

# *Command and control of air power*

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*Air Vice-Marshal Turnbull outlines the evolution of the command and control of Western air power over the past century, emphasising the importance of centralised control and, to this end, the need for an Air Component Commander and an Aerospace Operations Centre in any unified joint or combined command arrangement. He describes the command and control system currently used in Australia.*

**Key words:** air power; command and control; history; dispersed control; centralised control; Air Component Commander; Aerospace Operations Centre; Theatre Air Control System.

The command and control of air power has evolved over the past century since its first sustained use in support of the land battle in the Great War. In this paper, I will outline this evolution; mention opportunities and complexities introduced by modern technology; describe how air power currently is commanded, controlled and generated; and conclude with a few words on leadership and the future.

## **Air Power Command and Control – a short history**

The Great War saw the first use of military air power on a significant scale. Military aircraft initially were used only for observation of the land battle. There were limited numbers of aircraft and crews; aircraft range was limited; equipment reliability was poor; and the aircraft lacked a communications capability. When guns were introduced, initially they were hand-held, but later were aircraft-mounted. Aircraft squadrons were dispersed in support of subordinate land formations and command and control was exercised separately by the supported ground commanders.

## **World War II**

By the Second World War, most air forces had gained independence from the army – they had become a separate arm. With the implementation of centralised control, integration of air power became possible on a regular basis. Air forces conducted strategic warfare through independent commands to destroy the enemy's capability and will to continue the war.

While Japan and Germany focused primarily on tactical air forces, the Western allies built massive strategic bombing capabilities to wage strategic warfare in the enemy's homeland. This ultimately led to Japanese capitulation and to Germany becoming overwhelmed by brute force.

A defining moment in the command and control of air power was the Battle of Britain in the summer and

autumn of 1940. Air Marshal Sir Hugh Dowding, commanding the Royal Air Force's Fighter Command, devised the world's first large-scale centralised air defence system. Through it, he skilfully managed the employment of his 650 allied fighter aircraft against Germany's 1500 bombers and 900 fighters and thereby gained victory in the Battle of Britain.

Another defining moment in air power employment was Operation Torch, the allied offensive in North Africa in February 1943. Planners parcelled out Allied air forces to the supported American and British ground forces. The vague doctrine stated that: *"The most important target at a particular time will usually be that target which constitutes the most serious threat to the operations of the supported ground force. The final decision as to the priority of targets rests with the commander of the supported unit."* This was interpreted as complete subordination of air power to the land commander. A consequence was that Allied air forces failed to gain air superiority prior to the ensuing operation. The operation could have been a dismal failure but, luckily, Rommel withdrew.

Based on this experience, Air Vice-Marshal Sir Arthur Coningham convinced Eisenhower that close air support forces in future must be organised on a basis of scarcity. Army subordinate formation (division and corps) commanders would have to request close air support through the highest army commander. Air support missions would be offensive, with fighters seeking out the enemy's air force at or near Axis bases.

Centralised control was a fundamental premise of Coningham's air support concept. In view of limited air resources, all aircraft units should be used in the highest priority missions. None could be held in reserve for the future use of a currently inactive ground unit. Coningham would determine allocation and employment upon the ground commander's determination of objectives.

Subsequently, new doctrine was introduced in July 1943. It considered the land force and the air force as co-equal and independent; neither was an auxiliary of the other. The doctrine provided that:

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- The gaining of air superiority is the first requirement for the success of any major land operation. Land forces operating without air superiority must take extensive security measures against hostile air attack and their mobility and ability to defeat the enemy land forces are greatly reduced. Therefore, air forces must be employed primarily against the enemy's air forces until air superiority is obtained.
- Control of available air power must be centralised. Command must be exercised through the air force commander if this inherent flexibility and ability to deliver a decisive blow are to be fully exploited.
- Therefore, the command of air and ground forces in a theatre of operations will be *vested in the superior commander charged with the actual conduct of operations in the theatre*, who will exercise command of air forces through the air force commander and command of ground forces through the ground force commander.

### **Gulf Wars and Afghanistan**

The First Persian Gulf War (1990-1991) saw the first explicit use of effects-based operations (in Kuwait)<sup>2</sup>; the first use of a Joint Force Air Component Commander (JFACC); the introduction of push-CAS<sup>3</sup> via an Air Support Operations Centre (ASOC); and development of Air Operations Centre divisions and doctrine into what we currently use.

