Designing for the Future Force:
Informing the Debate on the Future Structure of the Royal Australian Air Force

by WGCDR Travis Hallen

FOREWORD

Wing Commander Hallen has written an interesting and compelling working paper on the structure of the Royal Australian Air Force. He has divided his paper into three sections: a historical analysis of the development of the force structure of the air force; the reasons that now exist for changing the current structure; and considerations for designing any future forces.

I urge readers to read the whole of the history section, even though the operational requirements that existed for previous force designs no longer exist, as it provides an excellent background for ensuring that any discussion generated by this paper includes lessons learnt in the past.

Changing organisational structures is enviable and to paraphrase Marcus Aurelius, "the Universe loves nothing so much as to change the things that are and to make new", but WGCDR Hallen's paper cautions us not to make change for change's sake. It exhorts us to review the assumptions that created the structure we have today and use them to evolve into an organisation that will meet the needs of the future.

I congratulate WGCDR Hallen on the production of another quality product and I hope that you will be encouraged to join in the debate of how the air force should be structured in the future.

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ABOUT THE AUTHOR

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INTRODUCTION

[P]erformance is the joint outcome of capability and design.

Richard P. Rumelt[1]

The Royal Australian Air Force's (RAAF) organisational structure, centred around Force Element Groups (FEGs), has enabled the development of the tactical and technical brilliance in the employment of Australian air power. The creation in 1987 of FEGs was critical to developing the highly technical capabilities that enabled the RAAF to justifiably claim to be 'one of the most capable air forces in the world and certainly the best in our region'.[2] Though they have served RAAF well for over three decades, Australian airmen are starting to question whether FEGs remain fit for purpose. Changes in the operational, strategic, and technological context are placing unprecedented demands on the Australian Defence Force (ADF). The strategic environment is more volatile than at any time since World War II, the opening of new domains is changing the way airmen think about air power, and the rate of technological progress is making disruption the norm not the exception. To ensure that the RAAF is positioned to provide the air power needed by the joint force to succeed in future operations, it is time to review the organisational design upon which the RAAF's approach to force generation has been developed.

There is an appetite at the highest level of the RAAF to engage in a discussion and debate about the structure of the RAAF. In the words of the then-Deputy Chief of the Air Force, Air Vice-Marshal Gavin Turnbull, at the 2018 Air Power Conference:

> For years our Air Force has been developed in stovepipes we call Force Element Groups … where we manage like capabilities, free of geography, to raise, train and sustain air operations. Through the FEGs we are really good at the individual tactical air power capabilities. They have served us well but perhaps we need to think harder about the enterprise structure we need to generate and sustain an integrated force. I'll take advice on that.[3]

Calls from the senior leadership for a discussion on the future structure of the RAAF create an environment conducive to a contest of ideas. While new ideas are needed, in the absence of a compelling justification for change, overcoming three decades of organisational inertia is difficult. Indeed, most RAAF personnel know no organisational structure other than the FEGs. Being reluctant to change is not inherently bad. Change for the sake of change is a recipe for failure. But this should not preclude testing, validating, and potentially amending the RAAF's organisation. This paper aims to support the discussion on organisational structure by providing the means to assess existing assumptions and, where appropriate, to create new ones.

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1   Richard P. Rumelt, *Good Strategy, Bad Strategy: The Difference and Why it Matters* (New York, NY: Crown Business 2011), p. 133

2   Air Marshal Geoff Brown, 'Keynote Address', *90 Years of the RAAF: Proceedings of the 2011 RAAF History Conference*, Canberra, Air Power Development Centre, 2012, p.9, http://airpower.airforce.gov.au/APDC/media/PDF-Files/Conference%20Proceedings/CONF32-RAAF-History-Conference-2011-90-Years-of-the-RAAF.pdf (accessed 10 September 2018)

3   Air Vice-Marshal Gavin Turnbull, *Air Force Next!* [video], (Air Power Development Centre, 13 April 2018), https://www.youtube.com/watch?v=OlXI8wUUx2Q&feature=youtu.be (accessed 10 September 2018).

HISTORY OF AIR FORCE OPERATIONAL STRUCTURE

The history of the RAAF's operational structure must be understood within the contemporary strategic and operational context. Throughout a century of operations, the RAAF leadership has tried and tested different approaches to structure in their efforts to adapt to perceived and actual requirements for force generation. As circumstances changed, so did the structures used to generate Australian air power. The pages that follow comprehensively, yet concisely describe, the evolution of the RAAF's operational structure since 1921. The political management aspects of the RAAF have been intentionally excluded from this history; although the administrative machinery does play an essential role in developing Australian air power, the operational aspects of force generation are the focus of this paper.

Before discussing the development of RAAF operational structure, a brief overview of the structural nomenclature used by the RAAF is needed. Defining the relationship between organisational terms is important as air force differ in their relative hierarchy of terms. For example, in the USAF, wings are comprised multiple groups, whereas in the RAAF, wings are subordinate to groups.
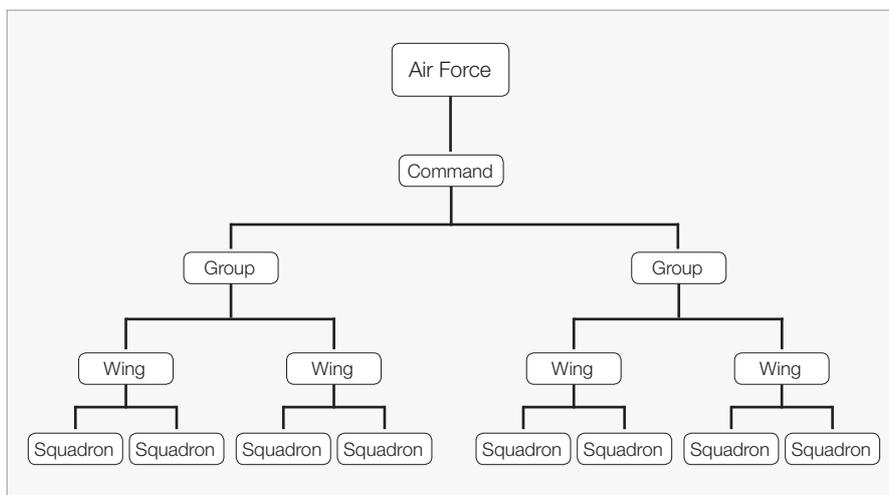

Figure 1: Generic RAAF Organisational Hierarchy

The Early Years

In the RAAF's early years, it made little sense to distinguish between operational and executive functions. Size constrained organisational options during the first two decades of its existence. At the time it was formed, the RAAF planned for a force of approximately 1500 members, consisting of a headquarters, an aircraft depot, a flying training school, a recruit training depot, and six squadrons. This force was to be divided between Victoria and New South Wales, with each being home to two landplane and one seaplane squadron, and the headquarters, depots, and training establishments located in Victoria.[4] However, these modest goals lay beyond the reach of a fledgling service, particularly when faced with the financial limitations that began to bite into Defence funding almost immediately after the RAAF was formed.[5]

When Air Marshal Sir John Salmond—the Royal Air Force (RAF) officer tasked with reviewing the RAAF at the invitation of Australian Prime Minister, Stanley Bruce—arrived in Australia in 1928, the RAAF comprised two composite squadrons (No. 1 Squadron in Victoria, and No. 3 Squadron in New South Wales), and a seaplane flight (No. 101 Fleet Co-operation Flight in Queensland). With such a small force, a debate over organisational structure would seem academic. However, the interwar RAAF leadership did not ignore questions of structure as they developed plans to expand the force.

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4   C. D. Coulthard-Clark, *The Third Brother: The Royal Australian Air Force, 1921–39* (North Sydney, NSW: Australia: Allen & Unwin, 1991), p.33.

5   ibid., p.42; Steve Campbell-Wright, *An Interesting Point: A History of Military Aviation at Point Cook 1914–2014* (Canberra: Air Power Development Centre, 2014), p.81.

In his 1925 *Memorandum Regarding the Air Defence of Australia*, then-Wing Commander Richard Williams described the force he believed necessary to counter a Japanese seaborne threat, which he presciently identified as Australia's primary threat.[6] Williams's proposed force was unrealistic: thirty squadrons comprising 324 aircraft was a massive increase from the two squadrons and 60 aircraft that existed at the time of his memorandum.[7] The structure that Williams proposed mixed mobility of strike capabilities with geographic stability for army and naval support capabilities as the key to a balanced yet effective force. A 'mobile force of *5 bombing* squadrons' would provide Australia with the ability to attack a potential enemy 'at sea long before he reaches the coast and … make possible the attack of those units now otherwise easily attacked by surface craft, namely, his aircraft carriers and transport.'[8] Meanwhile, six co-operation squadrons would work closely with the main army units, detached forces, and Australia's coastal defences to support Army and Navy operations.[9] How these forces would be commanded in wartime was not clear in the document; however, Williams's development plan envisaged the formation of a 'Wing Headquarters' in New South Wales, Queensland, and Western Australia, with RAAF Headquarters remaining in Victoria. This structure suggests a geographic division of command with various wing headquarters being responsible for operations occurring within their area of responsibility.

Despite his detailed and sound justification, Williams's goals were overly ambitious, and his ideas did not get further than the sub-committee of the Council of Defence appointed to review the document after it was tabled. The force recommended by the sub-committee closely resembled that which existed at the time of Salmond's review in 1928. The sub-committee recommended expanding the RAAF to six squadrons with two independent flights split between Victoria and New South Wales, to be achieved by 1929.[10]

Not much changed in RAAF force structure, composition, or size until the second half of the 1930s when events in Europe and Asia forced the Australian government to increase its expenditure on defence. For the RAAF, this investment saw the number of aircraft increase from 67 in 1935 (only seven more than in 1925) to 107 in January 1939.[11] The organisational structure also incrementally shifted. RAAF Headquarters would continue to exercise control over RAAF activities, but instead of a wing headquarters, a group headquarters would be established, reflecting the growth in size and diversity of platforms envisaged through the planned investment—the RAAF was planned to grow to 17 squadrons with 198 aircraft.[12] The outbreak of war derailed this planning.

