical to ensure air power is sustainable and resources are preserved.

## Force Generation and Sustainment Missions

4.23 Force generation and sustainment is usually realised by the following air power missions:

a. **force generation and capability development**,

b. **force preparation and sustainment**,

c. **air and space systems support**,

d. **combat support**,

e. **operational support**, **and**

f. **international engagement**.

## Force Generation and Capability Development

4.24 Air power capabilities are based on highly technical and complex equipment and networked systems that are usually expensive to generate, develop, maintain and operate. Effective force generation and capability development require specialist technical and professional mastery. Increasingly, the acquisition of air power capabilities involves international partnerships that allow the sharing of research, development and production costs. Air Force capabilities are generally retained in service for many years, with system complexity and logistics support costs increasing

as platforms age. Supportability is a major factor in deciding upon mid-life platform upgrades, as is the cost of replacement and programming such replacements within long-term capability planning. Such factors apply equally to aircraft and ground-based operating and enabling systems, and also influence ongoing and future force generation and capability development.

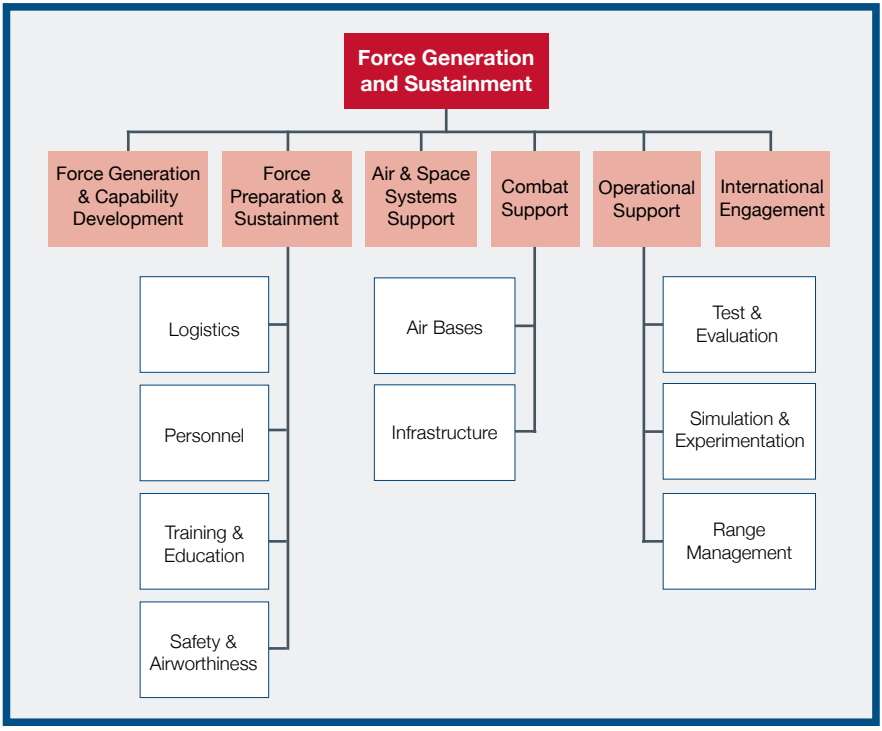



**Figure 4–4: Force Generation and Sustainment Missions**

## Force Preparation and Sustainment

4.25 The organisational and administrative actions to mobilise the force and to ensure that Air Force personnel are trained and educated to attain the level of technical and professional mastery required to operate and command air power in complex operations are the cornerstones of force preparation. Force sustainment provides the necessary logistics and other support to sustain generated forces during preparation and when they are assigned to operations. This support is drawn from a network of relationships and arrangements with the national industry base, international sources and the forces of Australia's allies and partners.

4.26 Air power is enabled by force preparation and sustainment through:

a. **Logistics**. Logistics is a fundamental component of military capability and a critical enabler of air power. It provides the mechanism for mounting and sustaining air power operations over an extended period. Air Force's logistics capability comprises a critical organic capability required to provide focused airminded logistics support to air operations, augmented by a responsive support base. This includes the other Services, joint organisations, the national support base, allies, and civil and defence industry. Logistics has three main functions: engineering, maintenance (both of which include technical airworthiness), and supply support.[6]

   (1) **Engineering support**. The function of engineering support is to facilitate the design and acquisition of aviation materiel (including airborne platforms, aeronautical product and technical equipment that directly supports aviation) and some land materiel (such as general purpose trucks), and ensure its operational viability.

---

6 Royal Australian Air Force, Australian Air Publication 1001.4—*The Air Force Approach to Logistics*, Air Power Development Centre, Canberra, 2012.


NO CHAINS
ASHEN
AIR FORCE
82WG
WATCH
& WATCH

(2) **Maintenance support**. The function of maintenance support is to maintain equipment in a state where it is fit to perform its designated purpose, to prolong equipment life and to minimise capability loss.

(3) **Supply support**. The function of supply support is to provide the right support at the right place, at the right time, for the duration necessary. A major component of supply support is supply chain management. It also includes the functions of supply, transport, movement, catering and messing. The supply function involves requirements determination, procurement, inventory management and control, warehousing and distribution, and disposal.

b. **Personnel**. Establishing and supporting an effective and appropriately shaped force in terms of personnel feeds directly into the ability to apply air power effectively. Attracting, recruiting, training, educating, supporting, retaining and transitioning a workforce capable of performing the air power roles with technical and professional mastery requires a comprehensive and strategic approach to personnel support, especially workforce development and review, and personnel management. This is particularly relevant in a demanding and competitive employment environment. Air Force must continue to evolve to meet the diverse personnel support and health needs of the force and also balance workforce demand and supply. Drivers of this evolution will include: changes in social attitudes, expectations and demographics; current and future force structure; preparedness levels; operational tempo; legislation and policy; technology; and resources.

c. **Training and education**. Military training prepares individuals for 'certainty' by instilling instinctive procedures, processes and knowledge. In contrast, military education prepares individuals for 'uncertainty' and complexity by developing knowledge, adaptability, judgement and creativity. High quality and effective training and education are fundamental to the generation, employment and sustainment of air power. Air Force develops its personnel for the effective application of air power through a holistic education and training process that provides the baseline knowledge, skills and attitudes required for Air Force members.

(1) **Training**. Air Force trains individuals and force elements to develop the ability, skills and attitudes that enable them to conduct specified activities that enable military operations. Military training ensures personnel can apply standard solutions to predictable circumstances and enhances their

adaptability to deal with unfamiliar circumstances. Training focuses on making an individual competent to undertake a specific task. Military training enables technical mastery.

(2) **Education**. Military education involves activities intended to develop the knowledge, skills, understanding and moral values required to be proficient in all aspects of military life. Military education transfers theoretical knowledge to the student and develops cognitive skills such as critical thinking, problem solving and communication. Unlike training, education provides individuals with the basic wherewithal to apply their acquired knowledge and experience to analyse emerging situations and to develop new and improved methodologies for the completion of tasks. Within Air Force, air power education is the primary tool used to improve individual knowledge levels and through that process establish and enhance an individual's professional mastery and the organisation's collective professionalism.

(3) **Personal development**. Personal development complements military training and education. It involves a process of self-learning to enhance education and training in developing professional mastery. All Air Force members are responsible for supplementing their education and training by expanding their knowledge and broader professionalism through personal development. It is only then that they can effectively enhance their professional mastery and overall value to Air Force.

d. **Safety and airworthiness**. Air Force relies heavily on robust safety and airworthiness management systems that enable it to provide air power at acceptable levels of risk and, where appropriate, to a level of risk as low as reasonably practicable. Safety and airworthiness contribute directly to the sustainability of air power,

especially in a numerically small force. Safety is important in both ground and air activities. Maintaining a safe working environment for all personnel in Air Force is both a legal obligation and moral responsibility. Ideally, safety is cultural—an integral part of everyday processes—and allows Air Force to conduct inherently dangerous activities safely. Air Force's approach to achieving the necessary safety and airworthiness standards that support capability involves occupational health and safety management systems, and aviation safety programs. These combine to cover safety in the airborne and ground operating environments.

## Air and Space Systems Support

4.27 Air and space systems support encompasses those support activities directed at enhancing the airworthiness and battleworthiness of ADF aircraft and systems. It enables Air Force to evolve towards a networked force and adapt its operational capability through the integration of new systems and procedures. There is a joint dimension to air and space systems support, which provides the technical, intelligence and electronic threat data support to ensure the ongoing operational superiority of the ADF's EW systems.

4.28 While air power is enabled by a multitude of air systems, it is also enabled by space systems through the conduct of a number of activities, including:[7]

a. **Satellite communications**. Satellite communication (SATCOM) systems provide a conduit through which voice and data information is shared within and between the strategic, operational and tactical levels in an operational environment. Consequently,

7 United States Joint Chiefs of Staff, Joint Publication 3–14, *Space Operations*, Joint Chiefs of Staff, Washington, DC, 2013, pp. II–4 to II–6.

they are essential for the integration and effectiveness of the C2 and ISR roles.

b. **Positioning, navigation and timing**. Positioning, navigation and timing (PNT) data is essential for the operation of modern aeronautical systems. Air power is dependent on space-based global navigation satellite systems to provide capabilities such as precision guidance for weapons and airdropped resources, accurate navigation for aircraft, and the essential timing signal needed to synchronise systems.

c. **Surveillance and reconnaissance**. Space-based systems provide data and information such as imagery and a range of signals and electronic intelligence, which can be used to determine adversary location, disposition and intent. They also provide information regarding the status of infrastructure and lines of communication that, in turn, supports targeting, battle damage assessment and other inputs that enable situational understanding of the operational environment.

d. **Missile warning**. Satellites are employed to detect and monitor an adversary's use of ballistic missiles. Observation of threat data, such as time of launch, speed and trajectory, is possible from the vantage point of space.

e. **Environmental monitoring**. The operating altitudes and perspective of space-based systems allow monitoring of the meteorological, oceanographic, and ground and space environmental factors that affect the employment of air power. Information on surface and subsurface conditions, combined with air conditions such as cloud and visibility, is extremely valuable when planning, conducting and assessing the impact of air power missions focusing on features such as targets, airfields and drop zones.

## Combat Support

4.29 Combat support is the provision of air base services and other operations support activities necessary to sustain air operations. This can be done at fixed or expeditionary locations. It is usually provided from major and small air bases, mounting bases and airheads in both Australia and abroad. This includes:

a. **Air bases**. The employment of air power across the spectrum of conflict is fundamentally dependent upon access to secure air bases to provide the mission critical support required to generate and conduct the necessary missions. This requires air bases in the right locations with adequate base utilities, essential support personnel and services. Air base support involves numerous activities, including the provision of C2, logistics, runways, hangars, maintenance, fuel, communications, financial management, administration, intelligence, firefighting, policing, airfield engineering, medical and dental, legal and chaplaincy services, and contract support. As they are fixed, large and complex, air bases are highly vulnerable both to actions by an adversary as well as the environment and thus require proactive and extensive protection. They are also resource intensive to operate and require significant lead time to develop. Air operations are conducted from a variety of bases:

   (1) **Major air base**. Major air bases support the ADF's operational aircraft for operations within the immediate region. They are major infrastructural sites from which the force derives its capacity to generate and sustain the complete spectrum of air operations required. Major air bases support and facilitate the Air Force's peacetime capability RTS activities and concurrently support the conduct of air operations as part of joint, combined and coalition operations.

(2) **Small air base**. A small air base is capable of accommodating and operating a small to moderate number of platforms. It may be established within the immediate region, at any Australian bare base or other Australian airfield.

(3) **Mounting base**. Mounting bases are establishments outside the area of operations (AO) where forces, and their associated supplies, can be received, staged for movement and inserted into the AO. They may be established on an ADF-run air base or civilian airfield or airport.

(4) **Airhead**. An airhead is established in a forward location to support air operations, without aircraft being based there. The airhead is capable of supporting small-scale contingencies for short durations. It may be deployed forward of, and in support of, operations from a major or small air base.

b. **Infrastructure**. As the ADF is a small, focused military force, the combat power of Air Force depends upon effective partnerships and integration with allied and civilian infrastructure in both peace and conflict. The ability to organically develop and maintain the infrastructure necessary to support RTS activities as well as operations is essential to the effective employment of air power. In addition to Air Force's organic infrastructure capabilities, the national support base infrastructure provides key support to military air power in terms of goods and services such as transportation, communication, human resources, aeronautical information, air traffic control, navigation equipment, fuel, electricity, and engineering and maintenance services. This is supplemented by international sources of infrastructure support that enhance the ADF's military capacity and preparedness. These are established through a range of relationships, international treaties, agreements, contracts, arrangements and memoranda of understanding.

## Operational Support

4.30 Operational support is the provision of services that support the introduction, development and review of air power capabilities. Air Force's ability to provide organic operational support requires expertise in the areas of test and evaluation, simulation and experimentation, and range management. Operational support to air power provided by these activities also relies on the availability of suitable facilities to undertake them.

4.31 The following operational support activities provide the scientific basis to analyse emergent threats, design responses and integrate new systems and weapons onto existing platforms:

a. **Test and evaluation**. This is necessary for the effective development and introduction of air power capabilities. It requires specialist equipment, personnel, facilities and expertise to assess the abilities, performance, effectiveness, reliability, interoperability and safety of procedures and systems. Test and evaluation should be considered as a continuum applied throughout a system's life cycle.

b. **Simulation and experimentation**. Either in a real or virtual environment, simulation and experimentation represents an efficient means of developing, training, preparing and testing capabilities. Like test and evaluation, it requires specialist equipment, personnel, facilities and expertise. In combination, it provides a means of mitigating risk and saving resources.

c. **Range management**. The safe and effective test, evaluation and exercising of capabilities requires appropriate areas and facilities, such as military ranges and other restricted areas. The establishment, development, access to and management of ranges for the development of Air Force capabilities, and those of allies and partner nations, is a significant part of providing operational support to air power.

## International Engagement

4.32 The ADF's ability to generate, support, test, evaluate, exercise, employ and sustain air power capabilities is enhanced through relationships with our allies and other partner nations. Often a long term mission, where outcomes may not be realised for some years into the future, international engagement (IE) requires the implementation of coordinated and appropriate engagement strategies at all levels of the organisation. Upstream engagement, such as the multi-national *Pitch Black* exercise, exchanges, and attaché and cooperation programs, influences and enables interoperability and facilitates support to operations. Further, the intrinsic benefits of IE, including international access, basing and overflight options, can positively affect how air power is employed. Shaping and influencing relations with other nations in a positive way facilitates Air Force activities across the spectrum of conflict and furthers defence and security goals.

## IADS, 1971 – present

On 11 February 1971 the Headquarters of the Integrated Air Defence System (HQIADS) was formed at Butterworth air base in Malaysia under the command of Air Vice-Marshal Ron Susans of the RAAF. After talks between Australia, Britain, Malaysia, New Zealand and Singapore concluded with the Five Power Defence Arrangements (FPDA), the FPDA defence ministers acknowledged that the defence of Malaysia and Singapore was indivisible. They also recognised that a single headquarters, HQIADS, would be tasked with organising the air defence of both nations. The Commander of IADS was given emergency powers to employ assigned forces against surprise attack, making IADS the operational cornerstone of the FPDA.

As the Royal Malaysian Air Force and the Republic of Singapore Air Force developed and matured, the IADS evolved and rapidly established its reputation as the focal point of the region's air defence capabilities. Air Defence Exercises were developed to test the readiness of the air defence units assigned to the FPDA, in fact all IADS exercises were constructed around the defence of Malaysia and Singapore rather than on offensive operations.

Over time, the scope of FPDA activities expanded, land and naval activities were also incorporated within regional exercises, and IADS became increasingly 'joint' by including Army and Navy on the staff. During 2001 the acronym IADS was redesignated to refer to the 'Integrated Area Defence System'. Since its inception, IADS has been the glue that has held the region's network of military capabilities together.

For over 40 years the air forces of each member nation have worked together harmoniously and IADS remains an important mechanism for the cooperative defence of Malaysia and Singapore. The RAAF's crucial role of providing professional guidance has helped maintain stability while the regional partners developed their own forces and skill levels. A senior Australian Air Force officer continues to exercise command of HQIADS, and in a low-key way, IADS remains a major vehicle for international engagement and builds security in the region.

## The Air Force Foundation

4.33 The generation and sustainment of air power is a broad-ranging and complex undertaking involving activities across the full range of Air Force's FIC. While Air Force is an enterprise established upon a set of tangible FIC, it is also built upon a less tangible, but equally important, foundation comprised of a skilled, technology-enabled and knowledgeable workforce operating a diverse range of air power technologies. Combined, the following three components constitute the foundation upon which our air power capability is built:

a. **people**,

b. **technology**, **and**

c. **knowledge**.

### People

4.34 People are a core component upon which Air Force capability is built. It is the human element that decides how all aspects of air power, technology and force structure are developed, employed, sustained and maintained. This human element also encapsulates how people, individually and collectively, apply their non-materiel resources such as intellect, emotions, motivation and leadership to achieve objectives. The physical, mental and spiritual wellbeing of Air Force members is paramount and feeds directly into the moral and conceptual components of air power capability. Further, Air Force's identity, culture, heritage, and customs and traditions reside in and are nurtured by its people. It is the members of Air Force who build the social structures within the force and create the norms and values that embody the foundation of Air Force as an organisation. This factor is not always clearly understood. The social role of the people who comprise the force is a powerful factor to be considered when analysing the foundation of an air force and its ability to generate, employ and sustain air power.

4.35 The culture, traditions and customs that contribute to Air Force's identity are reflected in the values and ethos that it promotes and the manner in which Air Force people adhere to and embody those qualities. It is important that Air Force members understand the range of tasks they could be required to undertake and that they are obliged to perform them in a manner that aligns with ADF and Air Force values. By doing so, Air Force's identity reinforces the Australian national identity and the conviction that the military must operate within the national bounds of legality, morality and ethics. Air Force's stated values provide the moral guidance for the way Air Force acts and demonstrates its commitment to Australia's societal norms. Air Force values are a reflection of the ADF and Australian culture and beliefs, and adherence to them is a commitment of not only Air Force personnel but all ADF members. From this, a number of enduring qualities can be derived, which include professionalism, loyalty and integrity, morality and legitimacy of action, and teamwork and innovation.