The main concern of airmen then becomes ensuring the resources are prioritized on the most important objectives. Chaining scarce resources – like electronic warfare aircraft or intelligence-surveillance-reconnaissance assets – to an area risks not having them in the areas where they are needed. Only a theatre-level view can overcome this. Ground forces, on the other hand, are subject to terrestrial barriers. Because of these constraints, ground commanders must try to gain advantage by manoeuvring in conjunction with firepower. The two are inseparable. The ground commander needs to be assured that he can place firepower and the other effects of air power where and when they are needed.

The issue then became command relationships. Airmen wanted to have an airman in command of all air forces, with the authority to task the aircraft on a theatre-wide basis. Those on the ground wanted the aircraft to

be organic to the ground units so the actions would be synchronized for the greatest effect. The Joint Force Commander, General Norman Swartzkopf, resolved this by saying: “Gentlemen, I own everything, and I will decide”.

There are two problems integrating ground and air forces. The first is allocating the resources in priority order to the broader theatre objectives, only one of which is supporting ground forces. The second is determining how to leverage command relationships so interacting components can take full advantage of the capabilities when they need it most. These are both issues of command relationships, of which more later.

**Operation Anaconda** undertaken in Afghanistan in March 2002 serves as a useful case study. Joint Task Force Mountain formed under General Hagenbeck deployed without an air support co-ordination centre or a tactical air command post. There was no combat air support. The army liaison battlefield co-ordination detachment had not been involved in the largely special operations-oriented fight to this point. The air component was not involved in development of the plans from the beginning, instead reacting to detailed guidance from United States Central Command. Indeed, the air component was not advised of the plan until two days prior to its execution. Fortunately, heroic actions and sacrifice saved the day. Within Central Command, it was “a wakeup call” to establish common procedures for air operations.

### **United States**

The chief-of-staff of the United States Air Force from 1997 to 2001, General Michael E. Ryan, emphasised the need to strengthen the ability of commanders to command and control aerospace forces. To this end, Aerospace Operations Centres (AOC) were developed to gather and fuse the full range of information and to rapidly convert that information to knowledge and understanding to assure decision dominance over adversaries.

In 2000, the AOC was redefined as a weapon system. Now, someone had to figure out how to operate it, standardise the operating procedures, and train people to set it up and maintain it. 505<sup>th</sup> Wing (Hurlbert Air Force Base) was tasked to train people, develop formal processes, and test systems to perform air and space command and control.

Geographic Combatant Commanders (GCCs) have evolved to have standing functional components as an alternative to establishing joint task forces in response to a crisis. GCCs each have: a Joint Force Air Component Commander, with a standing Aerospace Operations Centre; a Joint Force Land Component Commander; a Joint Force Maritime Component Commander; and a Joint Force Special Operations Commander. Each operates in a supported/supporting command relationship as directed by the Geographic Component Commander as the Joint Force Commander.

<sup>2</sup>Effects-based operations (EBO) put the desired strategic effect first and then plan back to the possible tactical-level actions that could be taken to achieve the desired strategic effect. Rather than focus on attrition and annihilation, EBO focuses on desired outcomes using a minimum of force. The approach was enabled by advancements in weaponry – particularly stealth and precision weapons – in conjunction with a planning approach based on specific effects rather than absolute destruction.

<sup>3</sup>Push-CAS is the provision of pre-planned combat air support for the ground commander rather than providing combat air support reactively in response to a ground commander's request (pull-CAS).

The Australian Defence Force is part-way to adopting this system.

### **United Kingdom**

The Royal Air Force (RAF) was the world's first independent air force. The subsequent development of command and control of air power in the RAF was informed by lessons from the Battle of Britain in 1940, Operation Torch in 1943, and the strategic bombing of Germany in 1944-45. By the 1980s, however, the RAF had become too focused on the NATO scenario and too dependent on its main operating bases.

Operation Desert Storm (Kuwait 1991) generated a full realisation of the need for change and caused the term 'expeditionary' to re-enter the RAF vocabulary. In turn, United Kingdom forces opted for a Permanent Joint Force Headquarters, within which the RAF would opt for a United States-like model for command and control. This led to the RAF developing a fully-trained battle staff and organisational process, the Joint Air Operations Centre, to implement the air portion of a joint operation.

### **The Role of Technology**

Advances in technology have played a key part in the evolution of air power and its command and control. In the Great War, communication methods were elementary, often as simple as a hand-written message dropped from a plane in a bottle.

Rapid advances were made in the next two decades. By World War II, radars, sector controllers, visual identification and sensing had been introduced, but all correlation was still done manually and passed by voice.

By the Vietnam War (1960–1975), the technology was far superior – airborne radar; control and reporting centres<sup>4</sup> – but co-ordination was still by voice and was managed on a plexiglass display. The ability to automate a common air picture eluded air forces until the late 1980s.