World War II

When the Menzies Government declared war on Germany on 3 September 1939, the RAAF had 12 squadrons operating out of five stations (Point Cook, Laverton, Richmond, Pearce, and Rathmines). The Air Board in Melbourne directly controlled the squadrons.[13] On 20 November 1939, No. 1 and No. 2 Operational Groups (OG) were established in Victoria and New South Wales respectively to decentralise the RAAF's organisation and manage the rapid expansion of the force. The OGs were responsible for controlling air operations in their respective areas—an approach in-line with that proposed by Williams a decade earlier—except for army or navy cooperation training and 'defence of trade' operations that were to be centrally controlled by RAAF Headquarters.[14] However, these groups were short-lived. Beginning in March 1940, the OGs gave way to

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6   National Archives of Australia: A664, 449/401/2A, Memorandum regarding the Air Defence of Australia, 1925, p.10.

7   Alan Stephens, *The Royal Australian Air Force*, The Australian Centenary History of Defence, Volume 2 (South Melbourne, Australia: Oxford University Press, 2001), p.44.

8   ibid., p.11.

9   ibid., p.10.

10   ibid., p.3.

11   Coulthard-Clark, *The Third Brother*, p.472.

12   Douglas Gillison, *Royal Australian Air Force, 1939-1942*, Volume 1, Series 3 Air (Canberra: Australian War Memorial, 1962), p.47.

13   Stephens, *The Royal Australian Air Force*, p.111.

14   Gillison, *Royal Australian Air Force*, p.67; Stephens, *The Royal Australian Air Force*, p.111.

Area Commands that assumed responsibility for all operations in their respective region.[15] By January 1942, responsibility for Australian air operations had been divided between Southern, Eastern, Western, North Western, and North Eastern Area Commands as shown in figure 2 below.

Figure 2: The RAAF's wartime area commands[16]

The Area Command arrangements in place by January 1942 marked the high point of the RAAF's geography-centric approach to organisational structure. Wartime historian, Douglas Gillison, describes the role of the Area Commands in his official history of the RAAF during the period 1939 to 1942:

> These areas had three basic defence tasks within their geographical boundaries: protection of naval, military and air force equipment and installations and all other vulnerable national centres against enemy air attack; protection of sea communications, including surface vessels, against submarine attack; reconnaissance of sea areas and enemy bases to provide Intelligence [sic] of enemy activity. If an attack was imminent, the air officer commanding in the area concerned was to assume operational control of all RAAF formations and units within that area.[17]

In modern parlance, the air officer commanding each area had operational control of RAAF assets supporting joint operations in his area. This structure was defensive and static, not a structure for taking the fight to the enemy.

In late 1942, the Allied Air Force organisation changed substantially after United States Army Air Forces' General George Kenney, assumed command the allied air forces in the Southwest Pacific Area. The formation in late September 1942 of RAAF Command under Air Vice-Marshal William Bostock to control RAAF operations attracts most of the attention when discussing this period, particularly in light of the RAAF command scandal that it caused. However, it was the earlier formation of No. 9 OG on 1 September 1942 that was more significant to the debate on operational structure.

No. 9 OG combined RAAF units operating in New Guinea with the intention of creating a mobile strike force.[18] The group brought together flying, logistics, medical, construction, and radar units into a single

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15   Gillison, *Royal Australian Air Force*, p.92.

16   ibid., p.386

17   ibid., p.92.

18   ibid., p.588.

integrated command that could move as the war progressed. According to former RAAF Historian, Alan Stephens, No. 9 OG 'was envisaged as a highly mobile offensive force capable of moving forward rapidly in leaps of about eight hundred kilometres.'[19] By creating No. 9 OG and placing it under the command of Headquarters Allied Air Force rather than the under RAAF Command, which exercised command over the Area Commands, the RAAF leadership acknowledged that the existing geographic method of command was not conducive to the type offensive operations needed to win the war.

By mid-1943, No. 9 OG consisted of 3614 personnel across four wings comprising: 'nine operational squadrons and a torpedo-bomber detachment, one transport squadron, one rescue-and-communication unit, three fighter sectors, four operational base units, two medical receiving stations, and seven works unit.'[20] No. 9 OG was larger than the entire RAAF had been only four years previously. During those four years, the RAAF had managed to expand, adapt, and project Australian air power in previously unimagined ways. Even William's idealistic vision of 1925 did not venture to propose a mobile air-combat capability that the No. 9 OG structure demonstrated.

As the war progressed, No. 9 OG lost its focus on mobility and transitioned into a New Guinea-based area command. Its successor in the mobile strike role was No. 10 OG. Formed initially as a subordinate group to No. 9 OG on 13 November 1943, by late 1944, No. 10 OG had grown large enough to warrant being redesignated as the 1st Tactical Air Force (1st TAF); its workforce strength was 21 893 by June 1945.[21] The RAAF's senior operational commander at the time, Air Vice-Marshal Bostock, regarded the role of 1st TAF to be 'the fast-moving, hard-striking formation of the RAAF'.[22] Accordingly, he warned against incorporating 'static' units into its organisation as this would detract from its mobility. As a result, by war's end, the RAAF had evolved into a hybrid organisational structure that mixed the mobility of 1st TAF with the static, geographic focus of Australia's area commands, No. 9 OG in New Guinea, and, from July 1945, the short-lived, Morotai-based No. 11 OG.

A final, often overlooked aspect of Air Force structure during World War II was the functional groupings of domestic training and maintenance roles. Nos. 1, 2, and 3 Training Groups, and Nos. 5, 6, 7, and 8 Maintenance Groups were established in 1942 to administer training and maintenance in their respective geographic areas. Although nominally a functional structuring of units, the Air Board was explicit in stating their intention to establish the groups 'on a broad geographic basis.'[23]

Post-War

This hybrid structure was suited to managing the training, maintenance, and operations of a force of 173 622 personnel, in 570 units, operating 5260 aircraft, across the Southwest Pacific Area.[24] It was so successful that it was refined and further developed to become the foundation for the post-war force despite the substantial change in force composition and size resulting from the massive reduction in the RAAF following demobilisation.

Plan D, the RAAF's plan for its post-war force, incorporated the lessons learned about force structure during the war and applied them to the perceived requirements of the emerging strategic environment of the Cold War. The post-war force developed along three broad functional lines: an operational force, a training organisation, and a maintenance organisation.[25] The operational force was further divided into a static 'Home Defence' component, and a 'Mobile Task Force' (MTF), a blend of geographic stability and operational mobility.

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19 Stephens, *The Royal Australian Air Force*, p.144.

20 George Odgers, *Air War Against Japan, 1943-1945*, Volume 2, Series 3 Air (Canberra: Australian War Memorial, 1957), p.35.

21 Odgers, *Air War Against Japan*, p.477.

22 Odgers, *Air War Against Japan*, p.298.

23 Directorate of History-Air Force [DH-AF]: Air Board Agenda 3944, Proposed Organisation of the Royal Australian Air Force to Meet Expansion Approved by the War Cabinet on 2nd March 1942.

24 Stephens, *The Royal Australian Air Force*, p.173.

25 DH-AF: Air Board Paper No. 906, Role, Composition and Employment of the RAAF, 1 March 1948, p.1.

The Home Defence component was structured around the five area commands created in 1942. Within each, the Area Headquarters was responsible for air defence, maritime reconnaissance, and training; maintenance was managed centrally by Maintenance Group Headquarters located in Victoria.[26] The Home Defence Force was a hollow force, being split into five areas comprising a paltry four-fighter squadrons (all part of the Citizens Air Force—now called Reserves), a general reconnaissance squadron, a survey squadron, a target-towing squadron, and a 'wing' for search and rescue.[27] This was a home defence capability in name alone.

The heart of the RAAF's operational capability was to be the MTF. The force nominally comprised a bomber wing of three squadrons, a fighter wing of two squadrons, a transport wing of two squadrons, and a single tactical reconnaissance squadron. Its role was to maximise the flexibility and responsiveness of air power by providing a tailored force package to meet the requirements of any given situation, such as, the reinforcement of area commands or an expeditionary type operation. The MTF was a continuation of the expeditionary air force capability embodied in the 1st TAF, a 'miniature Air Force capable of limited operations across the spectrum of air power missions'.[28]

Organisationally, the MTF was designed for flexibility and interoperability, and to exercise national command in conducting independent operations if required. The RAAF explained the MTF concept to the government as:

> A group of task force elements which in an emergency can be organised with suitable supporting ancillaries and headquarters in order to provide a force for employment for strategical purposes and in air support of other services.[29]

The rationale behind the creation of the MTF provides insight into the thinking of the RAAF's post-war leadership, as described in a 1948 Air Board Paper:

> The home defence organisation is designed to afford protection against sporadic raids and a light scale attack—a continuous threat in the form of warfare now visualised. It is, however, manifestly impossible and undesirable to immobilise a large number of operational units in defence of the many points in Australia territories against which attacks can be launched. *Nor is such a course necessary if the flexibility of Air Power is fully exploited*. Furthermore, the Air Staff conception of the defence of Australia is to reach out with the Air Striking Forces to attack and destroy an enemy's war potential to prevent a serious threat developing against Australian territory or her vital interests. It is the function of the Mobile Task Force … to provide the Air Striking Force for use from bases overseas or on the mainland of Australia as the situation may require.
>
> The composition of the force would vary based upon the nature of the task, the strength of enemy forces, and other relevant factors. However, for the range of tasks confronting a modern air force, it will usually be found that a balanced force will be comprised of Heavy Bomber, [long range] Fighter, Strategical Reconnaissance, Transport and ancillary units.
>
> The tactical unit is the Wing. It will be so organised, equipped and trained as to be able, by virtue of air bases and services provided, to concentrate at the vital time and place for the execution of the range of operations within its role.[30]

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26   DH-AF: Air Board Paper No. 921, RAAF Organisation for Operations, 14 April 1948, p.1.

27   DH-AF: Air Board Paper No. 906, p.2.

28   Christopher McInnes, 'Controlling Australia's Air: Royal Australian Air Force Air Superiority Ideas and Practices, 1946-1988', Unpublished Honours Thesis (University of New South Wales, 2002), p.26.

29   NAA: A5954, 1844/6, Five Year's Defence Programme. Royal Australian Navy and Royal Australian Air Force, 'RAAF Programme 1947/48-1951/52: Plan D', 1947, quoted in McInnes, 'Controlling Australia's Air', p.26.