4.36 **Professionalism**. The decisions Air Force people make that shape aspects of force capability are premised upon their professional competency to make informed air power decisions. This professional competency is built upon the solid foundations of technical competency and, eventually, technical mastery. Through diligent application and relevant professional military education, technical mastery develops into professional mastery of air power. Professional mastery is the sum of an individual's knowledge and understanding of a profession combined judiciously with the ability to apply it through the lens of personal experience and intellect. It is the human dimension of warfighting. From an Air Force perspective, it is the discipline of continually striving to achieve the most appropriate, effective and efficient way to generate, employ and sustain air power. Professional mastery therefore influences the success of air power and its successful integration into the joint campaign to realise national security objectives.


AIR FORCE
SEA BLITZ STROBE

4.37 **Loyalty and Integrity**. Operational success is influenced by morale and group cohesion which is underpinned by loyalty and integrity. Air Force members must act with honesty and integrity and be committed to each other and Air Force to gain the trust of their fellow members and joint partners. Such loyalty is cultivated by doing what is right in the face of adversity and by nurturing and caring for people. This is achieved by committed command and leadership, a strong emphasis on safety and elimination of unnecessary risk, and an effective support network.

4.38 **Morality and Legitimacy of Action**. As air operations potentially involve lethal force, all Air Force members need to understand and adhere to the LOAC and the moral principles that support it. This ensures operations are conducted in ways that Air Force and the ADF retain their legitimacy. A core element of Air Force values is the emphasis it places on individual and collective moral courage. Moral courage is the strength of character to honour one's convictions and uphold Air Force values. Exercising moral courage is fundamental to Air Force fulfilling its obligation to the Australian people and the Government, and highlights the professional responsibility that supports the employment of air power. Moral courage, bolstered by professional mastery, helps people make decisions in complex and volatile circumstances where information is imperfect, and enables them to adapt their decisions as situations evolve. Moreover, decision-makers must be prepared to take responsibility for the consequences of their decisions, even when they have been proven incorrect or harmful. Consequently, decisions need be guided by experience and based on thorough, contextualised assessment of all known factors. Such leadership qualities are essential for decision superiority and the moral and legitimate conduct of operations in an environment characterised by complexity and uncertainty.

4.39 **Teamwork and Innovation**. Teamwork and innovation are essential to effective air operations and to a strong and resilient Air Force. Air Force's vision articulates the centrality of teamwork as a core value

and characteristic of the force. Generating and sustaining air power is a team effort and Air Force recognises that a genuine team approach is not only an effective and efficient approach but a necessary one that fosters initiative and better ways of doing business. Teamwork is an individual value worked out in collective practical application.

## Air Force People: The Right Stuff

It may be self evident but air forces have always depended upon a relatively small group of professionals with the right skills, knowledge and experience. Air Force people need to have the right stuff. Historically it has been surprisingly easy to erode an air force's capabilities through the mismanagement of its people. The Imperial Japanese Naval Air Service started World War II with highly trained aircrew, many of whom had combat experience in China, and excellent ground staff. They performed very well for the first few months of the Pacific War but after just 12 months fighting, the lack of a rotation policy had led to considerable losses amongst their best pilots, while replacement pilots were often poorly trained and inexperienced. In effect the Japanese allowed their pilot numbers to waste away through attrition without having a system in place to sustain them. Japanese aircrew in bombers, reconnaissance and transport aircraft suffered massive losses that effectively destroyed these capabilities. Their problems were compounded when the Japanese Navy abandoned their ground staff in forward air bases, making almost no effort to withdraw them before they were isolated by Allied air forces. This, in turn, led to a systemic failure of the Japanese maintenance and support activities and to very poor levels of serviceability for operational aircraft. The Japanese Naval Air Service had the right stuff at the start of that war but attrition and mismanagement of their people resulted in their operations being unsustainable.

## Technology

4.40 Keeping Air Force's air power at a level that continues to offer the capability edge required to be effective in operations requires an extensive investment in technology and in training personnel to employ and develop that technology. Rather than be 'technology-led', Air Force chooses to judiciously select air power technologies directly relevant to its role in achieving Australia's security objectives with optimal efficiency.

4.41 The nature of air operations is such that aircraft must achieve the highest orders of performance, withstand harsh operating regimes and have a long operating life. Meeting these demands requires complex and innovative training and technology support, which inevitably creates high associated costs for the entire life of the assets.

4.42 Technology can provide the means for effective air power, but people's professional mastery is vital to its integration into Air Force and employment in operations. The acquisition of new technology and systems must be accompanied by training to develop the technical mastery of the personnel within and outside the force who are responsible for its operation and maintenance. Technology that is not properly understood or optimally employed will absorb inordinately high levels of resources without delivering the intended return.

4.43 Investment in technology can also be driven by the need to remain interoperable with allies and partners, especially the United States (US), who operate systems at or near the leading edge of technology. Although leading edge technology offers great returns in terms of capability advantage, the pursuit of such technology carries with it a greater degree of risk than the acquisition of more mature technology. Air Force would only choose to take these risks in areas directly related to critical niche capability. Although Air Force's systems may not always be at the leading edge of technology, our measured approach has delivered a capability edge while mitigating

the risk of a technology failure that we do not have the redundancy to absorb. Technology risk is further mitigated through the use of partnering arrangements that share development risks, maintaining arrangements for the exchange of information with allies and partners and developing a sound indigenous scientific and technical knowledge base to inform capability decisions founded on developing technologies.

4.44 Air Force will continue to acquire and enhance capabilities as technological advances continue. These advances will undoubtedly influence all aspects of Air Force including capability development, force structure, weapon systems, operational planning, C2, training and human capabilities. Successful adoption of new technology will involve the development, testing and evaluation of concepts and ongoing review of how technology can best support Air Force activities.

### Knowledge

4.45 While air forces are inherently derived from technology, they are also intrinsically founded on knowledge. The cultural and intellectual foundations of an air force provide the basis for an air force to understand itself, its air power roles and missions, and how it employs air power.

4.46 The knowledge of an air force is reflected in its professional and technical mastery. Technical mastery provides the capacity for Air Force personnel to perform their jobs with the required knowledge and skills. Meanwhile, for Air Force, professional mastery provides the means for airmen to apply their technical mastery in the employment of air power. Professional mastery also enables the optimal employment of air power within a joint campaign in support of national interests.

4.47 Concepts, strategy, and doctrine provide the intellectual means for an air force to continually evolve, adapt and remain relevant as an instrument of national power. While concepts provide the innovation and impetus for evolutionary change, strategy provides the direction for the employment of

air power in support of joint campaigns, whole-of-government objectives and national interests. Doctrine provides the mechanism to guide the employment of air power in support of strategy to achieve the desired objectives. Collectively, concepts, strategy and doctrine provide the knowledge base that complements the technological base that supports the employment of air power.

4.48 Applied knowledge of air power, skilled and professional people, and evolving technology underpin all that Air Force does to generate, employ and sustain air power. Without substantial, credible and relevant knowledge of air power resident within its personnel, an air force will remain a mere tactical force capable of facilitating the application of military force without supporting any overarching strategic objectives. With a deep and abiding understanding of all aspects of air power, Air Force can be a strategic entity capable of generating strategic effects that contribute to the attainment of national security objectives. Doctrine is the visible evidence and articulation of that sound knowledge base.

## Conclusion

4.49 The enabling air power roles represent capabilities and activities conducive to success at all levels of conflict. Success in the joint campaign involves the effective employment of air power enabled by three air power roles—C2, force protection, and force generation and sustainment.

4.50 The people, technology and knowledge within Air Force provide the foundation on which air power capability is built. Harnessing this capability and achieving the desired air power effects requires a comprehensive understanding of the fundamentals of air and space power, which are described in the next chapter.

# 5

## Executive Summary

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

*Space power is the total strength of a nation's capabilities to conduct and influence activities to, in, through and from space to achieve its objectives.*

*Air Force recognises five domains in the operational environment:* ***air, maritime, land, space,*** *and* ***cyberspace.***

*Air Force identifies nine characteristics of air power:* ***perspective, speed, reach, flexibility, precision, dependency, fragility, payload,*** *and* ***impermanence.***

*Air Force acknowledges three tenets of air power employment:* ***centralised control and decentralised execution, concurrency,*** *and* ***balance.***

# Fundamentals of Air and Space Power

## Introduction

5.1 The nature and character of air power should be understood in context if it is to be employed to maximum effect. Previous chapters have covered how air power contributes to national security and the seven air power roles. This chapter addresses the fundamental concepts of air power and space power. After describing these concepts, the chapter focuses on the domains of the operational environment through which military power is projected. The chapter then describes the nine characteristics of air power, the relevance of the ADF's principles of war within an air power context, and the three tenets for the optimal employment of air power.

## Air Power

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

5.2 The definition of air power has undergone significant change over the years. The various definitions that have been articulated since the early 1900s have not only reflected changes in air power theory and employment but also the cultural, political and strategic experiences of the nations that have coined them. As Brigadier General William 'Billy'

Mitchell proposed in the 1930s, air power could be defined as 'the ability to do something in the air'. However, such a simple definition could leave much of the nature, purpose and character of air power unexplained. This could lead to a less than optimum understanding of the nuances within the concept of air power.

5.3 Today there exists numerous definitions of air power that are each relevant and appropriate, offering different insights into what is a multi-dimensional concept. However, it is important to note that no universally agreed definition of air power exists. Contextual definitions are used by different nations and various military forces to suit their circumstances and purposes. Air Force's definition is no different. It is crafted to provide as simple and clear a description of air power as is possible, consistent with the ADF's understanding of the term.

5.4 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. This is how Air Force and the ADF views air power and its employment, and conveys its essential nature. Air power uses airborne systems that operate in the atmosphere, as well as space-based systems and ground-based surveillance and air defence systems. Air power affords the Government options to respond to the entire spectrum of conflict from providing humanitarian assistance or disaster relief to delivering national security imperatives and protecting national interests. Air power is primarily resident in air forces and air arms, and it is considered an inherently strategic capacity capable of creating unique effects from the strategic to tactical levels of armed conflict.

## Space Power

*The total strength of a nation's capabilities to conduct and influence activities to, in, through and from space to achieve its objectives.*

5.5 Space power is defined as 'the total strength of a nation's capability to conduct and influence activities to, in, through and from space to achieve its objectives'.[1] It is an integral adjunct to air power and provides two fundamental benefits—global perspective and persistence. Space power has a pervasive role in military operations, facilitating awareness and integrating different capabilities across joint and coalition operations to create maximum effect. Of note, many of the capabilities employed by the ADF depend on space-derived services for their effectiveness.

5.6 Space capabilities and the ability to conduct operations in space have traditionally been high-cost and technological endeavours. The recent growth in the commercial space sector has made access to space more available and affordable. However, the ability to operate in space, where the primary purpose is to achieve objectives in or through space, is still restricted to a small number of nations.

### Unique Aspects of Space Power

5.7 The orbital characteristics of space assets provide unconstrained overflight because there are no demarcated sovereign borders in space. Fundamental orbital mechanics limit the time a satellite can remain over a particular geographic area, other than in geosynchronous orbits. However, continuous line-of-sight can be maintained on any particular region or point on the surface of the earth through a properly configured constellation of satellites, thereby ensuring global presence. The movement



1 Department of Defence, Australian Defence Doctrine Publication 3.18—*Operational Employment of Space*, Defence Publishing Service, Canberra, 2010, Glossary, p. 8.

of space assets in orbit is not significantly impeded by earth's atmosphere or other terrestrial characteristics. This permits them to remain in orbit for extended periods creating persistence greater than any air asset.

5.8 Australia's participation in military operations has reinforced the vital role played by space systems in 21st century conflict. Although Australia has not sought to develop indigenous space-based capabilities, it has capitalised on space-derived services through its strategic alliance with the US and by accessing commercial space systems.

5.9 Although some capabilities are supported through non-space-based assets, such as undersea cabling, Air Force and the ADF have a significant reliance on space operations. Employing space power is critical to the effectiveness of air power and, therefore, potential risks associated with this reliance will have to be carefully managed by mitigating vulnerabilities of space systems and countering emergent threats.

## Domains of the Operational Environment

5.10 Air and space power are applied through the air and space domains, respectively. It is important to also recognise the other domains of the operational environment through which military power can be projected. These are the land, maritime and cyberspace domains. Along with the air and space domains, the land and maritime domains form the physical domains for the application of military power.

5.11 Air power is generated by manoeuvring in the air domain to create the necessary effects. Similarly, land, maritime and space power are generated by operating in the land, maritime and space domains, respectively. These four physical domains, in combination with the non-physical cyberspace domain, form the five domains of the operational environment as depicted in Figure 5–1. The air domain envelops the land and maritime domains the same way as the space domain envelops the land, maritime and air domains. However, there are some fundamental differences between the air and space domains that make them independent of each other.

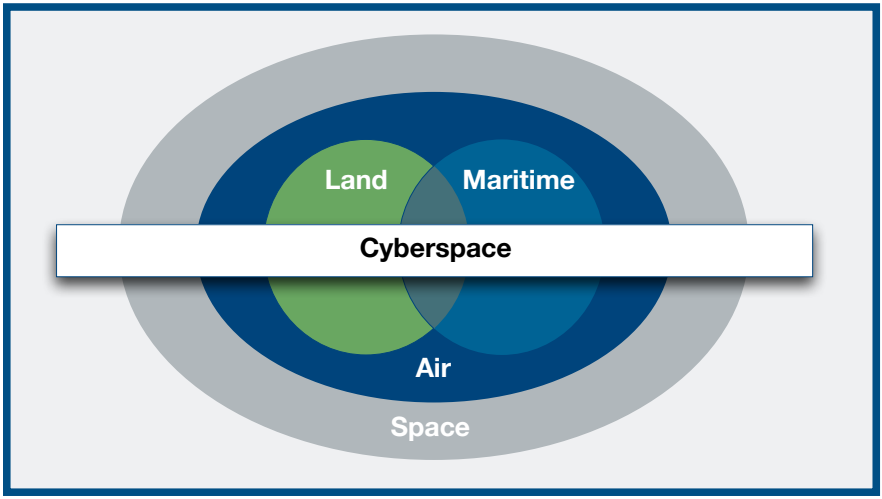



Figure 5–1: Domains of the Operational Environment

## The Space Domain

5.12 Early air power theory considered aerospace to be a continuum in the vertical dimension crossing air and space. Contemporary theory considers air and space as two distinctly separate domains; however, air power and space power are related. Although the transition point between the air and space domains is not clear-cut, their characteristics are distinctly different. In order to effectively exploit both air and space domains for the application of military power, it is important to understand them as separate domains. Australia defines space as the area beyond the distance of 100 kilometres above mean sea level.[2] The fundamental difference is that the airspace over a nation's territory is recognised as sovereign territory, whereas there is no recognition of national sovereignty in the space domain.

2 ibid., p. 1–3.

5.13 Additionally, space provides a much greater perspective of the operational environment as compared to the other three physical domains. Specifically, space operations are characterised by a broader perspective, inordinately higher speed and greater reach and longer persistence. Activities that exploit the space domain enable and enhance effects created by military power generated in the other domains. Finally, the satellites and systems operating in space are vulnerable to interference. Military operations need to consider the possibilities of disruption of the activities in the space domain in the planning and execution of terrestrial campaigns.

## Cyberspace

5.14 Cyberspace is the interdependent network of information technology infrastructures, including the Internet, telecommunications networks, computer systems, and embedded processors and controllers and their resident data.[3] It includes the collection of computing devices connected through individual or group networks in which electronic information is stored and utilised, and communication takes place. Data within cyberspace is transmitted by cable or through the EMS. It can act independently through, and influence or operate across, the breadth of all four physical domains. Cyberspace is man-made and, due to its scale, its collective physical properties are difficult to quantify and are considered largely intangible. It is essentially a composition of separate and collective networks that are unbounded by geography.



5.15 Cyber operations involve the employment of capabilities where the primary purpose is to achieve effects in or through cyberspace. This can encompass the processing, manipulation, protection and exploitation of information and its interaction with people and equipment. Cyberspace underpins the capability of all other air power roles and missions.

3 ADDP 3.0–*Campaigns and Operations*, p. 2–8.

From aircraft to planning systems, support equipment to C2, air power capabilities rely on data flow through cyberspace. Its speed and reach significantly enhances the operational abilities of air power; however, the breadth of cyberspace involved with every aspect of air power makes it a potential target for an adversary.

## Relationship Between Air Power and Cyber Operations

5.16 The added benefits air power gains from the use of cyberspace must be balanced against the need to maintain resilience in networks and data hosted in cyberspace. Considering the growing dependence on the world's cyberspace infrastructure, new variants and sources of vulnerabilities are tempting targets for strategic attack. Therefore, the ability to defend against attacks in cyberspace and operate with degraded cyberspace capabilities, while retaining the ability to concurrently exploit it to one's

own advantage, is critical for the effective employment of air power across the spectrum of conflict. The dependence of the nation on cyberspace for its day-to-day functioning has elevated it to become a key challenge to national security. From an Air Force perspective, as it introduces an increasingly network enabled force, it becomes critical to understand cyberspace, its relationship to air power and, specifically, its potential impact on operations and the optimal employment of air power.

## Characteristics of Air Power

5.17 The characteristics of air power shape the conduct of air operations and Air Force's ability to create the effects necessary to achieve the desired result. Air power characteristics are mostly derived from the characteristics of the air domain and the unique parameters of flight. Therefore, they are fundamentally different to those of the land, maritime, space and cyberspace domains.

5.18 Optimising the employment of air power requires an understanding of how its characteristics can be exploited and used to mitigate contextual limitations. For airmen, understanding the characteristics of air power is an integral part of their professional development. The characteristics enumerated below are strengths and limitations in a relative manner, dependent on circumstances and perception. They are not discrete entities but are closely related and often overlap. They are not ends in themselves but simply important factors that require careful consideration in the employment of air power.

5.19 Air Force recognises the following nine characteristics of air power, not listed in any order of significance:

a. **perspective**,
b. **speed**,
c. **reach**,
d. **flexibility**,
e. **precision**,
f. **dependency**,
g. **fragility**,
h. **payload**, **and**
i. **impermanence**.