Today, we take the recognised air picture (RAP) for granted. A RAP is a complete listing of all aircraft in flight within a particular airspace, with each aircraft being identified as friendly or hostile, and ideally containing additional information such as type of aircraft, flight number, and flight plan. The information may be drawn from a number of different sources, including military radar, civilian air traffic controllers, and allied nations or multi-national organisations such as NATO.

In Australia today, we also take for granted our Australian Defence Force (ADF) multi tactical data-link network which enables the sharing of computer-based

information between tactical platforms, and the distribution of such information to those who need it in a timely fashion.

### **The Australian Scene**

In Australia, Headquarters Australian Theatre was established in 1996 as the ADF's first operational-level joint headquarters to provide the ADF with a single headquarters to command the forces of all three services when deployed on operations. It was based on the United States concept of the unified command of maritime, land and air components as discussed above. Air Commander Australia was 'double-hatted' as the Air Component Commander (a role the Air Commander still performs) and an Aerospace Operations Centre (AOC) to support the Air Component Commander was built within Headquarters Air Command at RAAF Base Glenbrook.

In 2004, Headquarters Joint Operations Command (HQJOC) was formed from Headquarters Australian Theatre to become the operational-level headquarters responsible for the command and control of ADF operations worldwide. Its formation reflected the need to establish a purpose built, co-located and integrated joint headquarters. Since December 2008, HQJOC has been based near Bungendore, New South Wales, some 25km east of Canberra.

A new Air and Space Operations Centre was built within HQJOC. Air Force committed approximately 135 personnel to the integrated Joint Staff, but retained the component command and control structure in line with air power command and control development in the United States and the United Kingdom.

The Air and Space Operations Centre (AOC) has responsibilities to both HQJOC and Headquarters Air Command (HQAC).

- On behalf of HQJOC, the Director-General commands the air and space capabilities and assets assigned to the Chief of Joint Operations for specific operations and is the ADF airspace control authority. He/she also commands and integrates air power for the joint force commanders.
- On behalf of HQAC, the Director-General manages, controls and monitors Air Force raise, train and sustain activities; controls and administers the AOC; develops and maintains doctrine and processes; and manages manning.

Management of air power is by way of a Theatre Air Control System (TACS). The TACS comprises all elements essential to the generation, deployment, and command and control of air power: the AOC (the primary element); air support operations centre air liaison officers; tactical air control parties; and combat support units – air bases (not garrisons), logistics, and force protection.

The Aerospace Operations Centre's responsibilities include: providing advice to the Chief of Joint Operations; short-term/crisis planning; executing

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<sup>4</sup>A control and reporting centre (CRC) is a mobile command, control and communications radar element of a United States Air Force theatre air control system. It integrates a comprehensive air picture using data from air-, land- and sea-based sensors, and surveillance and control radars. It performs decentralised command and control of joint operations by conducting threat warning, battle management, theatre missile defence, weapons control, combat identification, and strategic communications.

support for regional operations; planning and executing air operations in support of joint task force commanders; ADF search and rescue co-ordination; integrating space and cyber in planning and execution; administering and controlling military airspace; co-ordinating strategic aero-medical evacuation; and monitoring and reporting on Air Force raise, train and sustain activities.

The Aerospace Operations Centre is organised into six divisions:

- Strategy Division develops, refines, disseminates and assesses the progress of aerospace strategy and associated plans, orders, and instructions;
- Combat Plans Division develops the air tasking order for the application of resources based on guidance from Strategy Division;
- Combat Operations Division executes the air tasking order;
- Space Operations Division;
- Intelligence-Surveillance-Reconnaissance (ISR) Division conducts threat and target analysis, and ISR asset management; and
- Air Mobility Division integrates and directs execution of inter- and intra-theatre air mobility assets.

The HQAC Air Staff assists the relevant commander in performing theatre engagement activities and single service, joint and combined exercises; immediate and deliberate planning (for handover to AOC Strategy Division) both joint and single service; force deployment, bed-down, sustainment, and redeployment; and operational and administrative support functions.

Enabling roles include command and control; force protection; force generation and sustainment; operations support, such as the delivery of services at air bases that facilitate air operations; and capability support, focused on supporting aircraft and the major systems that support aircraft operations – such as runways, hangars, radar stations, power generators, barracks, fuel and ordnance storage.