30   DH-AF: Air Board Paper No. 921, p.2.

The role and relative importance of the wing as the tactical unit for mobile operations has been a feature of RAAF structure considerations since the earliest days of the war. During the interwar period, the wing provided a high-level distributed management function for geographically dispersed units. Wartime experience using wings to integrate diverse air power capabilities to achieve operational effects led to an evolution in the RAAF's understanding of the potential of wings as a way of organising. As the paragraph above highlights, during the immediate post-war period, the RAAF came to view the wing as being central to the operational effectiveness of Australian air power. While the wing's role has changed in the contemporary RAAF (as discussed below), it is worth highlighting this earlier perspective as it is relevant to discussions on future force-structure.

Whereas the MTF was never deployed as a formed unit, the RAAF did use the organisational logic that underlay it.

On 30 June 1950, the Australian government committed No. 77 Squadron to support the United Nations' response to North Korea's invasion of South Korea. No. 77 Squadron was placed under the operational control of the US Fifth Air Force and began flying operations on 2 July 1950. The RAAF leadership acknowledged that managing the various aspects of deployed wartime operations placed an unnecessary burden on the squadron. Accordingly, on 20 October 1950, No. 91 (Composite) Wing was formed in Japan 'with a view of relieving No. 77 Squadron of the responsibility for providing base maintenance and similar services'.[31] The structure and command arrangements put in place for No. 91 (Composite) Wing reinforced their tactical and support role of the wing during this period.

At formation, No. 91 (Composite) Wing comprised a headquarters element, No. 77 Squadron, No. 30 Communications Flight (which included two Dakota and two Auster light aircraft and would eventually become No. 36 (Transport) Squadron), No. 391 (Base) Squadron, and No. 491 (Maintenance) Squadron.[32] Command and control of the wing and its component squadrons differed. The wing, minus No. 77 Squadron, was placed under the operational control of British Commonwealth Forces Korea, with the wing headquarters exercising operational control of Nos. 36, 391, and 491 Squadrons. No. 77 Squadron, though under the administrative control of Headquarters No. 91 (Composite) Wing, was under the operational control of the US Fifth Air Force.[33] Splitting command and control relationships in this way is an approach that modern airmen on operations are comfortable with as it reflects the distinct but equally necessary roles of sustaining air power and employing it.

The wing structure was also used in deploying RAAF fighters to Malta in 1952. In the early 1950s, the Australian government was pressured by the British to provide forces in support of the defence of the Middle East. With Australian forces committed in Asia, there was little capacity to deploy a large force to the Middle East. Instead, in March 1952, Prime Minister Robert Menzies announced the deployment of No. 78 (Fighter) Wing to Malta.[34] The wing, comprising Nos. 75 and 76 (Fighter) Squadrons, No. 378 (Base) Squadron, and No. 478 (Maintenance) Squadron deployed in July 1952. The wing was placed within the RAF's No. 205 Group, with control of all wing components exercised by the British Commander-in-Chief Middle East, through Headquarters Middle East Air Force.[35] Unlike No. 91 (Composite) Wing in Korea, No. 78 (Fighter) Wing operated within a unified command and control arrangement.

Though command lines varied between the Korean and Middle Eastern deployments, both Nos. 91 (Composite) and 78 (Fighter) Wings were examples of the operational employment of the MTF construct, albeit on a smaller scale than envisaged in Plan D. These were not the only examples. In July 1950, No. 90

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31 NAA: A11268, 9/5/AIR, [No. 91 (Composite) Wing] - Historical Notes, 1954, p.2. This file was identified and provided by Mr. Martin James, the RAAF Historian.

32 Robert O'Neill, *Australia in the Korean War, 1950-53*, Volume 2, Combat Operations (Canberra: Australian War Memorial, 1985), pp.314-315.

33 NAA: A11268, 9/5/AIR, p.2.

34 Alan Stephens, *Going Solo: The Royal Australian Air Force, 1946-1971* (Canberra: Australian Government Publishing Service, 1995), p.203.

35 Stephens, *Going Solo*, p.204.

(Composite) Wing, comprising Nos. 1 (Bomber) and 38 (Transport) Squadron was established at then-RAF Base Butterworth to maintain some degree of Australian control over RAAF operations in Malaya.[36] In each case, wings deployed with the capabilities—airbase support, maintenance, administration, and transport—needed to meet their tasked requirements. This approach to self-contained expeditionary air operations remains a feature of Australian expeditionary air power, even though the concept of an MTF has since passed into the history.

Although inventive, the Home Defence and MTF delineation was short-lived in practice. Except for those forces deployed on operations, most operational units were assigned to the MTF but operated out of airfields in Queensland and New South Wales, effectively placing them under Eastern Area Command, thereby giving 'Eastern Area the status of de facto operational headquarters.'[37] At the same time, training activities were concentrated in the Southern Area leading to that headquarters becoming training-focused. Organisational pragmatism led to training units within the Eastern Area being placed under the command of the Southern Area, and operational units overseas reporting to Eastern Command.[38] This slow divergence of organisational reality from the RAAF's plan, coupled with the retirement in 1952 of Air Marshal George Jones (who had been Chief of the Air Staff [CAS] since 1942 and an architect of the Area Command system), and the arrival of Air Marshal Sir Donald Hardman of the RAF to assume the role of Chief created an opportunity for change. It would take Hardman a year to implement his construct.

The Hardman Reforms

When Hardman assumed the position of CAS, the RAAF organisation was in disarray. The MTF and Home Defence force continued to exist in theory, but were managed through geographic commands.[39] However, Southern and Eastern Area Commands, were acting as functional commands. In a memo to the Air Board, Minister for Air, William McMahon, pointed at this confused situation stating: 'We should make up our minds one way or the other which system we wish to adopt'.[40] Hardman advocated a functional system and set about formalising an organisational shift along functional lines. The new structure was in place by 30 June 1954, though the refinement of command delegations continued until the end of September.[41] Hardman's reforms aimed to fulfil four requirements: 'provide for the higher direction of the Air Force; manage the air defence of Australia and any overseas commitments; successfully recruit and train personnel; and supply high-quality logistics'.[42] This effect was to be achieved through creating three functional commands: Home Command, Training Command, and Maintenance Command.

A limitation of the pre-Hardman organisational structure had been that the geographic division of the force reduced the benefits gained through conducting 'Australia-wide tactical exercises undertaken by operational units'.[43] According to Hardman, the creation of Home Command would enable the capabilities to be concentrated so 'their effort would be standardised under one Commander and his staff, who would be able to achieve a greater degree of efficiency than has hitherto been possible, in all aspects of operations'.[44] This peacetime structure, Hardman argued, would benefit the RAAF in a war as it would condition Australian forces

36   Stephens, *Going Solo*, p.247.

37   Stephens, *Going Solo*, p.73.

38   DH-AF: Air Board Agenda No. 12375, Command Structure – Delegation of Responsibilities, 2 July 1954, p.5.

39   In October 1952 the Air Force Programme 1952/1953 still divided the composition of the Air Force between Home Defence and the Mobile Task Force, refer DH-AF: Air Board Agenda 12345, Revised Estimates 1952/53–Organisation of the RAAF.

40   DH-AF: Air Board Agenda 12286, Command Organization. Memorandum from Minister for Air, 12 November 1951.

41   DH-AF: Air Board Agenda 12375, Command Structure–Delegation of Responsibilities, 23 June 1954; Stephens, *Going Solo*, p.76.

42   Stephens, *Going Solo*, p.75.

43   DH-AF: Air Board Agenda 12375, Basic Organisation of the RAAF, 20 May 1953, p.3.

44   ibid., p.5.

to operate under a single operational commander, something that had been lacking since the disbandment of the 1st TAF in 1946.[45]

Hardman's restructure was a significant, but not a revolutionary step for the RAAF. Although the high-level commands were functional, the actual conduct of training and operations remained geographically focussed. Within Home Command—renamed to Operational Command in 1959—squadron commanders reported to the Officer Commanding (OC) the base on which they were operating; each base OC was referred to as a 'formation commander'.[46] This structure reflected a shift from the wing as a tactical unit, as described by the Air Board in 1948, to a managerial construct. The focus of the wing was not to conduct air operations, but to manage a peacetime base, a subtle but significant distinction. Resolving this double focus would organisationally challenge the RAAF leadership for nearly 40 years.

This functional/geographic approach bore some similarity to the structure Hardman was familiar with in the RAF. But differences in size, geography, and operational deployments between the United Kingdom and Australia meant that what worked for the RAF may not suit the RAAF. Domestically, the RAF operated multiple bases each nominally connected with a functional command—Fighter, Bomber, or Coastal Command. Deployed RAF forces generally fell into geographically defined 'Air Forces', such as, the Middle East or Far East Air Forces. Unlike the RAF, the size of the RAAF precluded it creating functional commands aligned to air power roles. Hardman's functional division between operations, support, and maintenance was too broad. The benefits that unity of command at the operational level aimed to achieve were lost at the tactical level as bases became fiefdoms for individual capabilities.

This command arrangement was inefficient as non-specialist commanders were expected to control highly technical and unfamiliar capabilities without managing nor standardising like capabilities operating from different locations. Both outcomes resulted because formation OCs became like 'feudal warlords as they commanded all on their base, regardless of [the OC's] background of the type of aircraft under their command'.[47] Consequently, in 1969, SP-2H Neptunes from No. 10 Squadron and P-3B Orions from No. 11 Squadron that deployed to RAAF Richmond to conduct anti-submarine warfare training with the Navy off the East Coast would be commanded by OC RAAF Richmond, nominally an air mobility base. Standardisation across the geographically dispersed squadrons was lacking, and what the formation commander contributed added little beyond what logistics and base support required. This arrangement worked: deployed exercises bringing together geographically dispersed squadrons were conducted effectively during this period, but it was inefficient.