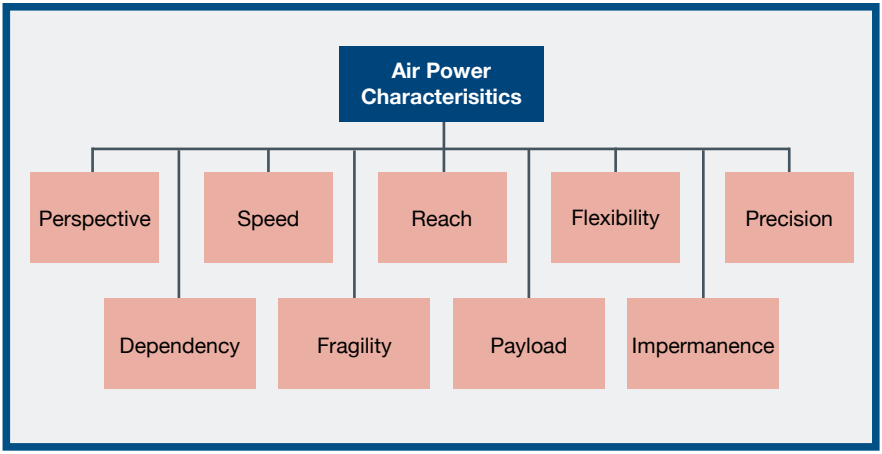



**Figure 5–2: Characteristics of Air Power**

## Perspective

*The greater field of view and extended horizon of the operational environment obtained by virtue of a platform's operating altitude.*

5.20 Perspective describes the way a force physically views the operational environment and is normally limited by its visual and sensor horizons. The operating altitude of air power sensors significantly increases their horizon and field of view. The view from space can provide a whole-of-theatre perspective. The advantage of enhanced perspective brought about by altitude permits air power to observe and dominate surface activities and occupy the figurative high ground.

5.21 In contemporary operations, the unique perspective that air power capabilities provide is a vital enabler for the enhanced information, decision-making and C2 that underpin a network enabled force. The operating altitude of air assets can enable their use as key communication nodes to ensure broad situational understanding across and beyond the theatre. However, the air perspective can be restricted by terrain, weather, infrastructure or type of target, and should not be considered as the ideal view of the operational environment in all situations. There will be circumstances where the perspective of another asset, possibly operating

in closer proximity to the adversary, may be more appropriate. One of the objectives of networking the force is to have the capability to select the right sensor to enable effective joint operations in each situation.

## Battle of the Marne, September 1914

Before the commencement of World War I, Germany planned to defeat France in the west before the Russians could mobilise and invade Germany in the east. The German strategy was encapsulated by the Schlieffen Plan, which involved defending the German-French border while five German armies conducted a massed offensive through Belgium and Northern France to encircle Paris and ultimately crush the Allied (French and British) armies. As the Germans approached the River Marne and Paris in early September 1914, General von Kluck changed the direction of advance of the German First Army, from the west to the east of Paris. This movement opened a gap between his force and the German Second Army, under General von Bülow, and exposed his flank to the Allies.

On 3 September 1914, British and French air reconnaissance informed the Allied commanders of this unexpected German movement. The next day British and French Armies ceased their withdrawal and went on the offensive. Regaining the initiative, the Allies exploited the gap and, over the next few days, forced the Germans to withdraw. The Schlieffen Plan had failed and the Germany's Western Front became bogged down in a costly war of attrition—a stalemate that the Germans could not win, but for four years they fought, with horrendous casualties on both sides, to avoid military defeat.

The Battle of the Marne 1914 was the major turning point of the Great War—it confirmed the importance of air power in land operations. Even during the early years of military aviation, the air perspective had demonstrably changed the conduct of war—from that time on, ground forces could be observed by those flying above them.

## Speed

*The ability to cover distance quickly and to create an effect with minimal delay.*

5.22 Speed defines the ability to cover distance quickly and to create an effect with minimal delay. Speed allows the rapid projection of military power, permits the swift completion of air power missions, and offers the potential to exploit time.

5.23 The speed of air operations need not be high in all situations. The key is to operate at a rate that can be sustained and create persistent effects in a manner which an adversary cannot mitigate.

5.24 Speed has relevance at the strategic, operational and tactical levels of armed conflict as follows:

a. **Strategic level**. The impact of the swift employment of air power at the tactical and operational levels can achieve strategic-level effects quickly and create strategic surprise.

b. **Operational level**. Speed enables a large number of air power missions and complementary activities to be undertaken within a given period, enabling effects to be created rapidly across the theatre.

c. **Tactical level**. Speed enables operations faster than the adversary's decision cycle and reduces the exposure of aerial systems to hostile fire, thereby increasing their survivability in battle.

## Operation *Vengeance*, 18 April 1943

United States Army Air Force P-38 Lightnings conducted one of the longest fighter intercept operations in history in April 1943 when they shot down Admiral Isoroku Yamamoto—the Commander-in-Chief of the Imperial Japanese Navy's Combined Fleet—near Buin on the southern tip of Bougainville Island. Signals intelligence was rapidly exploited and used to inform the immediate preparation of detailed mission plans. The Lightning fighters, fitted with long-range fuel tanks, flew at speed, unobserved for over 300 nautical miles of open sea before seeing their Japanese targets. In less than 10 minutes of aerial combat two Betty bombers had been shot down and Yamamoto had lost his life. Operation *Vengeance* was completed remarkably swiftly with minimal delay in target identification, planning and execution.

## Reach

*The ability to project military power over long distances, largely unconstrained by physical barriers.*

5.25 Reach is the ability to project military power over long distances, largely unconstrained by physical barriers. In combination with speed, reach permits air power to rapidly create effects in and beyond a theatre. The ability to operate across long distances offers a distinct asymmetric advantage against adversaries, while providing strategic options and contributing to national power projection.

5.26 Reach is a systemic product of a platform's intrinsic range, its sensor and communications range, and its weapon system type, range and employment options, as well as the competency of its support. This systemic reach is much more than pure range and, in combination with perspective, has the capacity to enhance the joint force's awareness of

### Catalinas Mine Manila Bay, December 1944

During the last year of World War II, Air Force demonstrated its considerable reach. On 11 and 12 December 1944, 25 Catalina flying boats took off from Darwin heading for Leyte Bay in the Philippines, which had recently been captured by American forces. Two days later these Air Force aircraft took part in a major operation to lay mines in Manila Bay and thereby bottle up Japanese shipping using this vital waterway. The air power mission was achieved with the loss of only one aircraft (believed to have flown into a hill). After the mission, the majority of aircraft were flown back to Darwin, but six Catalinas returned to their base at Rathmines, New South Wales, each having flown some 14 500 kilometres. These crews had conducted the longest, as well as the largest, single minelaying operation undertaken by Air Force in the war.

the operational environment. Air power's reach improves the capacity to deploy and sustain forces and their enabling capabilities for operations at long range. Reach can be enhanced through the use of stand-off weapons, AAR, UAS and long-range sensors.

### Flexibility

*The ability to create a variety of lethal and nonlethal effects across the full range of military and military-supported operations to achieve desired outcomes.*

5.27 Flexibility enables air power to create a variety of lethal and nonlethal effects across the full range of military and military-supported operations to achieve desired outcomes. Air power is inherently flexible because of its ability to switch between its roles and/or missions. This flexibility is further enhanced by aircraft being increasingly able to conduct multiple and sometimes concurrent activities to achieve multiple effects. Multi-role capabilities can undertake more than one air power role. Swing-role capabilities can switch air power roles during a single mission. These capabilities enable even relatively small air components to create far greater effects than their mass would suggest.

5.28 Air power's flexibility offers a wide range of options that can be employed to degrade the adversary's capacity to wage war. The speed and reach of air power also provides the flexibility to focus on one part of the theatre while simultaneously conducting operation across the theatre and beyond. This flexibility also serves to conserve resources in carefully planned and executed air operations. Exploiting air power's flexibility requires adept planning in linking air operations to the joint campaign and strategic military objectives.

5.29 Flexible employment of scarce air power assets is the key to establishing and controlling the operational tempo of a campaign. Tempo is the rate of operations relative to the adversary and in many circumstances controlling the tempo can be decisive by itself. Selection of the appropriate tempo requires careful assessment of the adversary in relation to one's own ability to employ and sustain air power at the required level.

## AP-3C Orions in the Middle East, 2003–12

Between 2003 and 2012, Air Force AP-3C Orion aircraft demonstrated their flexibility by undertaking ground-support ISR missions. For many years Orions had added to the common operating picture in the Indian and Pacific Oceans by detecting and prosecuting submarines and surface vessels. In the Middle East Area of Operations, Orion aircraft frequently conducted concurrent missions, including ISR (involving the collection of imagery and electronic data on a variety of targets) and prosecution of surface vessels. They would switch between tasks while in the air depending on the intelligence priorities, emerging threats and time sensitive activities on the ground. From time to time the Orions also supported joint personnel recovery and aeromedical evacuation missions. Many modern military aircraft, including the Super Hornet and the Joint Strike Fighter, are designed for multi-role missions, and hence provide small-to-medium air forces with increased flexibility in the application of air power.

## Precision

*The ability to employ lethal or nonlethal force and achieve effects accurately, with discrimination and proportionality.*

5.30 Precision is the ability to employ lethal or nonlethal force and achieve effects accurately, with discrimination and proportionality. Although most forces are capable of precision application, the combination of air power's speed and reach creates a unique capacity to apply discriminate force in a number of locations rapidly and, if required, simultaneously. Precision involves the ability to engage the desired target and create the required effect while avoiding collateral damage and undesired effects. This is particularly important in the modern battlefield where there is an increasing need to discriminate between targets and what surrounds them, such as people and civilian infrastructure that may not be legitimate targets.

### Operation *Odyssey Dawn*, March 2011

In the first few days of *Odyssey Dawn*, five United States Air Force (USAF) bombers took off from bases in the US to attack targets in Libya, as part of the North Atlantic Treaty Organisation's mission to protect civilians from attacks by government forces in that country's civil war. On 19 March three B-2s struck 45 targets at an airfield in Ghardabiya, Libya, hitting hardened aircraft shelters with great precision. All targets were collapsed or showed blackened trails emanating from their entrances, confirming that whatever was inside exploded and burned. A few days later, two B-1Bs destroyed command and control buildings, ammunition depots, combat aircraft, maintenance facilities, and Libyan air defence sites. The B-1Bs, attacked Libya directly from their base in the continental US, but recovered to Europe before striking at more targets on the way home. Collectively, these five bombers destroyed nearly 150 targets with a level of precision that is now considered routine.

5.31 There is an important distinction between 'precision' as a means to achieve a desired and focused effect and as a descriptor for precision guided capabilities. For example, a precision guided munition (PGM) can reliably hit a designated point target with well-defined accuracy. However, achieving the desired precise effect is the result of a thorough targeting process involving activities such as target identification and weapon matching to ensure discrimination and proportionality. Precision in the employment of air power does not always involve the use of PGMs or the application of force. Precision in the delivery of personnel or equipment via airdrop from aircraft can create an accurate effect. Furthermore, airborne systems can provide precise and timely information on a variety of air and surface targets, and space-based systems can deliver precision in PNT data.

## Dependency

*The reliance on support to enable the generation, employment and sustainment of air power.*

5.32 Air power is critically dependent on air bases, information, supporting systems and technology for its effectiveness. Air bases provide the infrastructure for training the operational force and are springboards from which air operations are launched, sustained, controlled and recovered. An air base is an operational entity consisting of the combat elements, support systems and people that enable the efficient employment of air power. Thus a well-developed air base is likely to be the fundamental centre of gravity of air power and, therefore, must be secured and protected.

### North Australia Air Campaign, 1942–45

The first Japanese air attack against Darwin on 19 February 1942 revealed major deficiencies in Australia's north-west area defences. Almost immediately, efforts were made to develop an integrated air defence network for Australia's north. Major air bases and emergency landing strips were constructed adjacent to the main road/rail system running south, some over 200 kilometres from the coast. Command and control facilities were constructed at Berrimah and Darwin, and extensive communications were developed linking radar stations, observers, and anti-aircraft units, with fighter squadrons. Air defences gained in strength as the network developed and redundancies were added. By late 1943 the Japanese air offensive was decisively defeated by a combination of the Allies' offensive and defensive counter air operations. From this time Air Force and the United States Army Air Forces escalated their own air offensive from northern Australia over the Netherlands East Indies (now Indonesia) supporting the flank of the Allied advance from New Guinea to the Philippines. The success of these offensive air operations was in no small measure dependent upon the integrated network of air bases in Australia's north.

Air forces counter the dependence on air bases by creating redundancy through the development of a network of alternative air bases, and by ensuring sufficient resilience to defend and recover from an adversary action.

5.33 Air power also has a systemic dependency on broader capability enablers, such as people, training, maintenance, logistics, information, intelligence and command. Although dependent on information for its optimal application, air power exploits the air and space domains for information collection and dissemination to provide the knowledge necessary to conduct successful operations. Air power is sensitive to technology and has a unique relationship with it. Air power is technology-enabled and maintaining a level of technology that continues to offer the flexibility, speed, reach and precision necessary to be effective in operations is resource intensive.

### Fragility

*The vulnerabilities inherent in the sophisticated materials of which air platforms and technologically advanced systems are composed.*

5.34 The demands on modern air platforms to be capable of high speed, high altitude, multiple roles, stealth and significant payload carrying capacity mean that they are inevitably constructed from sophisticated and strong, yet lightweight and highly stressed materials. This fragility frequently creates specific and highly specialised demands on personnel and systems to maintain and sustain air power, including specialised suites of defensive systems and battle damage repair techniques for aircraft.

#### Introduction of Aerial Torpedoes in the SWPA, 1942–43

In June 1941, Air Force decided to mount aerial torpedoes as a weapon system on Australian-built Beaufort aircraft. Between September 1942 and December 1943, Air Force's Torpedo Strike Force launched 19 missions in the South-West Pacific Area (SWPA) with very little effect. A lack of understanding and the operational imperatives that prevailed in 1942 combined to ensure that the aerial torpedo was put into Australian service and deployed prematurely. At the operational level, the incompatibility of the American Mk XIII torpedo with the British-designed aircraft, combined with its unsatisfactory performance, was the major reason for the failure of the weapon system. The torpedo was technically complex, requiring many man-hours to maintain. It was not a weapon that could be deployed effectively to the rudimentary airfields from which Air Force operated in New Guinea and where the weapon system was exposed to the insidious effects of tropical heat, mud, rain and humidity. The lack of foresight and intellectual rigour when introducing the system led to the concept itself failing at the strategic level. The introduction of the aerial torpedo was characterised by systemic failure: as a weapon system it was too fragile for the SWPA.

Planning for air operations must ensure that these personnel and vital systems are not vulnerable to adversary action.

5.35 By their nature, operations based on the use of air platforms and technologically advanced systems to produce capability can be vulnerable to fragilities. Air Force mitigates this fragility by planning and conducting operations to leverage from the strengths across the ADF and its partners to provide systemic depth. Because no platform or system is invulnerable, planning for air operations should include sufficient redundancy for alternative options.

## Payload

*The total weight and volume of passengers, cargo, sensors and weapons that an aircraft can carry.*

5.36 Aircraft are able to carry a wide range of payloads including passengers, cargo, sensors and weapons rapidly and over long distances. However, all military platforms have payload limitations. Due to the design of air platforms and the nature of flight, there are specific limits to the total weight and volume of passengers, cargo, sensors and weapons that they can carry. The payloads that can be carried by aircraft are often more limited than those that can be carried by ships and at times

### The Stalingrad Airlift, November 1942 to January 1943

When approximately 250 000 men of the German Sixth Army were cut off in Stalingrad by Russian forces in December 1942, the *Luftwaffe* was ordered to supply the isolated troops by airlift. The necessary crews were assembled at short notice from the advanced flight training schools, while over 500 aircraft—Ju-52, Ju-86 and He-111—were assembled from across Europe. The Ju-52 carried approximately two and a half tonnes of cargo per sortie, while the Ju-86 and He-111 could only carry two tonnes each. The aircraft could not trade much fuel for freight because the distance from the closest German air bases to the main airfield at Stalingrad was over 225 kilometres. The resupply effort needed to deliver 500 tons of supplies per day to sustain the troops, but this objective was never achieved. Operations were limited by the maximum payload of each aircraft as well as the appalling Russian winter weather conditions. The crews only managed to deliver a daily average of 94 tons, with the *Luftwaffe*'s best effort being the delivery of 700 tons over three days, 19 to 21 December. The German garrison could not be sustained from the air, and Stalingrad fell to the Russians on 31 January 1943. During the Stalingrad airlift the *Luftwaffe* lost around 488 aircraft and 1000 aircrew: their operational and training airlift units never recovered during the rest of the war.

somewhat smaller than what can be carried by land transport. Further, limitations of payload can restrict an aircraft's ability to manoeuvre and constrain its mission profile.

5.37 Payload limitations can, in part, be mitigated by high sortie rates conferred by air power's speed and reach. The accuracy and increased discrimination achieved by modern weapons combined with the reduction in the physical size of some airborne weapons permit air power to create precise and decisive effects without having to resort to large weapon payloads. In some instances the urgency of the situation can be such that only payloads air delivered to the point of crisis will meet objectives. This can apply to all payloads ranging from weapons delivering kinetic effects, air mobility missions delivering relief supplies or conducting AME, or sensors collecting data and information.

### Impermanence

*The temporary nature of an air platform's ability to maintain an influence or effect through its presence.*

5.38 Air power has a degree of relative impermanence. Air platforms cannot stay airborne indefinitely, nor can they hold ground in the conventional sense. However, in certain circumstances the impermanence of air power can be an advantage by creating persistent effect without the protracted physical presence and support requirements of a deployed force. Although technological developments are improving the ability to mitigate impermanence through AAR and long endurance UAS, aircraft must still return to a base to be serviced and rearmed.

#### Battle of Britain, July to October 1940

Relatively 'few' (less than 2000) fighter pilots defended Britain in 1940 in the fight against the German bombing offensive. In practice, it was never feasible to maintain 'standing' patrols of fighter aircraft to achieve control of the air at all times. Instead, the small defending force was efficiently employed by being concentrated where and when it was most needed. This form of warfare was made possible by the development of radar and its integration into a complex network of communications and control centres. Although it could not permanently maintain control of the air, the Royal Air Force could overcome this impermanence by concentrating over contested areas. The ability to be deployed where and when required in relatively short periods of time contributed to the success of the Battle of Britain pilots.

5.39 Impermanence can be substantially mitigated by planning and conducting air operations that ensure air power provides sustained effect where required. By leveraging off its relative impermanence, air power can engage and re-engage adversary forces and facilities with a regularity that creates lasting effects. It can also establish the effect of presence through CAP, ISR and rapid response to emerging challenges.