## Leadership

We must be able to work with the other Services, within a whole-of-government effort, to ensure air power effects are optimally integrated. Equally important are relationships between commanders (not command relationships), particularly the use of supported/supporting relationships. In the past decade of war, the support command relationship has been the most powerful relationship in terms of gaining access to additional capabilities. It provides the authority and basis for synergy and harmony. This support relationship, in essence, makes the supporting commanders responsible for the success of the supported commander.

The supported commander has the authority to provide general direction, designate and prioritise missions, targets or objectives, and other actions for co-ordination and efficiency; to identify needs to supporting commanders on an ongoing basis; to request liaison

from supporting commanders to integrate supporting capabilities in the operation; and to bring lack of support issues to supporting commanders first for resolution.

The supporting commander is responsible to both ascertain and satisfy the needs of the supported commander within the priorities directed by the joint force commander. She/he must recognise his/her role in ensuring the success of the supported commander – “one team, one fight”; understand and respect the authority of the supported commander; take time in ascertaining all the supported commanders’ priorities in apportioning his/her forces; send liaison to supported commanders to assist them in planning and in ascertaining the supporting commander’s requirements; and direct appropriate command relationships to subordinates to ensure all supporting responsibilities are fulfilled.

## Theatre Joint Force Air Component Commander Model

The use of a theatre-level Joint Force Air Component Commander (JFACC) is now common: to optimise air power across multiple joint task forces in an area of responsibility (AOR); to optimise high demand/low density air-power assets; and, as a response to insufficient Air Force resources, to establish additional Air Operations Centres (AOCs) below Theatre JFACC level. Concurrently, Air Component Co-ordination Elements (ACCEs) at adjacent functional components and joint task forces provide the link to the Theatre Air Control System.

The Theatre JFACC model retains the Joint Force Commander’s agility and flexibility of air power, enabling centralised planning, and allowing for rapid shifting of air power throughout the AOR. The Theatre Air Control System is the key enabler. The Joint Force Commander sets the conditions for success by clearly stating the supported command relationships of geographic joint task forces and the supporting command relationships of the JFACC.

The Joint Force Commander must make the hard calls on apportionment decisions, working with the supported joint task forces to provide the Theatre JFACC sufficient apportionment direction. The Joint Force Commander must also establish a robust intelligence-surveillance-reconnaissance and targeting oversight capability to ensure theatre-wide intelligence collection and targeting is occurring. The Joint Force Commander also has the ability to decentralise execution of the ground support mission to be more flexible and adaptive to the needs of multiple ground commanders.

Finally, on commanders, interdependence can be viewed in some aspects as a risk for we depend on capabilities we do not own or control for our success. This, however, this is the reality of today’s world. As a general rule, commanders who accept this interdependence do better in today’s environment than those

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who do not. We see commanders mitigating this risk through establishing a climate of co-operation, co-ordination, and collaboration by developing personal relationships and trust, use of liaison elements, and making conscious decisions on the degree of reliance with those stakeholders for critical tasks.

### **Conclusion**

The Royal Australian Air Force has formulated Plan Jericho to guide its future development. A rapidly changing combat environment means we must look for new and better ways of staying ahead of our adversaries. The threats we face are evolving. There is increased competition for the global commons and unprecedented ability to access data. The government needs rapid and agile military options and we are introducing 5th-generation technology to maintain our competitiveness. We are seeking to harness the combat potential of a fully integrated force; to develop an innovative and empowered workforce; and to change the way we acquire and sustain capability.

Command and control in the decade ahead will be

complicated by a contested electromagnetic environment; uncertain communications; and the need to convert data to knowledge and get that knowledge to the right people at the right time. Further, future command and control systems will need to be adaptable to the capabilities of modern platforms and systems – particularly rules of engagement.

**The Author:** Air Vice-Marshal Gavin Turnbull, Air Commander Australia at the time he delivered this presentation, is now Deputy Chief of Air Force. A pilot with more than 3600 flying hours on rotary-wing and fast-jet aircraft, he commanded No. 77 Squadron (F/A 18 multirole fighters) from 2002 to 2004 and No. 81 Wing (F/A 18) from late 2007 to 2009. He saw operational service with the Multinational Force and Observers in the Sinai in 1988; deployed to the Middle East in 2007 as chief-of-staff in the Australian National Headquarters, Baghdad; and redeployed to the Middle East in 2012 as director of the United States 609<sup>th</sup> Combined Air Operations Centre. He was appointed Air Commander Australia on 12 September 2014; and Deputy Chief of Air Force on 1 May 2017. He was made a Member of the Order of Australia for exceptional service to the ADF in 2016. [Photo of Air Vice-Marshal Turnbull: Department of Defence]