How this new functional structure influenced the decisions on the organisation of Australian air power during the Vietnam War is unclear. What is clear though is that the RAAF opted for a different approach. The RAAF did not deploy to Vietnam as a wing, and the command and control arrangements under which each of the three operational squadrons deployed (Nos, 2, 9, and 35 Squadrons) differed. Each squadron was placed under the operational control of different organisations. While national command for the Vung Tau based Nos. 9 and 35 Squadrons resided with HQ RAAF Contingent Vung Tau, for No. 2 Squadron, national command was retained at a higher level with the RAAF component of Headquarters Australian Forces, Vietnam. Unlike in the in the period immediately prior to the Koran War, the RAAF's operational air power was more fragmented, reflecting a shift to a plug-and-play approach to integrating with allied operations.

This Hardman approach to organising Australian air power would be reviewed several times from its inception in 1954 through to its replacement by the Force Element Group (FEG) structure in 1987. Home Command

45 Hardman stated that a 'functional organisation is better suited to meet war conditions in that the operational forces of the RAAF in Australia would be under the control of one Commander.' DH-AF: Air Board Agenda 12375, Basic Organisation of the RAAF, 20 May 1953, p.5.

46 Brian Weston, 'Combat Power through Organisation Part 2: The end of Area Commands', *The Central Blue*, 21 January 2018, http://centralblue.williamsfoundation.org.au/combat-power-through-organisation-part-2-the-end-of-area-commands-brian-weston, (accessed 31 August 2018).

47 Mark Lax, Untitled Draft Manuscript of Official History of the RAAF, 1972-1996, Provided to author by Mark Lax on 31 August 2018.

being renamed as Operational Command, and Training and Maintenance Command merging to become Support Command, both of which occurred in 1959 was a minor, mostly cosmetic change.[48] More significant was creating role-specific forces within Operational Command in the 1970s. These forces (Strategic Strike and Reconnaissance Force, Tactical Fighter Force, Maritime Reconnaissance and Surveillance Force, Fixed Wing Transport Force, and Rotary Wing Transport Force) sought to unify geographically dispersed capabilities functionally. However, this was a staff and not a command function.[49] Even though this grouping of capabilities anticipated the creation of the FEGs, the RAAF remained primarily a geographically focused organisation.

The first tremors of a seismic shift in Air Force structure were felt with the Tange Review of Defence in 1973. Although Tange's review focused on the highest levels of the Defence hierarchy, they presaged a shift in attitude towards force integration that would influence most subsequent aspects of the RAAF organisation. Most notable was the rapid proliferation of committees that began to place greater demands on the Chief of the Air Staff (CAS), thus reducing the time available to address day-to-day operational management of the organisation.

In 1978, responding to these challenges, Air Marshal Sir James Rowland, tasked the Deputy Chief of the Air Staff (DCAS), then Air Vice-Marshal Neville McNamara, with reviewing the RAAF's structure. The McNamara Report's recommendations were wide-ranging; many of the 74 recommendations are beyond the scope of this paper. However, one recommendation, which the RAAF did not implement until a decade later, was particularly noteworthy. It concerned the need to de-link operational wings from the bases from which they operated. As McNamara put it, a 'separation between base and wing … meant that our operational elements could go off at any time they wanted and it would not affect the day-to-day running of the base'.[50] McNamara was advocating a return of the operational wing, which would not occur in McNamara's tenure as DCAS, CAS, or even as Chief of Defence Force Staff (CDFS), which ended in 1984.

Significant changes in ADF organisation and RAAF structure began to be implemented soon after McNamara's departed as CDFS. His successor as CDFS, General Sir Phillip Bennett, introduced reforms to improve the ADF's operational focus. The first was renaming the position of CDFS as CDF in October 1984, thus reinforcing the role of CDF as the commander of the ADF and not merely the professional head of the organisation. To further enhance the ADF's operational focus, Bennett directed the creation of 'environmental headquarters', what we would today classify as the domain operational headquarters, to act as operational commanders for each of the services under a 'Joint Force Commander'. These changes were implemented with the creation of air, land, and maritime headquarters in 1985 and 1986.[51] Operational Command would fill this role for the RAAF, becoming the operational command for Australian air power on joint operations.

Force Element Groups

A growing joint and operational focus of the ADF in the late 1980s began to exert pressure on the RAAF to restructure itself to improve its force generation capability. Operational Command's new role as the ADF's air component headquarters, together with growing awareness of the failings of Hardman's hybrid functional-geographic structure to generate air power using increasingly sophisticated systems fostered a willingness to take risk in experimenting with organisational structure. In December 1986, CAS approved a 12-month trial reorganisation of Operational Command into FEGs; the trial was formalised with minor variations in December 1987, with the new structure taking effect on 1 June 1988.[52]

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48   DH-AF: Air Board Agenda 12787, The Composition of the RAAF: 1959/60 – 1961/62, 3 April 1959, p.19.

49   Lax, Untitled Draft Manuscript of Official History of the RAAF, 1972-1996.

50   Neville McNamara, *The Quiet Man: The Autobiography of Air Chief Marshal Sir Neville McNamara.* (Tuggeranong, A.C.T.: Air Power Development Centre, 2005), p. 182.

51   David M. Horner, *Making the Australian Defence Force*, The Australian Centenary History of Defence, Volume 4 (South Melbourne: Oxford University Press, 2001), p.107.

52   Air Force Organisation Directive 5/88: Re-Organization of Operational Command, 26 May 1988, AF86/44801, AB33611571, p.1.

FEGs were designed as 'an intermediate level operational command and control authority responsible to the [Air Officer Commanding Operational Command]'.[53] By grouping platforms based on their role, the FEG structure focused RAAF force generation on developing technical mastery within the specific role-set of each group. Five FEGs comprised the initial structure: Air Lift Group (ALG), Maritime Patrol Group (MPG), Strike Reconnaissance Group,[54] Tactical Fighter Group (TFG), and Tactical Transport Group (TTG).

Wing's also changed their role under this new structure. Subordinate to each FEG was a Base Support Wing associated with the Group's main operating base, and an operational wing combining maintenance, training, and operational flying squadrons.[55] While the wings' new roles separated the conduct of operations from the running of bases, as McNamara recommended in 1978, this did not mean returning to the 1948 situation of the wing being associated with the MTF. Wings became an intermediate management level connecting squadrons with their group headquarters. Over the next three decades, as individual wings adapted to differing managerial, operational, and organisational requirements across the FEGs, each wing developed a unique character and managerial approach. As a result today, RAAF wings differ significantly such that it is difficult to conceive or define a 'standard wing' that would adequately reflect the current structure. RAAF wings are not tactical units in any meaningful operational sense.

In the 30 years since it implemented the FEG structure, the RAAF has evolved and adapted its structure to fit circumstances. These adaptations have been concerned with composition and naming, with few significant changes in the central design.

The most significant change to the underlying logic that has guided Air Force structure since 1921 began in 1992 with base support wings being transferred from the FEGs to report directly to Air Commander Australia (ACAUST). This was the first time an intentional and deliberate effort was made to dissociate the force generation of air power from the management of air bases. The rationale given for this decision is worth quoting at length:

> Under [the original FEG] organisation the Officer Commanding a Base Support Wing (OCBSW) was placed under the command of the resident [FEG] Commander. However, experience has indicated that the geographical dispersion of FEG units and the presence of major Logistic Command units, as well as the occasional operational deployment and frequent transients, tends to undermine the original operational focus and intention that FEG Commanders be free of the burden of administering a base. Thus, that experience suggests that the original concept of a 'base manager' supporting all his lodgers and transients, irrespective of their parent command, would, in fact, be more effective than the arrangement adopted in [1988] for the evolving circumstances of the RAAF.[56]

The RAAF soon rectified the apparent neglect of the role of air bases in generating air power. A 1993 review advocated creating Air Base Wings (ABW) at operational bases to support air operations. A feature of the ABW construct was that they would use 'a generic organisational model, to enable comparison of like functions between bases, to reduce organisational friction and to minimise the time taken to bring activated bare bases to operating efficiency'.[57] Interestingly, this concept of the wing revisits that described in 1948. The ABW was to be developed to enable rapid concentration of force and to support the range of operations that RAAF

53 Air Force Organization Directive [AFOD] 5/88: Re-Organization of Operational Command, AF86/44801, AB33611571, 26 May 1988, p. 2.

54 The abbreviation SRG is not used in this instance to avoid confusion with Surveillance and Response Group (SRG) that was formed in 2004.

55 The exception was TTG, which did not have an operational wing but was comprised the Air Force' helicopter, Caribou and Airfield Defence Squadrons directly under the Group Headquarters. AFOD 5/88, Annex F.

56 AFOD 8/92: Transfer of Command and Control of Base Support Wings from Force Element Group Commanders to Air Command, AF86/44801 Pt1, AB33713579, 3 June 1992, p.1.

57 AFOD 6/94: Reorganisation of Air Command Base Support into Air Base Wings, AF92/20800 Pt16 (11), AB33740373, 1 June 1994, p.1.

capabilities could be expected to conduct. At the same time, the FEGs' operational flying wings continued to focus on developing stove-pipes of technical excellence with each wing developing their unique organisation characteristics.

The RAAF's attitude towards air base operations appeared to come full circle when it decided in 1996 to reintegrate air-base support functions into the operational FEGs. In that year, command of the ABWs at Williamtown, Amberley, Richmond, Edinburgh, and Townsville was transferred from ACAUST to Commanders of TFG, Strike Reconnaissance Group, MPG, and Operational Support Group (OSG) respectively. Moving the ABWs into the individual FEGs was another short-lived change. In 1998, Combat Support Group (CSG), a new FEG, replaced OSG and consolidated all Air Force's support services (Air Base Wings and Air Defence Wings) into a single specialised group.[58] In forming CSG, the RAAF developed an approach to force generation that separated the geography-centric aspects of domestic air bases from the flexible and mobile aspects of air power without neglecting, at least in theory, the importance of air base operations to air power effectiveness.

The decision to disassociate air bases and flying operations proved prescient. In 1999, INTERFET, the Australian-led operations to stabilise East Timor in the aftermath of the violence of the independence referendum, relied on East Timor's airfields being connected to the international airlift hub in Darwin. As international forces deployed into East Timor, Expeditionary Combat Support Squadrons were deployed to operate East Timorese airfields. Additional staff from an Expeditionary Combat Support Wing were integrated into the headquarters of a nascent Air Component. The role of the combat support personnel and the capabilities they brought with them were not the conduct of flying operations but the establishment and maintenance of an airhead in the area of operations. Flying operations were the responsibility of a Combined Airlift Wing operating out of RAAF Darwin. Though the INTERFET Air Component generated the tasking for the Combined Airlift Wing, the Air Component did not directly control the airlift wing itself.[59] The functions of combat support and airlift were divided but effective, highlighting the benefits of tactical excellence gained through a stove-piped focus on the functional role.