### Combining Characteristics to Achieve Synergy

5.40 The combined use of air power characteristics can enable air power to deliver specific effects. A combination of perspective, speed and reach enables air power to penetrate adversary territory and create strategic, operational and tactical effects largely unconstrained by physical barriers. The penetration capability of airborne systems is the product of precision navigation systems that permit all-weather and all-terrain operations, self-protection systems, stealth, airborne electronic attack and evasive tactics that allow flights through the adversary's passive and active air defence systems. Penetration can enable surprise and can also be used to shape the environment, respond in conflict and conduct humanitarian operations where natural or other physical barriers preclude the ready use of other national power elements. The threat of air power's potential penetration capability can be a powerful deterrent and coercive element.

5.41 The combination of speed, reach and precision enables air power to respond rapidly and decisively to sudden changes in the prevailing strategic or operational circumstances. Air power assets can be deployed to a theatre or within a theatre very rapidly to provide the immediate initial military response to an emerging and unanticipated challenge. Responsiveness can also create an element of strategic surprise by attacking at a time and place of choice and achieving results out of proportion to the effort expended. Air power achieves its unique responsiveness by combining speed to deliver combat power rapidly and reach to achieve global presence though the employment of air power over large distances. This ability often makes air power a key component of the nation's ability to apply credible combat power swiftly in distant theatres. Responsiveness enables air power to be employed early in a crisis, both in combat and non-combat situations, and at times could be the only option to provide an immediate response to emerging situations.

## Principles of War and Air Power

5.42 Principles of war provide simple and logical guidance that focuses the planning processes prior to and during the conduct of military operations. These principles are the most basic form of military doctrine and remain applicable across the spectrum of conflict, from the strategic to the tactical levels of armed conflict. They are not prone to frequent change, being enshrined in the philosophical level doctrine of the ADF. However, principles of war are not a set of laws. Blind obedience to them will not always lead to success nor will non-observance of them always lead to adverse effects.

5.43 The principles of war are equally applicable to all Services. Airmen must appreciate how these principles apply to the other Services while having a particularly comprehensive understanding of how they influence the employment of air power. From an air power perspective these principles must be understood in a three-dimensional as well as integrated manner, especially since air power is typically employed within a joint environment.

5.44 The ten principles of war used by the ADF are described in greater detail in ADDP–D—*Foundations of Australian Military Doctrine*.[4] With the exception of the principle of 'Selection and Maintenance of the Aim', which is regarded as pre-eminent, the other principles are generally not listed in any particular order of importance. For Air Force, the principles of war provide a list of fundamental beliefs that, properly applied, will guide the effective employment of air power in independent, joint, coalition or combined operations. The ADF principles of war within an air power context are detailed in Figure 5–3.



4 ADDP–D—*Foundations of Australian Military Doctrine*, p. 6–2.

| ADF Principles of War | Air Power Context |
|---|---|
| **Selection and maintenance of the aim**<br>Identify strategic, operational and tactical objectives and ensure that military plans at all levels remain focused on achieving them. | ▪ By identifying strategic objectives and subsidiary operational goals, this principle ensures that the inherently strategic nature of air power is not diluted in the joint campaign.<br>▪ Air power must be employed in a focused manner, directed towards achieving strategic objectives through the appropriate allocation of forces.<br>▪ Focusing on the aim ensures that the effects of air power are optimised. |
| **Concentration of force**<br>Apply superior military force or combat power at the right place, at the right time, and in such a way as to achieve a positive and decisive result. | ▪ Air power can rapidly concentrate combat power at the desired focal point employing assets from widely dispersed locations to achieve the optimal effect.<br>▪ The flexibility, speed, reach and precision of air power enable it to be concentrated rapidly at chosen locations to achieve the best effect.<br>▪ Air-delivered weapons have the ability to be precise, discriminate and proportionate, making them influential in concentrating combat power and applying them as required. |
| **Cooperation**<br>Establish close cooperation between the Services, as well as with the broader Australian community, allies and partners, as this is vital to success in war. | ▪ The air domain envelopes both land and maritime domains, making cooperation between the three Services crucial to campaign success.<br>▪ Developing a well-understood, integrated approach to air-air, air-land, air-sea, and sea-land operations is critical to operational success in a joint environment. |
| **Offensive action**<br>Undertake actions to gain and retain the initiative, as this is essential to achieving ultimate victory. | ▪ As operations approach the higher end of the spectrum of conflict, offensive air action becomes essential to success.<br>▪ Air power is inherently offensive in nature and, therefore, even defensive air campaigns must comprise offensive actions and be conducted in an offensive manner.<br>▪ Air power, when employed appropriately, can seize the initiative in a joint campaign and retain it through sustained offensive action. |

| ADF Principles of War | Air Power Context |
|---|---|
| **Security**<br>Ensure that friendly forces are able to operate effectively with minimal interference from the adversary and deny the adversary freedom of action. | ▪ Air power assets—airborne systems and ground support infrastructure—are vulnerable on the ground and require security through integral force protection capabilities.<br>▪ The reach of air power permits it to operate from outside the adversary's area of influence, thereby reducing security risks and protection requirements.<br>▪ Control of the air and perspective provided by air power can enhance the security of assets in the air, land and maritime domains. |
| **Surprise**<br>Seize the initiative, disrupt the adversary's decision and action cycle, and create results disproportionate to effort expended by acting in ways unexpected by the adversary. | ▪ Surprise is achieved by airborne systems that can operate at high speeds and approach from any direction at any time.<br>▪ The reach, speed and perspective of air power can be used to achieve strategic, operational and tactical surprise. |
| **Flexibility**<br>Adapt to the evolving situation to counter changed or unforeseen circumstances, deal with setbacks, or capitalise on unexpected opportunities. | ▪ Air power undertakes multiple roles and missions in and beyond a theatre and across multiple theatres simultaneously to provide strategic flexibility to a joint campaign.<br>▪ At the operational level, air power's flexibility provides a distinct advantage to all elements of a joint campaign. |
| **Economy of Effort**<br>Allocate national and defence resources prudently, control the expenditure of effort, and strike the right balance between offence and defence to achieve the desired results. | ▪ Limited availability of air power assets makes it imperative to ensure that their allocation is in alignment with the strategic objectives of the joint campaign.<br>▪ The flexibility of air power can ameliorate the lack of availability.<br>▪ Air power, with its limited resources, must be employed in a responsive and efficient manner. |

| ADF Principles of War | Air Power Context |
|---|---|
| **Sustainment**<br>To implement strategies and operational plans effectively, operations must be sustained for the desired duration, including the necessary support arrangements, logistics and personnel aspects. | ▪ The speed and reach of air power can sustain an effect over a long period of time or distance, supporting others and improving sustainability of the whole force.<br>▪ Air power has unique sustainment requirements that must be considered from the initial stages of capability development through to the planning and execution stages of a campaign.<br>▪ Assured logistical and personnel support are critical for air power to sustain the necessary tempo and intensity of a campaign for the desired duration. |
| **Morale**<br>Maintain a positive mental state that is an embodiment of the national will to resist aggression and coercion. | ▪ Morale is an intangible human factor affecting the success of an operation and is common across all Services.<br>▪ Air power effects can have a significant influence on the morale of forces in an operational environment. |

**Figure 5–3: ADF Principles of War Within an Air Power Context**

## Tenets of Air Power Employment

5.45 Land, maritime, and air forces generate specialised effects across the operational environment. The employment of these forces is optimised when guiding principles are applied. The employment of air power is guided by a specific set of tenets that have been developed from past experience and offer more specific and inviolable guidance. The three tenets of air power employment are:

a. **centralised control and decentralised execution,**

b. **concurrency, and**

c. **balance.**

## Centralised Control and Decentralised Execution

*The appropriate retention of control and delegation of execution authority undertaken with the objective of achieving the optimal employment of air power.*

5.46 History has repeatedly demonstrated that demand for air power vastly outstrips the available assets, even with the emergence of multi-role platforms capable of serving multiple customers during a single mission. The optimal employment of air power involves balancing the supply of air power assets against joint campaign demands. This is achieved best when air power is controlled as a single entity and its roles are executed with coherence and flexibility. This concept is codified by the tenet of centralised control and decentralised execution (CCDE). Centralised control assures unity of command through the retention of control of air power assets by a senior commander who maintains the broad, theatre-wide perspective necessary to balance and prioritise the use of scarce air power assets. Decentralised execution involves the delegation of execution authority to lower level commanders, thereby enabling them to execute orders that originate from the Joint Force Air Component Commander (JFACC).

5.47 Air power demands operational and organisational unity and uniformity rather than dispersal into discrete packages, if economies of scale are to be achieved. This is particularly so because of the resource intensive nature of air power and the limited numbers of air power assets normally available. CCDE permits a commander to fully exploit air power's flexibility and employ scarce assets in accordance with the strategic intent of the joint campaign. Centralised control permits the optimum application of effort where and when needed.

5.48 The authority of centralised control exploits the multi-role potential of air power assets across the spectrum of conflict. In this way, centralised control ensures the most efficient use of limited air assets by providing coherence, guidance and organisation to the employment of air power.

Such centralised control must be exercised at the highest appropriate level of command by a single authority possessing professional mastery of air power. However, every commander must be cognisant of the critical need to delegate control as necessary to diminish delays and mitigate inefficiencies that could otherwise constrain subordinates from successfully exploiting emerging opportunities.

5.49 Decentralised execution provides the operational level commander with sufficient freedom of action in carrying out assigned missions while maintaining the flexibility to support the full range of directed priorities. Ideally, decentralised execution should occur at the lowest possible levels, which permits commanders at all levels to exercise their professional expertise and initiative. This has to be balanced against the potential risk of mission drift from the strategic objective and diminished control of the commander.

5.50 Air Force recognises that there are a variety of perspectives on CCDE and endorses a flexible and balanced approach to its application. Optimising the employment of air power requires achieving an appropriate degree of balance between centralisation in control and decentralisation in execution. This optimisation is influenced by a number of factors: the nature of the operation being conducted; the quantity and quality of air power assets available; the extent of the geographical area within which effects have to be created; the command level at which situational understanding is at its best and flexibility is best preserved;[5] and the resilience and depth of command relationships within the force.[6] Achieving the correct balance between CCDE is critical to the success of air power employment.



5 Hinote, Lieutenant Colonel Clint, USAF, *Centralized Control and Decentralized Execution: A Catchphrase in Crisis?*, Research Paper 2009–1, Air Force Research Institute, Maxwell Air Force Base, Alabama, USA, 2009, pp. 58–64.

6 Kometer, Lieutenant Colonel Michael W., USAF, *Command in Air War: Centralized Versus Decentralized Control of Combat Airpower*, Air University Press, Maxwell Air Force Base, Alabama, USA, 2007, p. 272.

## Commanding the Allied Air Campaign in North Africa, 1942–43

In late 1942, the Allies were bogged down in Tunisia despite superior numbers and logistical advantages. The Allied air forces in North Africa could not prevent the *Luftwaffe*—which was operating from bases in Tunisia, Sicily and Sardinia—from inflicting damage upon the Allies' sea and land communications or their military forces. The American defeat at the Battle of the Kasserine Pass, however, convinced them to re-examine the way that air units were allocated as 'penny-packets' under Army commands. The Allies clearly needed to concentrate their air power. Having learnt from the British experience in North Africa during 1941–42, senior Allied air commanders argued for centralised control and pressed hard for a major reorganisation of air forces. In February 1943 the Allied Combined Chiefs of Staff placed the British Air Marshal Sir Arthur Tedder in command of all Allied air forces in the Mediterranean.

Tedder believed that the air campaign was most effective when under the command and control of experienced air commanders and integrated into an overall theatre-wide air, maritime and land strategy. He adopted the tenet of centralised control and decentralised execution, allowing operational air commanders considerable autonomy within an overall command structure. The success of these arrangements was swiftly demonstrated by the complete isolation and destruction of Axis forces in Tunisia in May 1943, and the successful invasions of Sicily in July and mainland Italy in September. These command and control lessons were codified in the US War Department Field Manual (FM 100–20) *Command and Employment of Air Power*, promulgated in July 1943.

The hard-won lessons of World War II have been reinforced by experiences during more recent air campaigns, and, even though the command of air power remains a topic of considerable professional interest and debate, the tenet of centralised control and decentralised execution continues to resonate with air forces to this day.

## Concurrency

*The ability to conduct multiple operations simultaneously in and beyond a theatre in a coordinated manner to achieve maximum effect.*

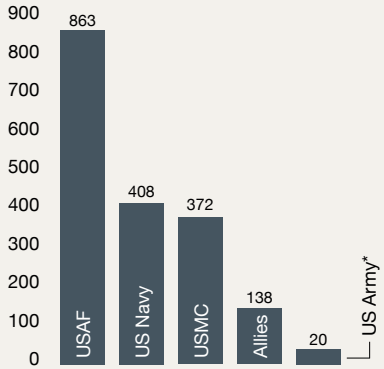
5.51 Concurrency is the ability to conduct multiple operations simultaneously in and beyond a theatre in a coordinated manner to achieve maximum effect. Air power's flexibility, speed, and precision enables it to concentrate force rapidly at different areas and permits it to perform multiple activities and support separate and independent lines of operations concurrently. Commanders can adeptly coordinate and synchronise these diverse air power missions to create focused, tailored and synergistic effects in widely dispersed operational environments simultaneously. This can shape and influence the adversary, neutral and friendly forces, civilians and/or governments. These operations can also be directed against a wide range of targets. Concurrent operations of carefully managed intensity and tempo can be the controlling element in a campaign and can overwhelm an adversary in both the physical and non-physical domains, leading to a state of strategic paralysis that can render them incapable of conducting effective operations.

5.52 The characteristics that enable air power to conduct concurrent operations also make it possible for the same force to participate in two or more concurrent joint campaigns. Concurrent operations allow parallel air attacks that can target the breadth of an adversary's war-making potential. This has the capacity to overwhelm the adversary, enabling friendly forces to maintain the initiative and operate inside the adversary's decision-making cycle. Concurrent operations permit the commander to dictate the battle and campaign tempo, disorientate the adversary both physically and cognitively, and degrade their decision-making process, thereby reducing their overall capacity to fight. Concurrent operations are therefore a key element of manoeuvre warfare and a decisive factor in the effective employment of air power.

## The Air Campaign against Iraq, March–April 2003

Air Force's contribution to the invasion of Iraq in 2003, ADF Operation *Falconer*, included three airlift (C-130H Hercules), fourteen fighter (F/A-18 Hornet), and two ISR (P-3C Orion) aircraft, supported by command, intelligence, logistics, and base and force protection personnel. However, this Australian air component—by itself—was more like a composite wing than a balanced national air power force. When it was combined with the contributions from other coalition air forces, the total force available for the coalition effort, known as Operation *Iraqi Freedom* (OIF), was well balanced and able to conduct every likely air mission effectively across the spectrum of conflict.

Overall, the coalition air armada deployed to the Arabian Gulf comprised 1801 combat and support aircraft, including a balance of aircraft types—fighter, bomber, Special Operations Forces, ISR, C2, airlift, tanker and others.




| | Fighter | Bomber | SOF | ISR | C2 | Airlift | Tanker | Other | Total |
|---|---|---|---|---|---|---|---|---|---|
| **USAF** | 293 | 51 | 131 | 60 | 22 | 111 | 182 | 13 | 863 |
| **Navy** | 232 | 0 | 0 | 29 | 20 | 5 | 52 | 70 | 408 |
| **USMC** | 130 | 0 | 0 | 0 | 0 | 0 | 22 | 220 | 372 |
| **Army*** | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 2 | 20 |
| **Allies** | 80 | 0 | 14 | 11 | 4 | 10 | 12 | 7 | 138 |

* Does not include helicopters

Around 467 000 air personnel, from four nations, and seven different air forces, were deployed under OIF between 19 March and 18 April 2003. Over this time, coalition forces flew 41 400 sorties, expending some 29 200 munitions on strike missions—68 per cent of these were precision guided munitions. For the first time, four United States Air Force (USAF) Predator unmanned aerial systems flew simultaneously in support of combat operations. In terms of air mobility, the USAF alone conducted 2200 missions, moved 9660 passengers and 11 290 tonnes of cargo. In addition, they airdropped 954 personnel via parachute into Iraq. There were 136 aeromedical evacuation missions flown, moving 1572 patients. The air-to-air refuelling effort transferred 189 million kilograms of aviation fuel—the equivalent of the fuel required to keep a Boeing 737-300 airborne for 11.9 years. Other activities included: psychological operations, information warfare, space operations, time sensitive and dynamic targeting, joint search and rescue, and weather monitoring. The air logistics, engineering, communications, financial, international engagement and related air support efforts were fundamental enablers of air power capability during OIF. Together, all the coalition air components worked smoothly in concert, as a balanced force, to deliver air power as and when it was required.

## Balance

*Achieving the appropriate mix and level of capabilities and strategic depth to deliver effective and credible air power.*

5.53 Air Force is carefully balanced to meet the security needs of the Government. The correct force balance creates a credible air power posture and, even without being employed on operations, acts as a means of signalling resolve, maintaining strategic influence and deterring potential adversaries. Balance involves achieving the appropriate mix and level of capabilities and strategic depth to deliver effective and credible air power. It refers to both the force generation and the force employment aspects of air power.

5.54 Within the force generation phase, balance is the outcome of shaping a force structure to develop particular capabilities dependent on the priority accorded to them. This balance should be able to achieve effectiveness across the spectrum of conflict. Within the force, quality and quantity must also be balanced. Quality is achieved through leadership and organisational efficiency, the capability of available assets, and the professional mastery of personnel. It is also important to have at least a minimum quantity of assets because a few highly capable platforms will not be able to perform all necessary air power missions, nor will they provide critical mass or strategic depth. While a particular asset may be capable and versatile, it may not be able to perform two discrete missions simultaneously, whereas this may be achieved with two less-capable assets. An optimum balance of the competing demands for quality and quantity must be determined.

5.55 It is essential to balance the employment of air power forces and overall mission success with the necessity to mitigate the risks of completing such missions and, ultimately, prevailing. Similarly, successful operations depend on the balanced employment of air power across the

operational environment, thereby reducing the potential for the dilution of effect and fragmentation of effort. Further, balance between immediate requests and deliberate and planned requirements for the employment of air power is best established by a single air commander who can concentrate air power forces to achieve the required effects. For Australia, the tenet of balance requires a mix of appropriate assets, in suitable numbers and supported appropriately, in order to meet ongoing strategic and operational requirements across the spectrum of conflict.

### Applying the Tenets

5.56 The stated objective of air power is the ability of a nation to assert its will by projecting military power in, through and from the air domain. Practical experience and assessment of what has worked well in the past indicate that the best method of achieving this objective is encapsulated in the tenets of air power employment. If the tenets are not applied, military effectiveness will decrease. There may, however, be reasons for not applying the tenets. These could include an inability to do so, a conscious decision to sacrifice effectiveness for expediency, or external influences such as political or alliance considerations which operate against the pursuit of maximum military effectiveness. Obviously, the outcome is the same in all cases: air power will not be at its most effective.