The INTERFET operation is unique in Australian air power history as the RAAF was the lead air force for a major coalition operation. Fortunately, INTERFET was able to secure East Timor with relatively limited violence and thus the ADF's leadership of the operation was not tested by the rigours of combat air operations or attacks against operating bases. While the stove-piping of functions described above functioned smoothly and thus efficiently during INTERFET, the lack of a unified air power organisation may have created unnecessary friction had combat operations been necessary. While the RAAF should learn from the successes of East Timor, it should also heed Graeme Dobell's caution that 'the lesson to take from East Timor in 1999 was not how well it ended, but how dangerously it started'.[60]

Changes to FEG nomenclature and composition, such as creating CSG, were important and consequential as they reflected changes in both RAAF capabilities and its approach to integrating them. With the loss of Australia's battlefield helicopters to Army, the RAAF disbanded TTG in February 1991 and combined its Caribou squadrons into No. 84 Wing, a component of OSG.[61] This arrangement was short-lived, with No. 84 Wing being transferred, in October 1991, from OSG to ALG thereby centralising all fixed-wing air mobility under a single operational commander.[62] In 1996, the decision to shift the RAAF's air surveillance and control capabilities from an 'air defence' to an 'air battle management' focus saw RAAF air traffic control integrated

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58 AFOD 1/98: Formation of Combat Support Group, CAF 98-8099 Pt1 (9), AB33876094, 29 May 1998.

59 Stewart Cameron, 'INTERFET: Intervention in Timor, 1999', in *Air Expeditionary Operations from World War II until Today*, ed. Keith Brent (Proceedings of the 2008 RAAF History Conference, Canberra: Air Power Development Centre, 2008), 113–25, p.116.

60 Graeme Dobell, 'The "Arc of Instability": the history of an idea', in *History as Policy: framing the debate on the future of Australia's defence policy*, ed. Ron Huisken (ANU E Press: Canberra, 2007), p. 100.

61 AFOD 2/91: Reorganisation of Tactical Transport Group, AF86-44801, AB33655775, 14 February 1991.

62 AFOD 9/91: Transfer of Command and Control of No 84 Wing from Operational Support Group to Air Lift Group, AF86-44801 Pt3 (2), AB33655776, 29 October 1991.

with No. 41 Wing, its air-defence ground environment wing.[63] Two years later, No. 41 Wing would be removed from TFG and placed under a new Surveillance and Control Group (SCG).[64]

In 2002, a significant shake-up of Australia's air-combat capability occurred when TFG was merged with Strike Reconnaissance Group to create Air Combat Group (ACG). The motivator of this change was then CAF Air Marshal Errol McCormack's frustration with the lack of integration between the RAAF's fighter and strike capabilities.[65] According to McCormack, fighter and strike aircraft would need to collaborate closely if they were to be successful against modern integrated air defence systems. In Australia though, the split of Australian combat air between trike and fighter groups had created organisational cultures that focused on working against rather than with each other: 'The only way to get past this was to put the Hornet and the F-111s together'.[66]

Further changes aimed at preparing the RAAF for introducing new capabilities occurred in 2004 when Surveillance and Response Group (SRG) was formed by merging the maritime capabilities of MPG with the air-battle management role of SCG. The rationale for creating SRG had perhaps been the most forward-focused organisational change instituted by the RAAF:

> The merger of SCG and MPG will place Air Force [Intelligence, Surveillance, Reconnaissance, and Electronic Warfare] ISREW components into a single FEG to develop emergent ISREW capability and to prepare the information infrastructure for the introduction of new systems.[67]

The future focus underpinning the creation of SRG is evident in the organisation directive establishing the group, which talked of needing to prepare to introduce a 'High Altitude Unmanned Aerial Vehicle' (UAV). The ADF's first high-altitude UAV is not planned to reach initial operating capability until mid-2024, two decades after SRG was formed.[68]

Another major step towards aligning the RAAF's organisational structure with its changing force-generation requirements resulted from the creation of Headquarters Joint Operations Command (HQJOC) in 2006. With HQJOC taking sole responsibility for ADF operations, Air Command's role as the command element for air power in the joint force essentially ceased. The CAF's vision for Air Command's role in the post-HQJOC force was as a raise, train, and sustain (RTS) organisation.[69] The most noticeable change resulting from refocusing Air Command's role was to create Air Force Training Group (AFTG) in 2006. AFTG succeeded Training Command, a separate command formed in 1989 by the split of Hardman's Support Command into Training and Logistics Commands. AFTG was now a FEG within Air Command. This shift would also require changes in how the other FEGs viewed their roles within the RAAF and the broader ADF.

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63 AFOD 13/96: Integrated Command and Control for RAAF Air Traffic Control and Air Defence Ground Environment, AF 96/28644 Pt1 (14), AB33759740, 18 December 1996.

64 Brian Weston, 'Combat Power through Organisation Part 4: Evolving the FEG' *The Central Blue*, 14 February 2018, http://centralblue.williamsfoundation.org.au/combat-power-through-organisation-part-4-evolving-the-feg-brian-weston/, (accessed 3 September 2018); AFOD 6/98: Formation of the Surveillance and Control Group, CAF 98-8099 Pt1 (21), AB33877069, 31 July 1998.

65 'A Central Blue debrief with Air Marshal Errol McCormack (Retd.)', *The Central Blue*, 4 February 2018, http://centralblue.williamsfoundation.org.au/a-central-blue-debrief-with-air-marshal-errol-mccormack-ao-retd/, (accessed 3 September 2018).

66 ibid.

67 AFOD 01/04: Formation of Surveillance and Response Group (SRG), and Disbandment of Maritime Patrol and Surveillance and Control Groups, 2004/1000462/1 (2).

68 Andrew McLaughlin, 'Govt announces acquisition of six Northrop Grumman MQ-4C Triton UAS', *ADBR*, 26 June 2018, http://adbr.com.au/breaking-govt-to-announce-acquisition-of-six-northrop-grumman-mq-4c-triton-uas-2/, (accessed 3 September 2018).

69 AFOD 2006-06: Establishment of Air Force Training Group and Transfer of Command Responsibility for Combat Support Units East Sale, Pearce, Williams and Wagga, 2006/1014798/1 (26), AB6656889, 21 November 2006, p.2.

While managing how RTS, force generation, and the conduct of operations relate remains a work in progress for all three services, there have been successes. One stand-out success was the 2014 deployment of the Air Task Group (ATG) as part of Operation Okra, the Australian contribution to the fight against ISIS in Iraq. In the previous deployment of RAAF forces to support operations in Iraq in 2003 (Operations Bastille and Falconer) the organisational philosophy was reminiscent of the Vietnam War deployments. Fighter, transport, and surveillance units deployed as discrete entities, each having their own combat support elements, and each operating as distinct contributions to a diverse range of operations.

Operation Okra, however, reflected a return to the concept of the MTF. The ATG was the first post-war example of Australian air power self-deploying as a self-sustaining unit.[70] Notably, the ATG drew on capabilities from multiple FEGs to generate the force required to conduct operations. Not only were there aircraft from ACG, SRG, and Air Mobility Group (the renamed Air Lift Group), but also from Aerospace Operations and Support Group (AOSG), and CSG. The success of the ATG in deploying three new air capabilities (F/A-18F Super Hornet, E-7A Wedgetail, and KC-30A Multi-Role Tanker Transport) at short notice and to excellent effect reinforces the benefits of the FEG structure in generating tactical expertise, not only for flying operations but also for integrated air-power capability. However, lessons learned from the ATG experience also highlight challenges with the existing structure when it may face emerging operational and strategic challenges. These will be discussed in the following two sections.

Experience gained on operations and in exercises continues to shape the details of FEG structure. Creating the Air Warfare Centre (AWC) out of AOSG was significant for it was the first FEG with the express purpose to integrate the other RAAF FEGs, and to integrate RAAF capabilities with those of the other services.[71] AWC is the first and, to date, only structural change to result from Plan JERICHO, the RAAF's program intended to develop a future force that is agile, adaptive, and truly joint. AWC is also unique among the FEGs because Wings are absent from its structure; AWC is comprised of Directorates. While stipulating the significance of creating Directorates *vice* Wings is difficult because of its relative novelty, it does suggest that the time is ripe for the RAAF to re-examine and redefine the role that wings play in future force structure.

Conclusion

Over the past 97 years, as the RAAF has changed in size, composition, and capability, its leadership has been willing to test new concepts in operational design. At times, the ideas that have guided these concepts have been found wanting, such as Williams's 1925 vision for the air defence of Australia or the post-war MTF. On the other hand, the success of the RAAF's rapid evolution during World War II shows its impressive organisational capacity to adapt when demands are placed on it. The example of World War II is unique, and it would be foolhardy to assume ongoing adaptability based on the performance of an organisation from a different time and context. However, the continual evolution of the FEG structure over the past 30 years suggests that the RAAF's adaptability and willingness to experiment with its design has endured. The difference is that the RAAF has not faced a major operational challenge that has forced adaptation upon it. The RAAF's post-war history has been mostly successful because it has not been placed under significant organisational or operational strain, a situation that the RAAF cannot expect to continue. The question must then be asked: Is the RAAF's structure suited to preparing it for the operational and strategic challenge it now faces?

The next section begins to answer that question by identifying what factors are driving the need for change in the way Air Force structures itself to support its force generation role.

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70   Christopher McInnes, 'The Champion Team to Fight and Win #highintensitywar: The Case for Australian Expeditionary Air Wings', *The Central Blue*, 11 March 2018, http://centralblue.williamsfoundation.org.au/the-champion-team-to-fight-and-win-highintensitywar-the-case-for-australian-expeditionary-air-wings-chris-mcinnes/, (accessed 10 September 2018).

71   Addendum 1 to AFOD 2016-06: Disbandment of Aerospace Operational Support Group (AOSG) and Formation of Air Warfare Centre (AWC), AB31442847, 24 August 2016.