## Conclusion

5.57 Air Force's ability to provide air and space power is enhanced by a thorough understanding of the fundamental concepts discussed in this chapter. This conceptual foundation, combined with an appreciation of how air power contributes to national security, as discussed in Chapter 2, establish the background knowledge to support a discussion on what Air Force does and why.

5.58 A contextual understanding of air and space power and the operational environment is critical to creating the desired air power effects. Further, optimising these effects and the development of airmindedness and professional mastery involves understanding the characteristics of air power and applying the tenets of air power employment. These concepts are evident in how Air Force is led and what C2 structures and processes are used, which are discussed in the next chapter.

# 6

## Executive Summary

*Command and control is the means through which Chief of Air Force exercises legal authority, delegates command authority, and transfers this command authority to forces assigned to joint commanders.*

*The Joint Force Commander will designate an Air Component Commander who is normally the commander of air assets assigned to operations and is responsible for planning, tasking, coordinating and assessing joint air power operations.*

*An air campaign is the controlled conduct of one or more air power operations to achieve specific air objectives and enable specific land and maritime objectives that contribute to the joint campaign.*

*The air campaign delivers: the necessary category of control of the air to enable friendly force manoeuvre; and a wide range of decisive effects that contribute to the achievement of joint, coalition, combined and multi-agency objectives.*

# Commanding Air Power and the Air Campaign

## Introduction

6.1 The creation of independent air forces in the major military forces of the world is recognition that, in order to maximise the utility of air power, it needed to be capable of both autonomous and joint operations. This organisational and institutional independence provides increased efficiency through the development of leadership with a unique view on the employment of air power to achieve strategic, operational and tactical outcomes. This independence also facilitates the development of independent critical thinkers needed to optimally employ air power and understand its potential contributions at the strategic, operational and tactical levels across the full spectrum of conflict.

6.2 While the previous three chapters focused mainly on the seven air power roles and its nine characteristics, this chapter explains the capabilities required to command air power, provides an overarching view of the C2 structures and mechanisms to which Air Force adheres, and describes the purpose and conduct of air campaigns within the joint campaign.

## Airmindedness

*The sum of an individual's depth and breadth of knowledge and understanding of the characteristics and employment of air power.*

6.3 By virtue of the inherent nature of air warfare, professional airmen tend to develop a distinctive perspective—fundamentally different to that of a soldier or sailor—regarding the concept, characteristics and conduct of war. Further, air power is a dynamic entity and history has demonstrated that its employment requires a detailed and fine understanding of all aspects of its employment. This fine understanding of air power is termed 'airmindedness'. The deeper understanding of the use of force in the air and space domains is an intangible quality that connects airmen and optimises the employment of air power to achieve national objectives. Airmindedness cannot be inculcated through training alone; it is the product of personal perception, education, culture, organisational values and experience gained through involvement in air activities both in peace and war. It is the instinctive ability to use the air domain to create the necessary effects that, either independently or as part of a joint force, contribute to joint campaign objectives and national security.

6.4 Commanding air power, therefore, requires astute airmindedness, professional mastery and an enduring and philosophical understanding of the history, heritage, culture and values of Air Force. Its leaders and commanders share a broad and unique perspective of the employment of air power. They understand the inherent nuances of its employment that reflect an enduring set of beliefs about the nature of air power and its utility as a critical component of joint military forces.

## Australian Airmindedness During the 1920s and 30s

Airmindedness is not a word found in everyday speech today. It may never have been common but there was a period during the late 1930s when most Australians had some idea of its meaning. In 1920 one of aviation's first supporters in Australia, Prime Minister W.M. 'Billy' Hughes, stood up in Parliament and labelled himself as 'a fanatic in my belief in aviation'. Over time, words came into use to express the idea which the aviation pioneers had in mind: 'flying spirit', 'air sense' and 'air-spirit' as well as 'airmindedness' were used by aviators, politicians, the media and people in the street. The people who founded aviation in Australia thought of it as a condition in the public consciousness which would encourage people to use aviation; to travel in aeroplanes and to send their mail and their freight by air. Aeroplanes would be used to defend one's own nation and to destroy the armies and navies of any opponent.

An airminded society would be one which supported aviation, could appreciate its advantages and understood that prosperity and development lay in using the air domain.

By the mid-1930s, airmindedness had evolved into a way of thinking about the world which included the threat of air power and the use of air transport as everyday realities. It was no longer a simple enthusiasm for, or an appreciation of aviation, it was the unthinking use of aviation as a tool in the same way that other technologies are tools for shaping or relating to the physical world. If Australians now have trouble in recognising this attitude as something unusual it is because their society has become so thoroughly airminded that they find it difficult to think in any other way. All air forces, including the Royal Australian Air Force, need air power professionals who can clearly articulate the advantages and limitations of air power; they need to influence decision-making by ensuring that their professional advice is understood and acted upon by political leaders.

## Commanding Air Power

6.5 From the earliest experiences in the employment of air power as an instrument of military power, air force commanders have recognised its strategic utility, founded on a unique understanding of, and belief in, the ability of air power to create strategic effects even when applied in tactical activities. Air power is an inherently offensive capability and has the potential to significantly influence the course of a conflict. The fundamental premise stemming from this is that air power must be employed primarily in the pursuit of strategic effect. This is the essence of what is meant by being airminded and it forms the basis of an airman's understanding of the nature and form of commanding and employing air power and structuring air forces. Air power's ability to reach deep into the adversary's heartland and destroy 'strategic' targets has shaped the employment of air power over a century. As a result, when commanding forces, commanders intuitively seek to identify the strategic focal points to be attacked and neutralised.

6.6 Experience has demonstrated that almost invariably only a professionally qualified airman can be well versed in all aspects of the command and employment of air power because it requires dedicated study and practical experience over a period of time. For a professional airman this knowledge and experience is further enhanced through a clear understanding and belief in the fundamental tenets that govern the employment of air power. The necessary understanding comes from a broad and basic appreciation of the history and development of air power theories and concepts of operations. Consequently, Air Force's considered view is that air power should always be commanded by airmen.

## Professional Mastery

*The sum of an individual's depth and breadth of knowledge and understanding of a profession combined judiciously with the ability to apply it through the lens of personal experience and intellect.*

6.7 Maintaining Air Force's capacity to contribute effectively to joint campaigns and to guide the force into the future requires adept decision-making by professional masters of air power. Professional mastery requires a comprehensive understanding of air power's extensive body of knowledge that is complemented by the recognised ability to apply that knowledge to the employment of air power to achieve the desired objectives. From an Air Force perspective it is the discipline of striving continually to achieve the most appropriate, effective and efficient way to generate, employ and sustain air power.

6.8 Professional mastery requires that each member of Air Force acquires a comprehensive range of skills to be effective in the part that the individual contributes to the force. Airmindedness is an essential component of an individual's professional mastery. Collectively, this individual mastery of air power creates a substantial and valuable body of professional mastery. This collective professional mastery permits Air Force to optimise the potential of air power in operations. The mastery of individual personnel is brought together and transformed into organisational professional mastery through skilled and effective Air Force leadership.

6.9 Effective leadership depends on the personal and professional skills of Air Force leaders who will have to apply their professional mastery to shape the force and enable effective operations. They also provide the vision and guidance, and establish the processes necessary for the positive evolution of the force. Air Force leaders must be able to create the culture that permits the force to adapt to contemporary and future challenges.

## General George C. Kenny in the SWPA, 1942–45

For Australians, the war against Japan was largely fought in the South-West Pacific Area (SWPA). Our forces were employed under American General Douglas MacArthur, who was in modern terminology a Joint Force Commander. Throughout much of the Pacific War, Lieutenant General George C. Kenny was the combined air force commander, the equivalent of a modern Joint Force Air Component Commander, responsible for the Allied Air Forces in the SWPA. These forces included mostly United States Army Air Forces and Australian Air Force units, but also included elements from the Royal Air Force, Royal New Zealand Air Force and the Netherlands Air Force. Prior to General Kenny's arrival in Australia, in late July 1942, the Allied air forces were a neglected part of the SWPA campaign strategy. With Kenny however, MacArthur recognised that he had someone who was a professional master of air power. The 53-year-old Kenny had flown in combat during World War I, had extensive operational command and planning experience, had gained a reputation for technological innovation, and had completed formal study in air power.

During the first six months of his SWPA command, General Kenny was able to convince MacArthur, and in turn the strategic-level commanders in Washington, that the SWPA campaign should use air power as the primary offensive capability in advance of land and sea power. In essence, Kenny worked closely with MacArthur to develop the, now famous, island-hopping strategy.

Ultimately, MacArthur only had praise for Kenny, noting after the war, '[o]f all the commanders of our major Air Forces engaged in World War II, none surpassed General Kenny in three great essentials of combat leadership: aggressive vision, mastery over air strategy and tactics, and the ability to exact the maximum in fighting qualities, from both men and equipment'. This remains the essence of professional mastery. Today, with the increasing complexity of weapon systems and with operations supported by fewer uniformed personnel, it is even more critical to develop professional mastery across Air Force.

Professional mastery within Air Force is a product of the knowledge, skills and attitudes of its leaders at all levels of command.

6.10 To prevail in operations, Air Force requires the appropriate operational systems, an effective and adaptive organisation, and personnel with professional mastery of air power. Just as advances in air power and the increasing role of space power in operations make doctrine dynamic, necessitating continuous development, both individual and collective professional mastery must also evolve to meet the challenge of ensuring that Air Force remains functionally adaptive and, therefore, operationally potent.

## Air Force Culture and Values

6.11 **Air Force Culture**. Warfighting is the core competency of the ADF and its three Services. Air Force shares with Navy and Army the common purpose and commitment to protecting Australia, and its people and national interests. Although the fundamental aim is common, each Service is different from the other. The combat environments in which they operate, the technologies that are used and the individual histories of the Services create distinctive cultures that extend beyond the obvious variations in uniforms, ranks and daily functioning. Air Force culture is the distinctive way in which Air Force and its members think, what they believe, and how they perceive and understand themselves. Its culture is derived from the responsibilities and obligations of being part of the profession of arms; the characteristics and experiences that are common to all air forces; the specific historical context within which Air Force was formed, developed and continues to operate; and the ethos, identity and values of Australia as a nation. The culture of Air Force, developed over the years, has resulted in a distinct set of ideas, ethos and values.


AUSTRALIA

6.12 **Air Force Values**. The cohesion of an air force is defined by the values that it espouses. Acceptance of, and adherence to, Air Force values is vital to professional mastery. Air Force values state that Air Force stands for respect, excellence, agility, dedication, integrity and teamwork. The values draw together the human dimension of Air Force. By aligning its activities with its stated values, Air Force ensures that it remains effective, achieving outcomes valued by the nation in keeping with the ethos of the Australian people. It is self-evident that Australia will never make war on other nations for any purpose other than self-defence against an adversary who has already attacked Australia or its interests. However, should Australia ever have to engage in conflict, it would expect to win. This demands great competence from all members of Air Force.

## Moral Courage

*The strength of character to honour one's convictions and uphold Air Force values.*

6.13 From an Air Force perspective, moral courage is the strength of character to honour one's convictions and uphold Air Force values. The dialogue between Air Force and the Government, and Air Force and other Services and agencies, requires Air Force members to exercise the moral courage to provide honest and frank advice, even when they are aware that such advice may be unwelcome and may have the potential to become politicised. The honesty of the dialogue with the Government and others is founded on the mutual acceptance that Air Force will accord the highest degree of professional judgement to air and space power matters that are key to Australia's security. This includes advice on force structure and development, long-term strategic planning issues, and the provision of realistic Air Force response options to emerging crises and conflicts.

6.14 Exercising moral courage is fundamental to fulfilling Air Force's obligation to the Australian people and the Government and underpins the professional responsibility of all members and adherence to Air Force values. Moral courage bolstered by professional mastery facilitates decision-making in complex circumstances and the ability to adapt responses as situations evolve. Moral courage is necessary for decision-makers to accept responsibility for the consequences of their decisions, even when they have been proven to be incorrect or harmful.

6.15 **Risk Management**. Moral courage is central to risk management rather than risk avoidance. Air power can be applied to deliver lethal and destructive force. Consequently, decisions regarding its employment must not be taken lightly. Some situations may also include the need to make decisions that would place personnel and materiel at risk to achieve the desired outcome. Further, any unintended effects created by the employment of air power could rapidly produce negative consequences

which might impose unacceptable constraints on Government or Air Force. Risk management is critical to the preservation of the force and demands that command decisions be made prudently. However, such actions to reduce risk to an acceptable level and manage it through a combination of moral courage and professional mastery does not mean being risk-averse. Rather, it shows that Air Force is aware of the risks and has the ability to make the right decisions and manage them effectively.

## Command and Control of Air Power

6.16 C2 is fundamental to the efficient and effective employment of air power and is distinct from the concept of commanding air power. C2 binds the people, systems and processes necessary for Air Force to make capability, policy and operational decisions, and to prepare forces for joint operations in order to achieve national objectives. Air Force C2 is aligned with ADF C2 as described in ADDP 00.1—*Command and Control*[1] and discussed in detail in AAP 1001.1—*Command and Control in the Royal Australian Air Force*.[2] Air Force's C2 architecture is designed with sufficient robustness to enhance its effectiveness in the conduct of air roles and missions through an air campaign supporting the overall joint campaign. Air Force's C2 is also flexible enough to allow the Chief of Air Force (CAF) to position Air Force optimally to meet emerging challenges. Consequently, commanders at all levels must use Air Force's C2 framework to communicate their command decisions, intent and purpose in clear and timely ways. In this respect, while a key part of C2 is the framework and mechanisms put in place to enable it, command

1 ADDP 00.1—*Command and Control*.

2 Royal Australian Air Force, Australian Air Publication 1001.1—*Command and Control in the Royal Australian Air Force*, Air Power Development Centre, Canberra, 2009.

of air power largely comes down to being an art where a commander's leadership ability may impact the level of success of Air Force C2.

6.17 C2 is the system providing the lawful authorities that empower designated commanders to direct assigned forces. It is a critical enabler for all military activities. In Air Force, C2 is the means through which CAF exercises legal authority, delegates command authority, and transfers this command authority to forces assigned to joint commanders.

a. **Command.** Command is the authority that a commander in the military Service lawfully exercises over subordinates by virtue of rank or assignment. Command includes the authority and responsibility for effectively using available resources and for planning the employment of, and organising, directing, coordinating and controlling military forces for the accomplishment of assigned missions. It also includes responsibility for health, welfare, morale and discipline of assigned personnel.[3]

b. **Control.** Control is the authority exercised by a commander over part of the activities of subordinate organisations, or other organisations not normally under their command, which encompasses the responsibility for implementing orders or directives. All or part of this authority may be transferred or delegated.[4]

6.18 C2 of air power reflects the combined experience of airmen at the strategic, operational and tactical levels across the spectrum of conflict. Air Force's C2 structure has evolved throughout its history, incorporating the many lessons learned from air power's development and employment around the world. These lessons highlight the characteristics of air power and have significantly influenced how C2 is implemented by Air Force. The history of air power demonstrates that the overall effect of



3 ADDP 00.1—*Command and Control.*
4 ibid.

air power is optimised when command arrangements ensure that it is employed holistically rather than as a collection of disparate elements conducting missions. Consequently, applying the CCDE tenet of air power employment facilitates military effectiveness.

## Air Force Principal Executives and their Command Authorities

6.19 CAF commands Air Force through a defined line of full command and two principle headquarters that serve different but complementary purposes. Below CAF sit two principle executives, the Deputy Chief of Air Force (DCAF) and the Air Commander Australia (ACAUST). DCAF leads Air Force Headquarters (AFHQ) and is primarily responsible for the organisational tasks for Air Force. ACAUST leads Air Command and is primarily responsible for Air Force's contribution to operations and the RTS activities. This ensures Air Force capabilities are at the levels of preparedness directed by CAF for assignment to operations. DCAF interacts directly with ACAUST on issues relating to personnel training, resources and other aspects of Air Force's RTS activities.

6.20 AFHQ and its agencies manage and conduct the interaction between Air Force, the other Services, other Defence Groups, other government agencies and Government. It has responsibility for capability management (including personnel), strategic planning, policy and doctrine, safety and airworthiness.

6.21 Air Command comprises Headquarters Air Command (HQAC) and the six Force Element Groups (FEGs). ACAUST exercises command through each FEG commander and two additional Air Commodores. One is the Deputy Air Commander Australia (DACAUST) who manages HQAC and the support to Air Force operations, and the other is a dual-hatted officer, Director General Air (DGAIR) / Director General Air Command

Operations (DGACOPS), who works within both HQAC and the AOC in Headquarters Joint Operations Command (HQJOC) to manage air operations. The AOC is the single portal between AFHQ, HQAC and HQJOC for matters relating to the assignment of Air Force elements to the Chief of Joint Operations (CJOPS) and the subsequent employment and sustainment of assigned Air Force elements for operations and exercises. It is the primary agency for the planning of current air operations, which is predominantly a joint activity. Force allocation is recommended by the Air Commodore working within HQAC and HQJOC, through ACAUST, to be approved by CAF for assignment to CJOPS for operations.

### Air Force Tactical Formations, Units and Bases

6.22 The C2 of Air Force's tactical elements is based on a series of cascading building blocks organised along functional lines. The command authority held by CAF is delegated to groups, wings and squadrons; each commanded by an officer appointed by CAF.

6.23 The FEG is the highest tactical formation and each FEG has a unique functional output within Air Command. They comprise a headquarters and one or more wings. FEG commanders have forces assigned by ACAUST on a standing basis to realise the specific air power roles for which they are responsible. A wing is a formation that comprises one or more squadrons and it represents the operational element of Air Command. The complete wing, the wing headquarters, squadrons or other wing elements may be force assigned to CJOPS for the conduct of operations, exercises, missions or other activities. Squadrons and units of squadron size are the core tactical elements of Air Force. The role of the squadron or unit will normally be based around a single output, support activity or platform.

6.24 Air bases are a key aspect of Air Force's ability to sustain and project air power. Under the authority of the Chief of Defence

Force (CDF) and the Secretary of Defence, CAF appoints a Senior ADF Officer (SADFO) for each Air Force air base. There are unique C2 arrangements for ADF members on bases within Australia because, while members with the military units operate under their traditional military C2 structures, the SADFO has the authority to take command and control of the base when needed to enable a unified response to a base security, emergency or other incident. The SADFO has the additional management responsibilities of being CDF's and CAF's (in the case of those personnel on air bases) representative and is responsible for Defence's reputation and relationship with the local community.