REASONS FOR CHANGE

The world has changed significantly since the RAAF introduced the FEG structure in 1987. In 1986, Paul Dibb, one of Australia's leading strategic thinkers and policy advisors, wrote in his review of Australian defence policy: '*Australia is one of the most secure countries in the world.*'[72] Dibb is no longer so sanguine. In July 2018 he wrote:

> Australia's international security outlook is starting to look very threatening … Events could now become much more serious, much more quickly. More thought should be given to planning for the expansion of the ADF and its capacity to engage in sustained high-intensity conflict in our own defence—in a way that we haven't had to consider for several generations.[73]

Though the RAAF has proactively reorganised the FEGs to meet most of these changes as they occurred, it has not changed their fundamental design principles. The FEGs provide a capability management function for the RAAF to ensure continued tactical excellence in employing sophisticated, state-of-the-art systems. FEGs are not designed to provide an integrated operational command and control capability. The strategic, operational, and technological changes currently unfolding are, however, epochal; rearranging the organisation by moving capabilities between groups, or changing their names is no longer an adequate adaptation strategy. What is needed is to re-evaluate the philosophy that underlies the RAAF's structure.

Three factors motivate the need to review RAAF structure: first, the strategic environment differs substantially from any previously faced by Australia; second, the operational environments in which the ADF will be called to operate are more diverse, dangerous, and complex than any faced since the end of World War II; and third advances in technology are disrupting the traditional views of air power capabilities and their roles. What follows explores these separate but interconnected trends to establish the rationale for change.

Strategic Changes

That Australia's strategic situation has changed dramatically since the late 1980s is indisputable. China's rise, nuclear proliferation, strained international relations, and the continued threat of violent extremism regularly characterise Australia's strategic commentary and media. These threats are well known, well documented, and widely accepted. However, there is more to the current strategic change than just those factors that attract headlines. The changing nature of interstate competition and regional military modernisation are two additional trends that are less widely discussed but which will also shape the demands placed on the ADF. Collectively, these changes in Australia's strategic environment significantly challenge the ADF.

China's economic and military rise has come to define Australia's strategic situation. How Australia balances its economic dependence on an assertive and militarily capable China, with its strategic and security relationship with the United States could determine how and when the ADF is called upon to conduct the sustained high-intensity conflict described in Dibb's comments above. The strategic and military implications for Australia of China's rise have been covered extensively in other publications. To repeat that discussion in this paper does little to help us understand the impact of strategic change on the RAAFs structure. Presently, it is enough to draw readers' attention to the increasing call for the ADF to prepare for the likelihood of a great power conflict in the near-region involving both Australia's primary trading partner and its primary strategic ally.

Other widely-discussed strategic concerns are the development of a North Korean nuclear capability, Russian assertiveness in Europe and the Middle East, the impact of shifts in US foreign policy, and the rise of ISIS and aligned non-state actors in the region. Rather than presenting a direct challenge to Australian security, these issues exemplify the increasingly fraught strategic situation in which the ADF must be prepared to operate.

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72   NAA: K967,8: Review of Australia's Defence Capabilities [Report to the Minister of Defence by Mr. Paul Dibb], .https://recordsearch.naa.gov.au/SearchNRetrieve/Interface/ViewImage.aspx?B=12581224, (accessed 17 August 2018), p.xiv. Emphasis in original.

73   Paul Dibb, 'New security reality demands new Australian policy', *The Strategist*, 23 July 2018, https://www.aspistrategist.org.au/new-security-reality-demands-new-australian-policy/, (accessed 17 August 2018).

Both sides of Australian politics have demonstrated their willingness to deploy the ADF to support Australian strategic interests globally. Accordingly, not only must the ADF prepare for the possibility of high-intensity conflict, but it must also be suitably equipped and trained to execute various 'lower-end' roles, undertaking either or both roles with potentially little notice. The range of operational possibilities for which the ADF must prepare demands greater agility in force structure and employment than previously.

An additional complication is the changing character of strategic competition. Russian and Chinese success in Ukraine and the South China Sea has caused Western states to rethink how they understand competition. As British Director-General, Joint Force Development, Air Marshal Edward Stringer, stated: the revisionist powers, Russia and China, are conducting operations that 'fall short of our definitions of conflict or combat— they would not trigger a military response.'[74] By exploiting the West's 'obsolete peace/war binary conception of the operating environment', potential adversaries have succeeded in presenting the West with a *fait accompli* inimical to Western strategic interests.[75] In response, the United Kingdom, the United States, and Australia have begun to change how they define the strategic environment.

As an alternative to the 'obsolete war/peace binary' understanding of the operational environment, the US Joint Chiefs of Staff (JCS) has proposed a *competition continuum*.[76] This proposal frames the international situation as one of 'persistent competition with peer competitors'.[77] The Australian Army has incorporated this idea into its future statement on *Accelerated Warfare*: 'Our region is becoming increasingly defined by a changing geopolitical order and operating spectrum of *cooperation*, *competition* and *conflict*.'[78]

It is easy to envisage situation in which allied operations in the contested regions of the South and East China Seas escalate rapidly from competitive activities into open conflict; a shift from states demonstrating their presence and exercising freedom of navigation through contested waters, to conducting armed interstate conflict. A history of unsafe intercepts of US aircraft in the South and East China Seas, and the near collision between a United States and a Chinese destroyer in the South China Sea highlight the possibility of miscalculation between those major powers.[79] Given Australia's continued air and naval presence in the South China Sea, which has itself been challenged by the Chinese military, the ADF faces similar risks.

Concern over escalation is not new; 'escalation dominance' has long been a central component of nuclear strategy. What differs today is the potential for catastrophic non-nuclear escalation.

Modern societies rely on access to cyber and space for day-to-day activities. These are two domains that can be rapidly and decisively disrupted. In both, the advantage lies with the initiator of hostilities. In the so-called traditional domains of air, sea, and land, the potential of hypersonic weapons systems to provide survivable, rapid conventional strike against targets anywhere in the world will similarly provide a significant, and potentially decisive first-strike advantage. In a strategic environment where escalation along the continuum of competition can be rapid and decisive, there is a tendency to favour pre-emption and preventative action to ensure a state's first-mover advantage. Such a tendency exerts operational pressures on the ADF of a different quality than those previously experienced.

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74   Edward Stringer, Lord Trenchard Memorial Lecture 2018, speech at RUSI Whitehall, 4 September 2018, https://rusi.org/event/lord-trenchard-memorial-lecture-2018, (accessed 12 September 2018)

75   Joint Chiefs of Staff, *Joint Concept for Integrated Campaigning*, (Washington, DC: Department of Defense, 16 March 2018), p.4

76   Joint Chiefs of Staff, *Joint Concept for Integrated Campaigning*, Washington, DC, Department of Defense, 16 March 2018, p.vi

77   Edward Stringer, Lord Trenchard Memorial Lecture 2018, speech at RUSI Whitehall, 4 September 2018, https://rusi.org/event/lord-trenchard-memorial-lecture-2018, (accessed 12 September 2018)

78   Australian Army, *Accelerated Warfare: Future Statement for an Army in Motion*, (Canberra: Australian Army, 2018), p.1.

79   Andrew Greene, 'Near-Collision of US Warship and "aggressive" Chinese Destroyer in South China Sea', *ABC News*, 3 October 2018, https://www.abc.net.au/news/2018-10-03/south-china-sea-encounter-between-us-warship-and-chinese-vessel/10333096. (Accessed 30 October 2018).

A final trend motivating change in Australia's strategic situation is the ADF's declining technological edge over regional states. Maintaining a qualitative military advantage in the region has been a consistent theme in Australian strategic policy since the 1976 White Paper.[80] While Australia has traditionally achieved and maintained its military advantage by acquiring cutting-edge technology, as the 2016 Defence White Paper states:

> The capability superiority that Australia has traditionally maintained in the wider region will be challenged by military modernisation. Over the next 20 years a larger number of regional forces will be able to operate at greater range and with more precision than ever before.[81]

Regional militaries are not only investing in modernising their traditional military capabilities, that is, aircraft, ships, and combat vehicles, they are also directing efforts into new technological areas. Accordingly, progress quantum technology, artificial intelligence (AI), cyber capabilities, and advanced manufacturing (discussed in further detail below) will not be restricted to one state. In the words of Yale University academic, Professor Paul Braken:

> It follows from the sheer number of new technologies and their spread to many countries and even groups: *the monopoly that major powers once held in advanced military technology has broken down*.[82]

Civilian industry and commercial interests are now in the driver's seat for much cutting-edge technology. With commercial interests driving the development agenda, the ability of the great powers to restrict the diffusion of dual-use technology and the proliferation of their weaponised variants is significantly reduced. As regional countries become wealthier and their populations more educated, they will be more able to engage in independent technological innovation and pursue advanced and disruptive military capabilities. Potential competitors may, in the future, counter Australia's state-of-the-art air power by means of cyber or space denial. Technology is enabling new asymmetries to be developed and exploited faster and better.

Although regional states may not be directing their military modernisation and defence technology programs towards Australia, recent events demonstrate how shifts in domestic politics may lead to significant changes in a state's external relations. For the past 40 years, Australia has relied on its technological edge to provide an asymmetric advantage that could counter any threats that could emerge from any shift in regional attitudes. The rate of technological progress and the potential diffusion of high-tech capabilities means that this is no longer a viable option for Australia. Thus, we must now find other ways to develop and maintain a regional asymmetric advantage. Although pursuing technological solutions will remain essential to Australian defence policy, a solution must also be sought through innovative approaches to the employment of those solution in the conduct of military operations.

The development of regional states' military capabilities also brings opportunities for greater partnership and collaboration, as exemplified by the array of nations participating in the RAAF's Exercise Pitch Black in 2018. The relative decline in US military power and uncertainty over the United States's willingness to lead military operations, together with the growth in the technical and operational sophistication of regional air power suggests that the RAAF needs to be more prepared to lead or, at least, provide a command and control framework, for a coalition air operations in the region. The coalition air component of a regional operation in 2029, or even 2019, would be vastly more sophisticated, diverse, and capable than the Australian-led INTEFRET air component in 1999.

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80   John Hardy, 'Cutting Edge: The Evolution of Capability Advantage in Australian Strategic Policy Discourse, 1968-2009' (PhD Thesis, Australian National University, 2015), p.20.