## Command and Control Structures and Mechanisms

6.25 Air Force personnel, elements and/or units may conduct operations from permanent or deployed air bases in Australia or overseas, normally as part of a joint force. Within a joint force, Air Force elements are integrated into a joint C2 structure implemented specifically for the operation. CJOPS will appoint a Joint Force Commander (JFC) to command a specific joint operation within a defined AO. The commander may be of any Service but this is often dependent on the nature of the operation and whether it is oriented towards a particular type of military activity. The Joint Task Force (JTF) will comprise a headquarters and one or more Task Groups. The JFC will designate a JFACC to establish unity of command for all air power/force elements.

a. **Joint Force Air Component Commander**. The JFACC plans, coordinates, tasks, executes, monitors and assesses air power operations within the joint campaign. The JFACC normally exercises operational control of all core and enabling air power roles of the air elements in the joint force, and ensures that air operations are conducted in accordance with the JFC's concept of operations, which is influenced by the air apportionment decisions and other defined responsibilities. The JFACC effects air operations through the 'A' staff within a formed Air Component Headquarters, which contains the AOC. This ensures that air power is commanded by a single air commander, adhering to the CCDE tenet of air power employment.

b. **The Air and Space Operations Centre**. The AOC is a complex weapon system employing effective C2 mechanisms to optimise the employment of air power. It is the principle organisation where the JFACC plans and directs air missions as part of the air campaign within an ADF joint campaign, combined operation or joint exercise. It 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 consists of functional area experts and mission experts trained in joint air power operations. For multinational operations, a Combined AOC (CAOC) may be established and augmented by ADF personnel for the execution of coalition air power operations. The AOC provides essential air advice to the joint campaign and therefore must be staffed by professional masters of air power with a thorough understanding of its characteristics, principles and tenets.

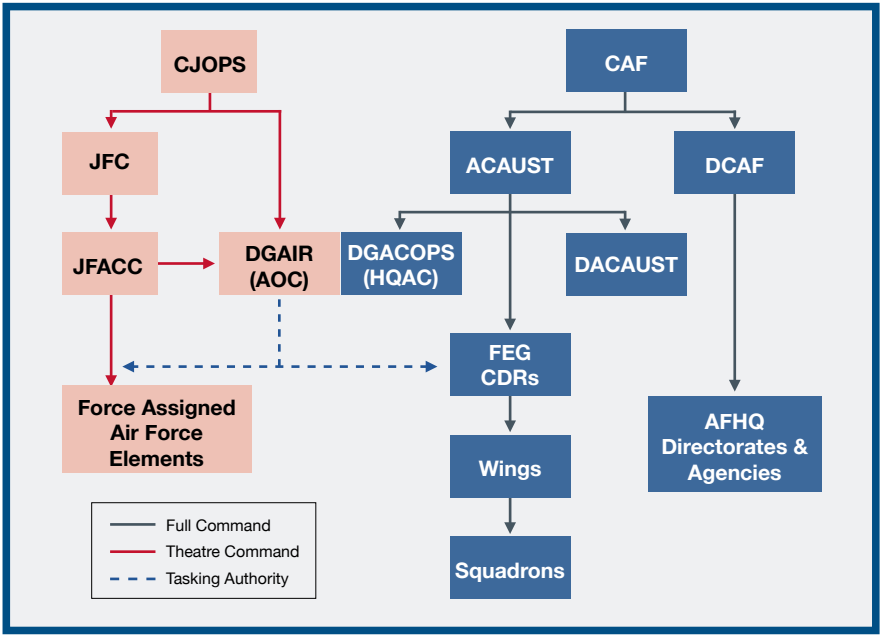



Figure 6–1: Air Force Command Relationships

6.26 The joint C2 structure may be simple or complex depending on the mission, operation or campaign, and the AO. All C2 mechanisms are operation-dependent and will vary with different operational contexts and will also differ significantly to standing peacetime Air Force C2.

6.27 **Task Organisation.** One C2 organisational system used by the ADF is *Task Organisation*. This system is also used by the US, the United Kingdom and the North Atlantic Treaty Organisation. Using *Task Organisation*, the Task Force is divided and subdivided into subordinate components called Task Groups, Task Units and Task Elements respectively as depicted in Figure 6–2.

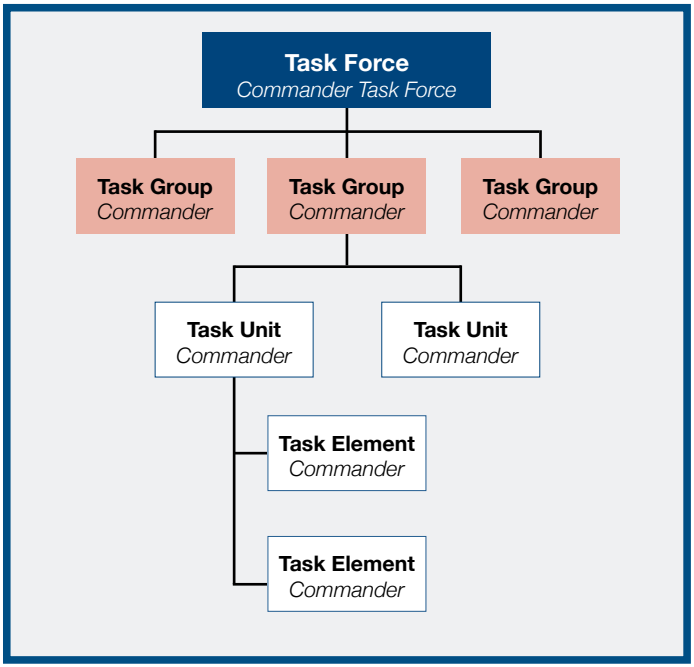



**Figure 6–2: The Task Organisation C2 Structure Framework**

6.28 Air Force elements will normally be organised into a Task Group and an Air Force officer will be appointed as the Commander Task Group (CTG). This officer will function as the JFC's Air Component Commander and principal air power adviser. Depending on the operational circumstances, a range of joint ADF air power elements may be grouped into the one task group. In accordance with the principle of unity of command and the CCDE tenet of air power employment, the JFACC controls all joint air power elements within the joint force to ensure the optimised employment of available air and space power resources.

6.29 The Task Organisation system may be employed for single Service, joint, combined or coalition operations. If operating in a combined or coalition environment, an Australian commander will at all times hold National Command. Operational/Tactical Command or Operational/Tactical Control may be delegated, depending on the operational requirements, to foreign commanders by CDF, but National Command is retained at all times by the senior deployed Australian officer to ensure that the ADF is employed in accordance with the Government's direction and objectives.

6.30 Ultimately, Air Force's C2 architecture is the means through which CAF commands Air Force in order to meet the responsibilities as directed by Government through CDF. This is achieved through a C2 framework that facilitates effective organisation, RTS activities, the planning and conduct of operations, and continual liaison within Air Force and with external partners. These C2 structures are formal and directed by CAF. They include links between Air Force and civilian components of the Australian Defence Organisation and are designed so that, when CAF deems necessary, they can be adapted to meet the demands of emerging circumstances.

## The Air Campaign in Joint Campaigns

6.31 The ADF provides the military means through which the Government pursues its strategic policy objectives. Military operations in the pursuit of national security are intricate and conducted to achieve military objectives that are aligned to strategic national objectives. Successful military operations require the skilful integration and employment of the unique capabilities of the Services to produce joint effects that contribute to the realisation of the desired national end state. Strategic military objectives, derived from national objectives, generate operational and tactical objectives that are achieved through a joint campaign.

6.32 Air Force remains the principal Service for the generation and employment of Australian military air power and it contributes to national security primarily through being an integral part of joint, combined or coalition operations and campaigns. The crafting of an effective campaign is dependent on the professional mastery of commanders. From an air power perspective, such mastery is epitomised in the balanced conduct of air campaigns that use and apportion available air power to achieve the desired effects and outcomes in joint campaigns. Air power should not be considered in isolation. Because the capabilities of air, land and maritime forces are complementary, it is crucial to integrate the use of these forces. Professional mastery consequently involves the commander's ability to work in the joint environment as this is the context of all ADF campaigns.

### The Air Campaign

*The controlled conduct of one or more air power operations in support of the joint campaign.*

6.33 From the joint perspective, there is only one campaign—the joint campaign. 'Air campaign' is a holistic term used to describe the controlled

conduct of one or more air power operations in support of the joint campaign. It includes all air power operations, conducted simultaneously or consecutively, to create decisive effects in combat. The air campaign also contributes to the actions of other friendly forces, and shapes the land, maritime and air domains in and around the AO. It is not a separate campaign that stands alone from the joint campaign or land and maritime activities.

6.34 Air campaigns deliver:

a. **the necessary category of control of the air** to enable friendly force manoeuvre; and

b. **a wide range of decisive effects** that contribute to the achievement of joint, coalition, combined and multi-agency objectives.

6.35 Air campaigns coordinate employment of air power to create precise, discriminate and proportional effects within the context of a joint campaign. Air campaigns can involve independent operations leveraging off air power's capabilities under circumstances when surface forces may not be able to deliver the chosen strategic outcome. More often, the air campaign will form part of a larger joint campaign, orchestrated with surface forces to achieve the commander's strategic objectives. They can also form part of a wider range of military and non-military operations.

6.36 The emerging security environment is such that air campaigns will continue to be conducted across the spectrum of conflict. Some of these campaigns will be conducted concurrently, in accordance with the air power employment tenet of concurrency, which will create stringent demands on Air Force's limited resources. Irrespective of the proximity of the AO, air campaigns will be shaped by the underlying need for timely deployment, manoeuvre and sustainment of air and surface assets across great distances and in a variety of environments.

## Purpose of Air Campaigns

6.37 Air power provides a means for Air Force to act responsively to create the effects needed to achieve decisive outcomes for the nation, region and wherever Australia's global interests are engaged. The air campaign is the JFC's means of coordinating the employment of air power within the joint campaign to achieve the desired end state.

6.38 Air power's speed, perspective and reach enable it to create multiple effects concurrently or in rapid succession in and around one or more theatres as required. These effects can also permeate non-military activities being conducted in support of national security. The purpose of the air campaign is the integrated employment of air power to create effects that are harmonised with the actions and effects of the joint force. This is achieved by the coordinated and complementary planning and execution of the joint campaign.

## Conduct of Air Campaigns

6.39 Depending on the needs of the joint campaign, air operations may be conducted independently or in coordinated operations with the surface forces. Air operations often have the advantages of being able to: neutralise an adversary's centre of gravity that is beyond the operational range of surface forces; engage time sensitive targets; reduce the risks to friendly surface forces; and mitigate adverse political and societal effects that may be associated with a surface presence. However, in all instances, the employment of air power and the degree of integration with surface forces will be guided by the requirements of the JFC and the joint campaign in support of national objectives.

6.40 An air campaign can be of short or protracted duration. It can include persistent air operations to achieve and maintain control of the air; apply force; meet the demands for situational information; facilitate special operations through insertion, sustainment and extraction of


A41-209

surface forces; and deliver logistics support to deploy, sustain and manoeuvre friendly forces by air in and around the AO.

## Air Campaigning

6.41 Air campaigning is the process of planning, conducting, sustaining, assessing and adapting the employment of air power to meet strategic and operational objectives in an air campaign. The purpose of air campaign planning is to identify air objectives—the ends—develop an air strategy that creates the effects required to achieve those objectives—the ways—and match the two with the resources available and required to achieve the end state—the means. Effective air campaigning ensures the optimum employment of air power to achieve the commander's intent. Integrated campaign planning with joint or coalition forces creates a systematic depth that can mitigate any potential vulnerability in both air power and joint force contexts.

6.42 The process of air campaigning is built on the timely and appropriate use of air power systems, including platforms and weapons, personnel, and infrastructure, and the air power roles and missions to achieve the strategic, operational and tactical effects required to succeed in a joint campaign. The JFACC determines the appropriate C2 structure, and the air assets and air power missions that should be employed to deliver the requisite air power to meet the specific demands of joint, combined and coalition campaigns. The air assets used could be drawn from Air Force, be a combination from all Services and could also include those of allies and/or partner nations.

6.43 The effectiveness of a coalition air campaign depends on adequate system interoperability, commonality of doctrine and concepts of operations, shared strategic objectives and long-term investment in joint training and exercises, brought together by mutually respected professional mastery. Efficient air campaigning ensures that the joint

effects required are achieved with minimal expenditure of effort and at a tempo that is not debilitating to Air Force in the long term. This is critical for smaller air forces with limited but high capability assets.

### Sustaining an Air Campaign

6.44 Air Force's capacity to prepare and sustain forces in joint operations is vital for the success of air campaigns. Since the tempo of air operations will vary during the course of a joint campaign, mastery in air campaigning is essential to maintain the correct balance between

#### The Air Campaign During Operation *Iraqi Freedom*, 2003

In March 2003, United States-led coalition forces commenced Operation *Iraqi Freedom* (OIF)—the invasion of Iraq to remove the Saddam Hussein regime. Unlike the 1991 Gulf War, the OIF planners felt that there was no need for a phased air campaign. This was largely due to the coalition air and sea power presence over the previous decade which had diluted Iraq's capacity to resist to such a level that little preparatory operations were thought necessary. On Day 1 of the air campaign, strike missions targeted leadership, command and control, air defence systems and critical infrastructure; however, they were largely ineffective due to the lack of surprise and the dispersal of the Iraqi commanders. As the coalition ground forces moved into contact, air interdiction and close air support—which had always been part of the air campaign plan—grew in intensity until, after a few days, these missions dominated air operations. With coalition ground elements helping to pull the Iraqi troops out into the open, air missions were used to destroy or disable Iraqi resistance. Air mobility was also critical for the successful joint campaign, not just in moving units about the battlefield but in airlifting fuel, food and military supplies to the fast moving advancing ground forces. The OIF air campaign was conducted simultaneously with the ground invasion, and air power contributed directly to the joint effects of the overall campaign.

operational tempo and the sustainment capacity of Air Force. This balance will be scenario-dependent and vary across the full range of operations, from high-end conflict to delivering humanitarian assistance. Maintaining this balance, especially in extended campaigns, is complex. Air Force must be able to conduct effective air operations while preserving the ability to regenerate the force concurrently.

6.45 Joint campaigns that demand high tempo air operations for prolonged durations, such as one that is countering a clear threat to national security, might necessitate the curtailment of long-term force generation activities in order to sustain the necessary tempo for the duration required. This decision will have to be taken at the highest levels of national security as the associated long-term risks could be significant. It must be noted that, in almost all cases, this would not be a viable option for small air forces in the long term. In all other cases, air operations will be planned and conducted at a tempo that the force can sustain for long periods of time, even indefinitely if necessary.

### Air Power Agility and the Air Campaign

6.46 The relationship between air, land and maritime operations in a joint campaign changes as the campaign progresses. Each Service becomes the supported or supporting force depending on the emerging scenario. Centralised control of the air campaign by the JFACC ensures that the allocation of air effort is effective and sustainable during all phases of the joint campaign and is concentrated at the right time and place, within the context of the joint campaign, to tip the balance in favour of friendly forces.

6.47 Other than in the campaign to achieve control of the air, air operations can shift their priority as required to create a broader range of effects that contribute directly to joint objectives. This range of air operations will continue for the duration of the joint campaign, aligned

with the JFC's evolving priorities. Under these circumstances, in resource-constrained air forces, the flexibility afforded by the multi-role capability of the modern air power systems will become invaluable. Employed professionally and innovatively, such capabilities will permit the conduct of a broader range of air operations while retaining the responsiveness needed to engage alternative targets in line with the JFC's strategic intent.

6.48 Through a range of operations, the air campaign can create strategic effects to influence an adversary directly, engage adversaries to achieve operational outcomes, create the preconditions for a surface force advance, or shape the environment for further stabilisation operations. These air operations can be conducted independently or in conjunction with surface force actions to achieve joint objectives. Independent air operations have the potential to avoid the deployment of surface forces into hostile territory that could have unfavourable political, societal and military implications. The JFACC exercises the flexibility inherent in air power to adjust the air campaign plan to meet the JFC's intent.

## Conclusion

6.49 Commanding Air Force and air campaigning are two crucial elements to the provision of air power. An effective command structure is pivotal to the operation of Air Force and is achieved through a recognised network of command relationships that lead operations and RTS activities. Effective command is also an essential component to air campaigning, which aims to achieve the necessary degree of control of the air and a wide range of decisive effects that contribute to achieving joint, coalition, combined and multi-agency objectives.

6.50 Successful command and air campaigning are underpinned by the airmindedness, professional mastery, values and moral courage demonstrated by Air Force. Equally as important is our ability to work with the other Services within a whole-of-government effort to ensure air power effects are optimally integrated for the defence of Australia.

# 7

## Executive Summary

*Air Force's future will be influenced by Australia's strategic, security and physical environments.*

*The importance of technology, an effects-based approach, the centrality of people, and the air power roles will endure as key features of Air Force's future.*

*The balanced force, technology and air bases are aspects of Air Force that will continue to evolve.*

*Factors likely to challenge Air Force in the future include the changing character of war, the cost of capability, dependence on cyber and space capabilities, energy and natural resource availability, and management of the workforce.*

# The Future Air Force

## Introduction

7.1 *The Air Power Manual* has concentrated on the fundamental principles that guide Air Force's actions in the contemporary environment. However, everything changes eventually, so it is necessary to focus ahead to be prepared for the demands of the future.

7.2 The nature of how Air Force operates is influenced by the strategic, security and physical environments. The history of air power highlights the intricate and dynamic relationship between environments, concepts, capabilities and air power employment. This will continue to be the case. As the environment changes, Air Force should acknowledge that in life it is not necessarily the strongest species that survives, nor the most intelligent, but the one most adaptable to change. This adaptation is best achieved by recognising what has worked in the past, predicting what might occur in the future, identifying any discrepancy between the two and then building an air force able to meet contemporary demands and evolve to meet those of the future.

7.3 This chapter presents a perspective on how Air Force will adapt to changes expected in the future. The discussion will identify what concepts are expected to endure, those that will evolve and those that will challenge Air Force.

## What Endures

7.4 There are a number of overarching factors affecting air and space power that are expected to endure. Many of them have been present conceptually since the inception of military air power. Although the complexity of those concepts has changed and will continue to do so, what Air Force has been doing in the past may still represent a sound basis for what it will do in the future.

7.5 Regional and global influences upon Australia are dynamic. Opportunities and challenges arising within the Asian Century will affect the way Air Force integrates and employs air power for joint, coalition, combined and multi-agency endeavours. Large-scale endeavours will continue to require involvement of other nations and the emphasis on alliances and partnerships will continue, but in a way that reflects the evolving influences. The alliances currently in place will remain the cornerstone on which Air Force maintains its own sense of security within the global community. The ability to work with partners has been demonstrated in the past and will remain its strength. This ability has been critical when working with both large and small partners as well as those that are located both near and further away.

### Air Power Roles

7.6 Air power has been an essential component in providing national security and it will continue to respond to that need. That will involve the ongoing performance of the seven air power roles—control of the air, strike, air mobility, ISR, C2, force protection, and force generation and sustainment—and its contribution to joint campaigns. Air Force is already committed to the comprehensive approach in responding to events that affect Australia's security and national interests. Air Force sees itself as but one part of a whole-of-government approach to security. This is evident

within an ADF context in the way Air Force seeks to integrate air power with the capabilities provided by Navy and Army.

## Effects-Based Approach

7.7 Developing and implementing strategy will continue to focus on an EBA. An EBA has proven itself a critically important mindset that provides the underpinning logic of employing military force to deliver desired outcomes through prioritised and effective use of available resources. Although effects and how they are achieved using air power may change, the overall philosophy of an EBA will continue to provide sound guidance for the employment of air power.

## Air Force People

7.8 The quality of Air Force people and their professional and technical mastery will remain the foundation for the generation, employment and sustainment of air power. Every capability within Air Force relies on the

skills and intellect of its people. Attention to attracting and recruiting the right workforce and then investing in people through provision of education, training and development opportunities will remain a priority to ensure Air Force retains a knowledgeable and loyal workforce.

7.9 From a capability perspective, Air Force has already introduced systems that can perform or enable multiple air power roles, sometimes within the same mission. This flexibility provides Air Force with the opportunity to achieve effects in an efficient and cost-effective manner. Flexibility within systems across the air power roles will continue to be a particularly important characteristic in the way Air Force performs its roles. Furthermore, maintaining high standards of safety and airworthiness will continue to optimise the effectiveness and longevity of systems.

## What Evolves

7.10 **Balanced force**. While the air power roles are enduring, the missions Air Force undertakes and how it performs them change in response to the character, means and modes of warfare and the emergence or evolution of threats. The associated changing strategies and policies of Australia, its allies, partners and potential adversaries influence what Air Force does. It must therefore be alert to how air power can provide capabilities that align with the changing needs of the nation. This evolution will be reflected in how Air Force matures as a balanced force and interacts within a joint and whole-of-government construct. It will also be seen in the way existing capabilities are employed and what capabilities are developed and acquired in the future.

7.11 **Technology**. The way air power roles are performed is constantly evolving as new technologies are developed and exploited. This has already been seen in the compression of the 'sense-to-effect' cycle, which

is possible through increased sophistication and connectivity within ISR capabilities. Advances in technology are not necessarily translated to advances within capability unless they are adequately supported through the enabling air power roles. This is particularly relevant as we see convergence between East and West in technologies and therefore need to look at the holistic 'tail-to-teeth' way of employing and enabling newer air power capabilities such as UAS, which extend and complement human capability. The way Air Force understands and incorporates advances in technology must therefore continue to evolve such that it is aware of what is becoming available and how it is relevant to the future employment of air power.

7.12 **Air bases**. Innovation and improvement within force structure, processes and the Defence estate represent areas where Air Force continues to evolve. Decisions on the size, location and structure of air bases, squadrons and infrastructure, such as maintenance facilities, should consider what is the most flexible and resilient way of providing capability within continuing resource constraints. Streamlining acquisition, sustainment and infrastructure activities should support this whilst also enhancing Air Force's ability to deploy for operations. A number of initiatives have already been introduced affecting base and infrastructure development and the evolution of these over time will continue to enhance both flexibility and resilience.

## What Challenges

7.13 The factors that will challenge Air Force in the future are diverse. The strategic, security and physical environments shape the role of Air Force. Although it is difficult to predict exactly what these environments will be like, trends and influences can be observed and predictions can be made in an informed and realistic manner. Building Air Force with the flexibility and right balance of capabilities to shape, deter and respond will provide the best options for Government in changing environments. Learning from Air Force's past performances and capturing people's expertise and experience within doctrine will provide a solid foundation of knowledge from which to work.

### Changing Nature of What Air Force is Required To Do

7.14 A flexible Air Force is responsive to the changing nature of what it is required to do. Activities such as irregular warfare, humanitarian assistance, disaster relief and nation-building involve a variety of capabilities. Air Force is also poised and ready to contribute air power

for the ADF's expanding amphibious capability. Air Force's ability to perform a broad range of activities will require functional, organisational and operational integration within the force and also across capabilities, domains of the operational environment, Services, allies, coalitions and partners. These concepts come with associated challenges.

7.15 Achieving the right balance of capabilities within a volatile, uncertain, complex and ambiguous environment will challenge the way Air Force employs kinetic, non-kinetic, manned and unmanned capabilities, both independently and in joint, coalition and combined operations. Determining the desired effect and then selecting the most appropriate system to create it is likely to involve consideration of ever-increasing options. Selection of the most appropriate option will therefore require increased knowledge and situational understanding so that commanders can make better decisions.

7.16 Emerging technologies will allow Air Force to re-examine how air power roles are performed. Better ways may become available and this is likely to challenge how quickly the force can adjust to change and also integrate across capabilities. A change in one capability or process is likely to have flow-on effects in all directions, as well as the FIC. Providing contemporary capability requirements while trying to implement new capabilities and also forecast future ones will continue to challenge the force.

7.17 Air power often operates at the forefront of new or developing technologies. Future projects therefore come with the associated risks of changing budgets and/or time frames. This is sometimes due to a level of unpredictability of operating with capabilities that were only a concept when first considered for acquisition. This makes capability acquisition and development a complicated process that requires a deep understanding of potential challenges and the creation and implementation of risk management plans.

7.18 The future character of war is also likely to have an increased emphasis on IO and the cognitive fight. Air Force will need to develop IO and cognitive combat capabilities relevant to the modern security context.

## Cost of Capability

7.19 In a resource-constrained environment where the opportunity to acquire physical assets is limited, Air Force will need to continue developing its conceptual capabilities to find more efficient and effective ways of generating, employing and sustaining air power. This involves activities such as innovation, education, research and engagement to explore, develop and implement new ideas.

7.20 The systems utilised to deliver air power are generally becoming more sophisticated and expensive. Indeed, for many capabilities Air Force

employs a system of systems. For example, performing a control of the air role may involve co-dependent or complementary systems such as fighter, airborne early warning and control and AAR aircraft, as well as land and maritime-based assets. Acquisition of major new capabilities will require consideration of a number of issues related to the type and number of systems. For example, in the case of acquiring new aircraft, the decision on how many are needed must consider the level of capability required and the ability to create the desired effects within a defined budget. Complicating this consideration is the difficulty of calculating how many platforms and support systems are required to create effects, how many are required for training, how maintenance rotations will affect availability, and how factors such as attrition will affect the ability to maintain capability over the life of the fleet. This challenge also applies to enabling air power roles and their associated systems as already referred to in the concept of a 'tail-to-teeth' way of generating, employing and sustaining air power.

## Cyber and Space

7.21 The increasing capabilities associated with advances in space and cyber operations will open up new areas where Air Force must continue to build expertise. Associated with this is the need to develop ways of operating with the most advanced space and cyber capabilities whilst recognising that dependence on space and cyber can create vulnerabilities. It is difficult to accurately predict the effects of attack on these capabilities and to also identify actual or potential attackers. The ability to operate with degraded space and cyber capabilities will be just as important as the ability to operate with a full suite of capabilities. Recognition that there is a level of dependency on other nations for some aspects of space and cyber capabilities means there is a need to establish and develop the appropriate relationships. It may also become necessary to build a level of self-sufficiency with the more critical capabilities. This represents a significant investment across the FIC.

### Environment, Energy and Resources

7.22 Influences of local through to global natures will drive the ADF towards different and more efficient ways of doing everyday business. Global influences, such as rate of climate change and limited energy and natural resource supplies, will have long-term impacts on how the ADF operates. Furthermore, shorter-term financial and human resource budgets will also drive the need for a holistic appreciation of how to realise efficiencies and operate responsibly. Making small gains in everyday processes accumulate to become significant savings over time. Identifying what these gains are and implementing changes to how things are done is important but they must not restrict the ability to undertake operations. Air Force must maintain a strong framework that can support RTS activities, operations and also surge when the time comes to employ air power, even in challenging circumstances. Within a defined budget, resourcing the right areas will require accurate prioritisation and identification of what Air Force cannot do without. The use of energy, whether it be intellectual or more tangible types such as fuel, should be done in a way that provides the best return on expenditure and is not wasteful or harmful to the environment. This will involve a deep understanding of the influences affecting Air Force and examination of how activities are performed, including the appropriate balance of simulation and live activities.

### Workforce

7.23 People are critical to Air Force capability. There are likely to be challenges in attracting, recruiting, training and retaining the right workforce. Both the supply and demand sides of Air Force workforce will change and the accurate determination of the appropriate size and characteristics of the workforce involves many of the same considerations as those used in obtaining other systems. Building a workforce that better reflects Australian society, especially with respect to gender and cultural

representation, will increase Air Force's capability and capitalise on the diverse range of skills and experience available within the Australian community. The demography of the Australian population is changing in areas such as age, skill sets, and employment motivation. This will affect the size and quality of the population pool from which Air Force draws its workforce. Attracting and recruiting a workforce with the appropriate technical and cognitive competencies will require a HRM strategy that can identify what skills will be required and where those skills should be situated across the force's structure. This must be harmonised with training, career development and retention strategies for both uniformed and civilian members of Air Force. Changes within crewing requirements and the need for specific security clearances are just two factors that will affect how the future workforce is built. A holistic approach to HRM will help build the right workforce and thereby reinforce the people component of the Air Force foundation.

## Conclusion

7.24 Air power remains a key component in the provision of national security and as the influences and concepts that shape air power change over time so too will Air Force's people, technology, knowledge and doctrine.

7.25 The history of air power is the best guide to Air Force's future evolution. This is recognised in the development of doctrine. Doctrine has always been a solid foundation upon which to build the force, conduct operations and address changes over time. It will continue to be so.

# Glossary

This glossary represents Air Force's context for terms and definitions. The source for approved Defence terms, definitions and abbreviations is the *Australian Defence Glossary* (ADG), available on the Defence Restricted Network at http://adg.eas.defence.mil.au/adgms/. Note: The ADG is updated regularly and should be checked for amendments to the entries in this glossary.

**active defensive counter air**
: Action taken by air and surface forces to inflict attrition on or deter the adversary and neutralise the effectiveness of adversary air activity.

**activity**
: An action or task that contributes to the achievement of an air power mission.

**aeromedical evacuation (AME)**
: An air activity conducted to transport ill or injured personnel under medical supervision to appropriate medical treatment facilities.

**air and space battle management (ASBM)**
: The control of military air and space operations. It encompasses the processes of planning, directing, coordinating and controlling air and space assets in operations.

**air and space systems support**
: Those support activities directed at enhancing the airworthiness and battleworthiness of ADF aircraft and systems.

**air base**
: A defined area containing infrastructure that supports military air power activities. It may or may not include an airfield.

**air base protection**

Protection of an air base through a combination of protective air and surface forces, hardening, dispersal, camouflage, concealment and deception. It includes measures to protect the ground support facilities of space-based systems.

**airborne operations (ABNOPS)**

An air activity conducted to deliver personnel, materiel or forces into a contested objective area. This may be achieved by airdrop or airland from aircraft.

**air campaign**

The controlled conduct of one or more air power operations in support of the joint campaign.

**air defence**

All measures designed to nullify or reduce the effectiveness of hostile air action.

**airdrop**

The delivery of personnel, materiel or forces from an aircraft while it is in flight.

**airfield** (synonymous with aerodrome)

A defined area on land or water (including any buildings, installations, and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

**air interdiction (AI)**

An air activity conducted to divert, disrupt, delay, degrade or destroy an adversary's capability before it can be brought to bear effectively against friendly forces. Although AI is an integrated process, it is conducted at such distance from friendly forces that detailed integration of each air mission with the fire and manoeuvre of friendly forces is not normally required.

**airland**

The delivery of personnel, materiel or forces from an aircraft after it has landed.

**air logistic support (ALS)**

An air activity, other than airborne operations, air-to-air refuelling or aeromedical evacuation, conducted to deploy, distribute or recover personnel, materiel or forces. It also includes special purpose airlift and the transport of VIPs in a secure travel environment.

**airman**

A non-gender-specific term referring to all military personnel in Air Force.

**airmindedness**

The sum of an individual's depth and breadth of knowledge and understanding of the characteristics and employment of air power.

**air mobility** (as an air power role)

The ability to move personnel, materiel or forces using airborne platforms.

**air operation** (synonymous with air power operation)

The employment of air power capabilities where the primary purpose is to achieve military objectives in, through or from the air domain.

**air parity**

When control of the air is being contested and no force has been able to obtain an air power advantage and/or air defence dominance over another.

**air power**

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

**air power mission**
An aggregate of military activities that contributes to the achievement of an air power role.

**air power role**
A fundamental and enduring function of Air Force.

**airspace**
The zone next to the earth consisting of atmosphere capable of sustaining flight.

**airspace control**
The real-time or near real-time implementation of the airspace management procedures governing airspace usage in order to mitigate risk and enhance the flexible use of airspace.

**airspace management**
Airspace management is the coordination, integration, and regulation of the use of airspace of defined dimensions.

**air superiority**
When operations can be conducted at a given location for the desired duration without effective interference by adversary air power and/or air defence capabilities.

**air supremacy**
When adversary air power and/or air defence capabilities are incapable of effective interference, unbounded by time and location.

**air-to-air refuelling (AAR)**
An air activity conducted to refuel one aircraft from another in flight.

**airworthiness**

A concept, the application of which defines the condition of an aircraft and supplies the basis for judgement of the suitability for flight of that aircraft, in that is has been designed, constructed, maintained and operated to approved standards and limitations, by competent and authorised individuals, who are acting as members of an approved organisation and whose work is both certified as correct and accepted on behalf of Defence.

**anti-submarine warfare (ASW)**

An air activity conducted with the intention of denying the adversary the effective use of their submarines and/or unmanned underwater vehicles in the maritime domain.

**anti-surface warfare (ASuW)**

An air activity conducted with the intention of denying the adversary effective use of their surface vessels in the maritime domain.

**area of operations (AO)**

That portion of a theatre necessary for military operations and their administration as part of a campaign.

**as low as reasonably practicable**

A risk is as low as reasonably practicable when it has been demonstrated that the cost of any further risk reduction, where the cost includes the loss of defence capability as well as financial or other resource costs, is grossly disproportionate to the benefit obtained from that risk reduction.

**assigned forces**

Forces-in-being which have been placed under the operational command or operational control of a commander.

**attrition**

The reduction of the effectiveness of a force caused by loss of personnel and material.

**aviation safety**

The state of freedom from unacceptable risk of injury to persons or damage to aircraft and property.

**balance** (as a tenet of air power employment)

Achieving the appropriate mix and level of capabilities and strategic depth to deliver effective and credible air power.

**battleworthiness**

The state of a combat force, system or platform enabling successful conduct of actions in accordance with a tasking designation and within a specific operational environment.

**campaign**

A set of military operations planned and conducted to achieve a strategic objective within a given time and geographical area.

**campaigning**

Describes a controlled series of simultaneous or sequential operations designed to achieve an operational commander's objective, normally within a given time and space.

**capstone doctrine**

The single, foundational doctrine publication which sits at the apex of the doctrine hierarchy, and from which all other doctrine is derived.

**centralised control and decentralised execution (CCDE)**

The appropriate retention of control and delegation of execution authority undertaken with the objective of achieving the optimal employment of air power.

**centre of gravity**

Characteristics, capabilities or localities from which a nation, an alliance, a military force or other grouping derives its freedom of action, physical strength or will to fight.

**close air support (CAS)**

An air activity conducted against hostile targets that are in close proximity to friendly forces. The aim of CAS is to destroy, suppress, neutralise, disrupt, or delay the adversary who is engaged with or about to engage with friendly ground or amphibious forces.

**coalition operation**

An operation conducted by forces of two or more nations, which may not be allies, acting together for the accomplishment of a single mission.

**coercion**

The use or threat of force to persuade an opponent to adopt a certain pattern of behaviour against their wishes.

**collateral damage**

Incidental damage to persons, objects or locations arising out of combat against a legitimate military objective.

**combat air patrol (CAP)**

An aircraft patrol provided over an objective area, the force protected, the critical area of a combat zone, or in an air defence area, for the purpose of intercepting and destroying hostile aircraft before they reach their targets.

**combat power**

The total means of destructive and/or disruptive force which a military unit/formation can apply against the opponent at a given time.

**combat recovery (CR)**

Recovery of isolated personnel during operations.

**combat search and rescue (CSAR)**

The detection, location, identification and rescue of isolated personnel during conflict in a hostile environment.

**combat support**

The provision of air base services and other operations support activities necessary to sustain air operations from major and small air bases in Australia and airheads in both Australia and abroad.

**combined operation**

An operation conducted by forces of two or more allied nations acting together for the accomplishment of a single mission.

**command**

The authority that a commander in a military Service lawfully exercises over subordinates by virtue of rank or assignment.

Notes:

1. Command includes the authority and responsibility for effectively using available resources and for planning the employment of organising, directing, coordinating and controlling military forces for the accomplishment of assigned missions.

2. It also includes the responsibility for health, welfare, morale and discipline of assigned personnel.

**command and control (C2)**

The process and means for the exercise of authority over, and lawful direction of, assigned forces.

**concept of operations**

A clear and concise statement of the line of action chosen by a commander in order to accomplish a mission.

**concurrency** (as a tenet of air power employment)

The ability to carry out multiple operations simultaneously in and beyond a theatre in a coordinated manner to achieve maximum effect.

**conflict**

A politico-military situation between peace and war, distinguished from peace by the introduction of organised political violence and from war by its reliance on political methods.

**control**

The authority exercised by a commander over part of the activities of subordinate organisations, or other organisations not normally under their command, which encompasses the responsibility for implementing orders or directives. All or part of this authority may be transferred or delegated.