81   Department of Defence, *2016 Defence White Paper* (Department of Defence, 2016), p.16.

82   Paul Bracken, 'New Technologies and International Order', in *Strategic Latency: Red, White, and Blue: Managing the National and International Security Consequences of Disruptive Technologies*, eds. Zachary S. Davies and Michael Nacht (Livermore, CA: Lawrence Livermore National Laboratory, 2018), 104–14, p.107.

Operational and Technological Change

An often overlooked aspect of the Third Offset Strategy that the Obama administration developed to respond to the relative decline in US military power was to invest in operational concepts that would 'explore how to employ resources to greater strategic effect and deal with emerging threats in more innovative ways'.[83] While the Trump Administration has not continued with the name, the strategy underpinning the Third Offset remains valid and extant. Developing and testing operational concepts aimed to advantage both the US military and the ADF continues, particularly within the area command and control (C2). The rationale for this focus was clarified by Chief of the Staff for the US Air Force, General David Goldfein, in 2017: 'Victory in future conflict … will go to that leader who can control his or her forces to create multiple dilemmas from multiple domain and achieve a decision speed that is able to manoeuvre forces … at a pace … that would overwhelm any enemy on the planet.'[84] The innovative management and use of air power are two ways in which Western air forces, including the RAAF, are adapting concepts to create operational dilemmas for potential adversaries. It is not the technology that is driving operational change, but the way in which airmen are imaging its use.

Goldfein's statement reflects a view, broadly held across Western military forces that the ability to conduct effective multidomain operations well will be critical to future operational success. Within the US military, the term, multidomain, has become the chosen term to describe a range of different but related concepts: multidomain battle, multidomain C2, multidomain manoeuvre, and multidomain operations to name some of the most notable.[85] The ADF has also embraced multidomain operations as a guiding concept. The RAAF's future C2 concept is called 'Agile Multi-Domain Warfare'; similarly, a recent draft concept for the ADF's future C2 concept talks of the need to 'bring integrated, multi-domain effects to bear against the adversary'.[86] Acknowledging the concept is, however, far more straightforward that operationalising it. The concept of multidomain operations significantly complicates how operations are conducted.

For the past three decades, developing as a joint force has been an operational imperative for the ADF. Such progress is exemplified by the transition from single-service operational constructs in the late 1980s to a truly joint force with the creation of Joint Operations Command as the ADF's operational command. However, joint operations are not the same as multidomain ones. Joint merely requires the use of more than one service to conduct operations; integration is preferred, but not assured nor necessarily required. Multidomain operations, by contrast, imply the integrated use of capabilities across multiple domains simultaneously to achieve the desired operational effect. This level of integration involves more than deconfliction or synchronisation: it requires commanders to design, plan, and execute operations in a way that maximises the strengths of individual systems while minimising their weaknesses. This integration depends on the operational context in which multidomain commanders seek to employ the capabilities. Not only does this require expertise in the systems being employed, but it also demands the ability to conceptualise how diverse systems can be integrated across time, domain, and effect. Multidomain integration adds an unprecedented level of complexity into tactical planning, operational art, and the command and control of systems across all domains.

The USAF has acknowledged that developing airmen to command and execute multidomain operations requires expertise developed through focussed training, education, and experience. The requisite expertise cannot be developed through just-in-time training before deployment to an air and space operations centre (AOC). Accordingly, the USAF is creating an operational command and control career field that takes officers from the eight-year mark in their career and trains them to be 'operational warfare specialists'.[87] Although the RAAF is not large enough to create a specialist pool of such specialists, it is exploring the possibility of

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83   Chuck Hagel, *The Defense Innovation Initiative*, Memorandum from Secretary of Defense, 15 November 2014.

84   General David Goldfein, 'Remakrs by Chief of Staff of the Air Force' at the 2017 Air Warfare Symposium, Orlando, FL, 2 March 2017.

85   Michael Spirtas, 'Toward One Understanding of Multiple Domains', *The RAND Blog*, https://rand.org/blog/2018/05/toward-one-understanding-of-mulitple-domains.html, (accessed 1 October 2018).

86   *ADF Concept for Command and Control of the Future Force*, Version 0.2, VCDF Group, 28 September 2018, p.6.

87   Justin Reynolds, 'Multi-domain command and control is coming', *US Air Force News*, 28 September 2018, https://www.af.mil/News/Article/1644543/multi-domain-command-and-control-is-coming, (accessed 7 October 2018)

implementing a multidomain approach in its future command and control systems. As multidomain operations transition from concept into practice, both in the US military and in the ADF, RAAF approaches to force generation will need to adapt. Operations will become increasingly sophisticated as integrating assets across time, space, domain and effect becomes more complex than for previous air campaigns. To succeed in such complicated multidomain campaigns, commanders and operators need to extend their knowledge, experience and expertise beyond their platforms. Fortunately, this should be less challenging for the new generation of airmen who are gaining experience in the next generation of multirole capabilities that are integrated by design.

New generation platforms, such as the P-8A Poseidon and F-35, are changing the mindset of those who fly, support, and task them. The development of the F-35, in particular, is inspiring a rethink of the tactical and operational possibilities of modern air power. As new advanced systems become operational, old labels are losing their relevance in delineating capabilities. One leading industry commentator has asserted that the F-35 will make the label, *fifth-generation fighter*, 'obsolete', claiming that the F-35 should instead be viewed as '*a first generation information and decision making superiority "flying combat system"*'.[88] This shift in thinking is also reflected in the British Ministry of Defence's definition of the term '*combat air*' as:

> An aircraft, manned or unmanned, whose prime function is to conduct air-to-air and/ or air-to-surface combat operations in a hostile and/or contested environment, whilst having the ability to concurrently conduct surveillance, reconnaissance, electronic warfare and command and control tasks.'[89]

Changing the definition of capabilities is more than a semantic exercise; it reflects a fundamental shift in the way airmen think about air power. As computing and software engineering advance and thus force changes air power systems, air power capabilities will become increasingly 'software defined', that is, their capabilities will be defined not by the physical platform but by the software of its mission system. While physical characteristics of aircraft will continue to restrict what different platforms can do, technology will expand the scope of available missions. Fifth-generation systems, such as the F-35, offer more than tactical attributes because they present airmen new possibilities that give scope for innovation. In the words of retired USAF Major General Bob Dulaney: '[The airmen flying the F-35] will find ways to use this airplane in ways that we never envisioned.'[90]

It is not only the aircraft that change the operational employment of air power. Advances in computing, networking, and advanced manufacturing are enabling changes in logistics management. These new approaches to the manufacture and maintenance of aircraft will require adaptation in the way operational commanders and tactical operators manage their logistics chain. Air bases are also changing. RAAF bases are being upgraded to enable them to support the new generation of aircraft. New systems require new security, maintenance, planning facilities, and movement areas. The requirement for logistics and airbase support will create unique operational challenges when the ADF deploys aircraft to operating bases that may not have the same supporting infrastructure.

Finally, intelligence requirements and capabilities are also changing. As the ability to collect data from the battle space and beyond grows, so does the task of filtering, deciphering, interpreting, and analysing data to transform it into useful intelligence. Technology offers the hope of reducing the burden on human analysts. AI particularly has been held up as the solution to the over-saturation that has come to define modern intelligence operations. However, although AI use for intelligence purposes continues to grow, there remains a significant demand for human input. Looking forward, finding the balance in roles and relationships between machine intelligence, human analysts, and the commander will be crucial to improving decision speed and quality.

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88   Emphasis in original. Robbin Laird, 'The F-35 and the Transformation of Power Projection Forces', *The Central Blue*, 19 September 2016, http://centralblue.williamsfoundation.org.au/the-f-35-and-the-transformation-of-power-projection-forces-robbin-laird, (accessed 7 August 2018).

89   *Combat Air Strategy: An ambitious vision for the future*, UK, Ministry of Defence, 2018, https://assets.publishing.service. gov.uk/government/uploads/system/uploads/attachment_data/file/725600/CombatAirStrategy_Lowres.pdf , (accessed 7 August 2018), p.11.

90   John Amble, *All About the F-35*, MWI Podcast, 9 November 2017, https://mwi.usma.edu/mwi-podcast-f-35/.

The possibilities for the future of Australian air power will not be defined solely by the technology of the systems, but also by the ability of engineers, logisticians, operators, planners, and commanders to exploit the possibilities that technology enables. This innovation potential will become increasingly crucial in operations against similar or superior levels of capabilities, not a situation that the ADF has had to face since World War II.

Conclusion

Airmen understand that the strategic situation and the operational environment is changing because they are exposed to daily media reports and, for some, regular intelligence updates. Similarly, they increasingly appreciate the impact of technology on their role in acquiring, managing, maintaining, and employing air power. The RAAF's consistent messaging about its plan to transform into the world's first fifth-generation air force is widely disseminated and accepted by its members. However, intellectually appreciating the reality of change does not necessarily translate into understanding how that change affects the way the RAAF operates. This section has detailed some of the trends that will directly impact on the RAAF and its approach to generating Australian air power. More importantly, it identified the connection between the strategic, operational, and technological factors that need to be considered when discussing future force structure. When this connection is understood, the need for change in the RAAF's approach to its force generation capability becomes clearer.

States are increasingly appreciating the shifting nature of competition and thus shifting their perspectives on the role of military force in the region. When the possibility of miscalculation and escalation along the continuum of competition are viewed in light of the increasing capacity and capabilities of regional militaries, the complexity of the ADF's future operational challenge becomes starker. With a decline in the ADF's technological edge, new approaches must be found that can generate an asymmetric advantage over potential adversaries or capitalises on the opportunities provided by more capable partners. The solution may lie in developing a structure that supports the innovative operational and tactical employment of air power. The next section explores what designs in force structure could be considered to best support the RAAF in maximising air power effectiveness tactically and operationally.