**control of the air** (as an air power role)

The ability to conduct operations in the air, land and maritime domains without interference from adversary air power and air defence capabilities.

**cyber operations**

The employment of capabilities where the primary purpose is to achieve effects in or through cyberspace.

**cyberspace**

The interdependent network of information technology infrastructures, including the Internet, telecommunications networks, computer systems, and embedded processors and controllers and their resident data.

**decision superiority**

The ability to make and implement more informed and more accurate decisions at a rate faster than the adversary.

**defensive counter air (DCA)**

A mission utilising active or passive defensive measures to detect, identify, intercept, destroy or neutralise the effectiveness of adversary air activity and to prevent the adversary from gaining control of the air.

**defensive cyber operations (DCO)**

Passive and active cyber operations undertaken with the intention of preserving the ability to use friendly cyberspace capabilities and protect data, networks and net-centric capabilities.

**dependency** (as an air power characteristic)

The reliance on support to enable the generation, employment and sustainment of air power.

**directed energy**

Technologies that are related to the production of a beam of concentrated electromagnetic energy or atomic or subatomic particles.

**doctrine**

Fundamental principles by which the military forces guide their actions to achieve desired objectives. It is authoritative but not prescriptive and requires judgement in application.

**domain**

Within the operational environment, a medium with discrete characteristics in, from or through which military activity takes place.

**effect**

The physical, physiological, psychological or functional impact on the adversary as a result, or consequence, of own military or non-military actions.

**electromagnetic spectrum (EMS)**

The entire range of radiation extending in frequency from approximately $10^{23}$ hertz (Hz) to 0 Hz, in corresponding wavelengths, from $10^{-13}$ centimetres to infinity and including, in order of decreasing frequency, cosmic-ray photons, gamma rays, x-rays, ultraviolet radiation, visible light, infrared radiation, microwaves and radio waves.

**electronic attack (EA)**

The use of electromagnetic energy or directed energy to attack personnel, facilities or equipment with the intent of degrading, neutralising or destroying adversary combat capability. It is considered a division of electronic warfare and a form of fires.

**electronic protection (EP)**

The actions taken to protect personnel, facilities, and equipment from effects of the use of the EMS that degrade, neutralise, or destroy friendly combat capability. It is considered a division of electronic warfare and also a form of force protection.

**electronic support (ES)**

The actions taken to search for, intercept, locate, record, and analyse radiated electromagnetic energy for the purpose of exploiting such radiations in support of military operations. It is considered a division of electronic warfare.

**electronic warfare (EW)**

Military action to exploit the electromagnetic spectrum, encompassing: the search for, interception and identification of electromagnetic emissions; the employment of electromagnetic energy, included directed energy, to reduce or prevent hostile use of the electromagnetic spectrum; and actions to ensure its effective use by friendly forces.

**electronic warfare battlespace management (EWBM)**
The coordination, integration and regulation of the use of the electromagnetic spectrum.

**ends** (as in ends, ways and means)
The objective or desired effect sought.

**end state**
The political and/or military situation to be attained at the end of an operation, which indicates the objective has been achieved.

**exclusive economic zone (EEZ)**
An area beyond and adjacent to the territorial sea, subject to the specific legal regime established in part V of the United Nations Convention on the Law of the Sea, under which the rights and jurisdiction of the coastal State and the rights and freedoms of other States are governed by the relevant positions.

**fighter sweep**
An offensive mission by fighter aircraft to seek out and destroy adversary air power and air defence capabilities.

**flexibility** (as an air power characteristic)
The ability to create a variety of lethal and nonlethal effects across the full range of military and military-supported operations to achieve desired outcomes.

**force element**
Component of a unit, a unit or an association of units having common prime objectives and activities.

**force generation and sustainment**
Provision of the necessary personnel, skills and equipment to conduct and sustain air operations—both domestic and expeditionary—while maintaining the ability to regenerate the force during and after operations.

**Force Level Electronic Warfare (FLEW)**
The integration of traditional EW with strategic and tactical ISR, and battlespace management capabilities.

**force projection**
The timely deployment or movement of joint forces within the operating environment by any means to achieve objectives.

**force protection**
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.

**fragility** (as an air power characteristic)
The vulnerabilities inherent in the sophisticated materials of which air platforms and technologically advanced systems are composed.

**Fundamental Inputs to Capability**
A standard checklist of inputs designed to enable the effective generation of Defence capabilities.

**hub and spoke logistics**
A method of delivering logistics from a central position to outlying locations.

**humanitarian assistance**
As part of an operation, the use of available resources to assist or complement the efforts of responsible civil actors in the operational area or specialised civil humanitarian organisations in fulfilling their primary responsibility to alleviate human suffering.

**impermanence** (as an air power characteristic)
The temporary nature of an air platform's ability to maintain an influence or effect through its presence.

**information activities**

The integration, synchronisation and coordination of two or more information related capabilities.

**information operations (IO)**

The operational level planning and execution of information activities to influence the decision making and actions of a target audience and to protect and enhance one's own decision-making and actions in support of national interests.

**information related capabilities**

Tools, capabilities or processes, which can have effects of a physical, functional or psychological nature upon targets and target audiences.

**intelligence**

The product resulting from the processing of information concerning foreign nations, hostile or potentially hostile forces or elements, or areas of actual or potential operations. The term is also applied to the activity which results in the product and to the organisations engaged in such activity.

**intelligence, surveillance and reconnaissance (ISR)**

An activity that synchronises and integrates the planning and operations of sensors, assets, and processing, exploitation and dissemination systems in direct support of current and future operations.

**interoperability**

The ability of systems, units or forces to provide services to, and accept services from, other systems, units or forces and to use the services so exchanged to enable them to operate effectively together.

**irregular warfare (IW)**

A violent struggle among state and non-state actors for legitimacy and influence over the relevant population(s). Irregular warfare favours indirect and asymmetric approaches, though it may employ the full range of military and other capacities, in order to erode an adversary's power, influence, and will.

**isolated personnel**

Military or civilian personnel separated from their unit or organisation in an environment requiring them to survive, evade, or escape while awaiting rescue or recovery.

**joint (J)**

Adjective used to describe activities, operations and organisations in which elements of at least two Services participate.

**joint force**

A general term applied to a force composed of significant elements of the Navy, Army and Air Force, or two or more of these Services, operating under a single joint force commander.

**joint personnel recovery (JPR)**

The aggregation of military, civil and political efforts to rescue, release or recover personnel from permissive, uncertain or hostile environments whether they are captured, missing or isolated.

**Joint Task Force (JTF)**

A force composed of assigned or attached elements of two or more Services established for the purpose of carrying out a specific task or mission.

**keystone doctrine**

The principle doctrine publication in each doctrine series. Keystone publications support the capstone doctrine, and provide a framework for all subordinate doctrine publications in that series.

**line of operation**

In a campaign or operation, a line linking decisive points in time and space on the path to the centre of gravity.

**logistics**

The science of planning and carrying out the movement and maintenance of forces, including: design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposal of materiel; transport of personnel; acquisition or construction, maintenance, operation, and disposition of facilities; acquisition or furnishing of services; and medical and health service support.

**maintenance**

Maintenance tasks include: all action taken to retain equipment in or restore it to a specified condition, including inspection, testing, servicing, classification as to serviceability, repair, rebuilding and reclamation; all supply and repair action taken to keep a force in condition to carry out its mission; and the routine recurring work required to keep a facility (plant, building, structure, ground facility, utility system or other real property) in such condition that it may be continuously utilised, at its original or designed capacity and efficiency, for its intended purpose.

**manoeuvre**

Employment of forces on the battlefield through movement in combination with fire or fire potential, to achieve a position of advantage in respect to the adversary, in order to accomplish the mission.

**means** (as in ends, ways and means)

The resources available to achieve the ends.

**military strategy**

The component of national or multinational strategy presenting the manner in which military power should be developed and applied to achieve national objectives or those of a group of nations.

**moral courage**

The strength of character to honour one's convictions and uphold Air Force values.

**national air power**

The total ability of a nation to achieve its objectives through the air domain and encompasses all elements of civilian and military aviation.

**national end state**

The set of desired conditions, incorporating the elements of national power, that will achieve the national objectives.

**national interests**

The general and continuing ends for which a State acts.

**national objectives**

The aims, derived from national goals and interests, toward which a national policy or strategy is directed and efforts and resources of the nation are applied.

**national power**

The total capability of a country to achieve its national objectives, devoid of external constraints and without being subject to coercion.

**national security**

The ability to preserve the nation's physical integrity and territory; to maintain economic relations with the rest of the world on reasonable terms; to protect its nature, institutions and governance from disruption from outside, and to control its borders.

**national strategy**

The art and science of developing and using the diplomatic, economic, cultural and information powers of a nation, together with its armed forces, during peace and war to secure national objectives.

**national support base**

The full range of organisations, systems and arrangements (both formal and informal) that own, control or influence ADF access to and use of capability.

**neutralise**

To degrade an adversary's capabilities to such an extent that it is rendered ineffective.

**objective**

A clearly defined and attainable goal for a military operation, for example seizing a terrain feature, neutralising an adversary's force or capability or achieving some other desired outcome that is essential to a commander's plan and towards which the operation is directed.

**offensive counter air (OCA)**

An offensive air activity conducted to destroy, degrade, neutralise or disrupt adversary air power, or to contain it as close to its source as possible.

**offensive operations**

Military operations conducted for the purpose of seizing or retaining the initiative.

**operation**

A designated military activity using lethal and/or nonlethal ways and means to achieve directed outcomes in accordance with national legal obligations and constraints.

**operational control**

The authority delegated to a commander to direct forces assigned so that the commander may accomplish specific missions or tasks which are usually limited by function, time or location; to deploy units concerned and to retain or assign tactical control of those units. It does not include authority to assign separate employment of component of units concerned. Neither does it, of itself, include administrative or logistic control.

**operational environment**

The composite of the conditions, circumstances and influences that affect the employment of capabilities and bear on decisions of the commander.

**operational objectives**

The objectives that need to be achieved in the campaign to reach the military strategic end state.

**operational support**

The provision of services that support the introduction, development and review of air power capabilities.

**passive defensive counter air**

Those measures, other than active defensive counter air, taken to minimise the effectiveness of adversary air activity by enhancing the survivability of friendly forces and installations.

**payload** (as an air power characteristic)

The total weight and volume of passengers, cargo, sensors and weapons that an aircraft can carry.

**personnel support**

A global term used to describe all personnel functions and activities undertaken for the efficient and effective employment of all personnel in the ADF, including their wellbeing and discipline.

**perspective** (as an air power characteristic)
The greater field of view and extended horizon of the operational environment obtained by virtue of a platform's operating altitude.

**precision** (as an air power characteristic)
The ability to employ lethal or nonlethal force accurately, with discrimination and proportionality.

**processing**
The iterative process which transforms data into information and information into intelligence.

**professional mastery**
The sum of an individual's depth and breadth of knowledge and understanding of a profession combined judiciously with the ability to apply it through the lens of personal experience and intellect.

**reach** (as an air power characteristic)
The ability to project military power over long distances, largely unconstrained by physical barriers.

**reconnaissance**
A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an adversary or potential adversary, or to secure data concerning the meteorological, hydrographic or geographic characteristics of a particular area.

**recovery operations (RecOP)**
Recovery of isolated personnel during and after combat, conducted in all threat environments.

**search and rescue operations (SAROP)**
Recovery of isolated personnel, involving military or civil search and rescue in permissive environments.

**sensor**

An equipment which detects, and may indicate, and/or record objects and activities by means of energy or particles emitted, reflected, or modified by objects.

**situational understanding**

The accurate interpretation of a situation and the likely actions of groups and individuals within it. Awareness, analysis, knowledge, comprehension and judgement facilitate understanding, which enables timely and accurate decision-making.

**space**

The region beyond the distance of 100km above mean sea level where the laws of astrodynamics govern the manoeuvre of systems and the conduct of operations.

**space operations**

The employment of space capabilities where the primary purpose is to achieve military objectives in or through the space domain.

**space power**

The total strength of a nation's capability to conduct and influence activities to, in, through and from space to achieve its objectives.

**special recovery operation (SRO)**

Recovery of friendly or hostile military or civilian personnel or materiel by Special Forces.

**spectrum of conflict**

The full range of levels of violence from stable peace up to and including general war.

**speed** (as an air power characteristic)

The ability to cover distance quickly and to create an effect with minimal delay.

**strategic attack (SA)**

An offensive air activity designed to employ air power to create specific strategic effects that damage, neutralise or destroy an adversary's will, warfighting capabilities or any other capacity opposed to one's interests.

**strategic objective**

A desired end state for military operations which is communicated from the strategic to the operational level and forms the basis for operational planning.

**strike** (as an air power role)

The ability to attack with the intention of damaging, neutralising, or destroying a target.

**surveillance**

The systematic observation of the air, maritime, land, space or cyberspace domains by visual, aural, electronic, photographic or other means.

**sustainment**

The provision of personnel, logistic, and other support required to maintain and prolong operations or combat until successful accomplishment or revision of the mission or of the national objective.

**targeting**

The process of selecting and prioritising targets and matching the appropriate response to them, taking into account of international and Australian national law, national and strategic objectives, and operational requirements and capabilities.

**technical mastery**

The combination of an individual's training, knowledge, experience and skills that ensures their ability to carry out a specific employment function with a high level of competence.

**tempo**

The rate or rhythm of activity relative to the adversary, and incorporating the capacity of the force to transition from one operational posture to another.

**tenets of air power employment**

Enduring beliefs developed from past experience that guide the employment of air power. They are: centralised control and decentralised execution, concurrency and balance.

**theatre**

A designated geographic area for which an operational level joint or combined commander is appointed and in which a campaign or series of major operations is conducted. Note: A theatre may contain one or more joint force areas of operation.

**unfavourable air situation**

When operations can expect to encounter prohibitive interference from adversary air power and/or air defence capabilities.

**unmanned aerial system (UAS)**

An unmanned aerial vehicle, its onboard systems and the equipment, network and personnel required for its control.

**unmanned aerial vehicle (UAV)**

A vehicle that operates in the air domain and does not have a human operator onboard, is operated remotely, and is normally recoverable.

**unmanned underwater vehicle**

A vehicle that operates in the maritime domain and does not have a human operator onboard, is operated remotely, and is normally recoverable.

**warfighting**

Government directed use of military force to pursue specific national objectives.

**ways** (as in ends, ways and means)
The activities undertaken to achieve the ends.

**weapon system**
A combination of one or more weapons with all related equipment, materials, services, personnel and means of delivery and deployment (if applicable) required for self-sufficiency.

**whole-of-government**
Denotes government departments and agencies working across portfolio boundaries to achieve a shared goal and an integrated government response to particular issues.

# List of Abbreviations

| | |
|---|---|
| AAP | Australian Air Publication |
| AAR | air-to-air refuelling |
| ABNOPS | airborne operations |
| ACAUST | Air Commander Australia |
| ACT | Australian Capital Territory |
| ADDP | Australian Defence Doctrine Publication |
| ADF | Australian Defence Force |
| ADG | airfield defence guard |
| ADG | Australian Defence Glossary |
| AFHQ | Air Force Headquarters |
| AI | air interdiction |
| ALS | air logistic support |
| AME | aeromedical evacuation |
| AO | area of operations |
| AO | Officer of the Order of Australia |
| AOC | Air and Space Operations Centre |
| APEC | Asia Pacific Economic Cooperation |
| ASBM | air and space battle management |
| ASuW | anti-surface warfare |
| ASW | anti-submarine warfare |
| BLI | bench level instruction |
| C2 | command and control |
| CAF | Chief of Air Force |
| CAOC | Combined Air and Space Operations Centre |
| CAP | combat air patrol |
| CAS | close air support |
| CCDE | centralised control and decentralised execution |

| | |
|---|---|
| CDF | Chief of Defence Force |
| CJOPS | Chief of Joint Operations |
| CR | combat recovery |
| CSAR | combat search and rescue |
| CTG | Commander Task Group |
| DACAUST | Deputy Air Commander Australia |
| DCA | defensive counter air |
| DCO | defensive cyber operations |
| DCAF | Deputy Chief of Air Force |
| DGACOPS | Director General Air Command Operations |
| DGAIR | Director General Air |
| EA | electronic attack |
| EATS | Empire Air Training Scheme |
| EBA | effects-based approach |
| EEZ | exclusive economic zone |
| EMS | electromagnetic spectrum |
| EP | electronic protection |
| ES | electronic support |
| ESTF | Emergency Services Task Force |
| EW | electronic warfare |
| EWBM | electronic warfare battlespace management |
| FEG | Force Element Group |
| FIC | Fundamental Inputs to Capability |
| FLEW | Force Level Electronic Warfare |
| FPDA | Five Power Defence Arrangements |
| HQAC | Headquarters Air Command |
| HQIADS | Headquarters Integrated Air Defence System |
| HQJOC | Headquarters Joint Operations Command |
| HRM | human resource management |

| | |
|---|---|
| I&W | indicators and warnings |
| IADS | integrated air defence system |
| IE | international engagement |
| IO | information operations |
| ISR | intelligence, surveillance and reconnaissance |
| JFACC | Joint Force Air Component Commander |
| JFC | Joint Force Commander |
| JPR | joint personnel recovery |
| JTF | Joint Task Force |
| LOAC | law of armed conflict |
| NATO | North Atlantic Treaty Organisation |
| NSW | New South Wales |
| OCA | offensive counter air |
| OIF | Operation *Iraqi Freedom* |
| PED | processing, exploitation and dissemination |
| PGM | precision guided munition |
| PNT | positioning, navigation and timing |
| RAAF | Royal Australian Air Force |
| RAMSI | Regional Assistance Mission to Solomon Islands |
| RCAF | Royal Canadian Air Force |
| RecOP | recovery operations |
| ROE | rules of engagement |
| RTS | raise, train and sustain |
| SA | strategic attack |
| SADFO | Senior ADF Officer |
| SAR | search and rescue |
| SAROP | search and rescue operations |
| SATCOM | satellite communication |
| SEAD | suppression of enemy air defences |

| | |
|---|---|
| SI | standing instruction |
| SOP | standard operating procedures |
| SRO | special recovery operations |
| SWPA | South-West Pacific Area |
| TRA | temporary restricted area |
| TTP | tactics, techniques and procedures |
| UAS | unmanned aerial system |
| UAV | unmanned aerial vehicle |
| US | United States |
| USAF | United States Air Force |

# Index

## A

## E



## F



## G



## H



## I



## J



## K

## L



## M



## N



## O

## P



## R



## S

## T



## U



## V



## W



## Y