DESIGN CONSIDERATIONS FOR THE FUTURE FORCE

The RAAF has begun to adapt to the changing context described in the preceding section. The *Air Force Strategy*, released in 2017, outlines a plan to transform the RAAF into, what its senior leadership has labelled, a fifth-generation force. Innovating and adapting along five strategic vectors: joint warfighting, people, communication and information systems, infrastructure, and international engagement, will enable the effectiveness and adaptability of the RAAF new capabilities. The vision is broad: Air Force will become a 'fifth-generation Air Force' a fully-networked force that 'will use joint and networked effects to prevail in the complex Information Age'.[91] Detail was added to this vision in a speech delivered by the Deputy Chief of Air Force at the 2018 Air Power Conference that listed the five attributes that will define the fifth-generation air force: the next generation of Air Force will be agile, integrated, resilient, collaborative, and informed.[92] These attributes should determine future force structure design.

The Deputy Chief also clarified his belief that transitioning into a fifth-generation air force 'requires a significant reformation of the Air Force'. The question is, what aspects of the air force's structure need to change and what needs to remain. The RAAF must ensure that it does not negate existing advantages in pursuit of transformation. This paper guards against such an outcome by not advocating for change *per se* but details the design considerations that any future organisation must consider. While some of these considerations are already evident in the existing operational structure, some are not. The challenge for those charged with developing and implementing a future RAAF structure is to ensure that changes balance the advantages of the present structure with those required to meet future demands.

Tactical and Technical Excellence

The RAAF has a reputation for tactical and technical excellence. Operational success in the Middle East, South East Asia and domestically, and the performance of Australian air power in domestic and international exercises have demonstrated that the current approach to force generation produces high-quality air power. Similarly, the blending of technical and tactical mastery in the RAAF's approach to capability development has ensured Air Force continues to operate leading-edge capabilities. Tactical and technical excellence has provided the foundations upon which a fifth-generation air force can be created; any future organisational design must ensure that this quality persists. However, as the character of air power and the operational environment evolves, so too must the RAAF's requirements, both regarding its existing technical and tactical strengths and to meet its operational potential.

Firstly, tactical excellence in future air operations depends upon successfully integrating diverse capabilities across multiple domains. Individual tactical brilliance in the employment of one system will achieve little if that system is not integrated and employed with others. Air forces have faced integration challenges since the earliest days of military aviation; successful integration of aircraft with land forces was one of the primary design considerations for the RAAF during the interwar period. What is changing is the complexity of the integration.

Multidomain operations require more than the ability to communicate and share a common picture across multiple platforms. Mutual understanding and the ability to anticipate actions will facilitate rapid and better tactical decision making. In a strategic and operational environment in which the speed of decision and action continue to increase, the force best able to reduce friction in their operations will enjoy a distinct tactical advantage. Accordingly, tactical excellence in the future force will be determined not by the ability to fly or operate a single system, but by the ability of each system to integrate with systems across a joint, combined, or interagency force. While enabled by integration technology, the way that different capabilities are combined

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91 Air Marshal Leo Davies, *Chief of Air Force Commander's Intent Update 2017* (Canberra: Royal Australian Air Force, 2017), p.3.

92 Air Vice-Marshal Gavin Turnbull, *Air Force Next!* [video], (Air Power Development Centre, 13 April 2018), https://www.youtube.com/watch?v=OlXI8wUUx2Q&feature=youtu.be (accessed 10 September 2018).

and applied to meet operational and tactical requirements will be primarily determined by human creativity and collaboration.

This logic applies to the capability development and management aspects of air power generation. There are two aspects of capability development that the RAAF needs to consider in its organisational design: platform-specific airworthiness, and force-wide operational effectiveness. These aspects should be treated as separate but interrelated in the design process.

Operational and technical airworthiness are essential to air operations and will continue to be a critical consideration when designing the RAAF's structure for the foreseeable future.

Operational effectiveness is more difficult to define than airworthiness. It differs from airworthiness insofar as operational effectiveness focusses on the effect generated by a range of systems rather than managing an individual platform capability. Moreover, operational effectiveness must be assessed relative to external, and often uncontrollable factors, such as emerging threat capabilities or changing geostrategic circumstances. For example, the many different systems that can be employed together or separately to conduct a strike mission means that developing and managing the ADF's strike capability are more complex than managing the airworthiness of the F-35. Managing operational effectiveness requires a broader view of a system then is necessary for managing airworthiness. Moreover, the utility of the ADF's strike systems must be measured against representative threats, which are themselves likely to integrate across through multiple domains.

As the number and sophistication of multirole and multidomain capabilities operated by the three services grows, and as the shared domains of cyber and space become ever more critical to the conduct of operations, the capability development and management aspects of operational effectiveness will become more challenging and complex. To manage this complexity the RAAF's structure should factor in the requirement for integrated capability development that takes the joint force by design approach, thus guiding capability acquisition and the management of in-service capabilities.

The second tactical and technical design consideration involves balancing the development and maintenance of capabilities required along the competition continuum. High-intensity warfare between involving great power demands capabilities developed through sustained, long-term investment in both people and equipment. Preparing for longer term contingencies needs to be balanced with the ensuring continued responsive to tactical tasks at the lower end of the competition continuum. The ADF's extensive involvement in irregular operations in the Middle East has exacerbated the challenge of finding this balance.

The belief that militaries should 'train for high-end activities and adapt to low' is flawed.[93] This adage is based on the premise that the threat of nuclear exchange and continued US military dominance will deter peer actors from engaging in conventional conflict thereby ensuring future conflicts will entail complex irregular warfare.[94] According to this reasoning, investment in developing and maintaining high-end capabilities will be unnecessarily wasteful as, in irregular warfare, 'conventional high-end air and maritime forces will be conspicuous by their non-use'.[95] Because state-on-state conventional conflict is now possible, Australian air power must be ready, both trained and equipped, to conduct it. Developing the skills and capabilities to conduct high-intensity operations in contested air domains requires continually investing in capabilities and training; the RAAF cannot rapidly develop such skills in response to an emerging situation. In contrast, tactical air operations at the lower end of the competition continuum can be effective despite a relative lack of focussed training and capability development dedicated to these types of operations. Preparing for high-end operations does not mean that lower-end missions and capabilities will need to be neglected. It rather acknowledges that the possibility of rapid escalation from competition into conflict requires Australia air power to be prepared to shift rapidly and decisively from low-end competition to high-end conflict. The RAAF's structure thus needs to be designed to ensure an suitable balance between maintaining high-end and low-end capabilities and that

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93   Michael G. Krause, *Square Pegs for Round Holes: Current Approaches to Future Warfare and the Need to Adapt*, Working Paper 132 (Canberra: Land Warfare Studies Centre, 2007), p. 4.

94   ibid., p. 21.

95   ibid., p. 38.

this balance considers the operational effectiveness of the entire force as well as the specific needs of discrete force elements.

The key to maintaining the RAAF's tactical and technical excellence will be finding the balance between individual platform mastery and force-wide operational effectiveness and between the need for high- and low-end capabilities. The RAAF's operational structure is key to finding and managing this balance.

Operational Excellence

Future operational success will depend on the ability of commanders and their staff to integrate and synchronise effects across multiple domains. It follows, therefore, that the RAAF's future success is contingent upon its ability to generate expert multidomain commanders and command teams; this will be a challenge. Air forces have typically focused on perfecting the tactical and operational employment of air power. As Air Vice-Marshal Johnny Stringer, of the RAF recently noted: 'our notion of "air generalship" stops at the boundary of the air component; it is as if we have implicitly accepted that we have not fitted senior airmen for cross-component command'.[96] In the future, excellence in air-centric command will not be enough. If the RAAF wishes to assume a more active role in planning and executing multidomain operations at the operational level of command, it follows that the RAAF must structure itself to enable airmen to develop expertise in operational level multidomain operations. Structuring for operational excellence requires different design than those needed to for tactical excellence.

There are many ways the RAAF can develop operational expertise. Whatever path it chooses, the design must meet three criteria: providing opportunities for operational commanders to practice and refine their command skills in diverse and challenging scenarios; developing battle staff to support the operational commander; and identifying and developing future operational commanders. These three criteria are connected. Training and exercising commanders and their battle staff broadly will support them to develop operational expertise and will also provide opportunities to identify and foster future command talent.

The complexity of modern operations means that the RAAF cannot view operational command as a part-time or secondary duty; it requires focused effort and repeated exposure to develop the skills and confidence of command. In some respects, the complexity of multidomain operations demands a similar level of focused training and development as operations of discrete high-technology systems. To understand how capabilities vary across multiple domains, many of which remain highly classified on a strict need-to-know basis takes time. To learn how to integrate these diverse capabilities to maximise effectiveness in varying operational contexts requires practice. Potential operational commanders must, therefore, be given the time and opportunity to develop expertise through formal and informal means before they are tasked to lead real-world operations.

Command training must be designed to expose commanders to the full range of possible operational scenarios; it must also provide experience in failure. Success is useful for instilling confidence, but it can promote hubris. Failure, on the other hand, promotes agility of mind, creativity, critical thinking, and humility, all attributes required in current and future operating environments. The requirement to experience and learn from failures in operational command highlights another problem with viewing operational command as a pick-up game that can be played by those receiving just-in-time training. If commanders are given limited exposure to operational command before assuming this role in real-world operations, they will have had little time to learn from mistakes, identify where knowledge deficits exist that need to be addressed, and understand how their idiosyncrasies affect their performance in leading complex multidomain operations. Commanders will need to learn these lessons as they go. In the current operational and strategic environment, where decision speed is rapidly increasing, the consequence of command errors can be catastrophic. It is therefore imperative that operational commanders be given the opportunity to learn, practice, fail, and evolve in their role before they are expected to lead real-world operations.

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96   Johnny Stringer, 'Changing Character, Changing Context: Enhancing Operational Airpower Employment in the Royal Air Force's Second Century', *The RUSI Journal* 163, no. 3 (4 May 2018): 36–42, https://doi.org/10.1080/03071847.2018.1 494367, p. 40.

However, success does not merely rest on the skills and experience of one man or woman; operational command is a team sport whose success depends on the ability of a team, including the commander, to collaborate to achieve the required result. Battle staff—those staff officers responsible for providing an operational commander with the information, advice, and support in the exercise of command—will therefore also require to be similarly trained and developed. Command legal, administration, operations, intelligence, and logistics staff play an essential role in the types of information and options that are presented to commanders, how it is presented, and how the commander's direction is communicated to others. A highly-proficient battle staff needs to understand context quickly, identify what information is important and relevant, and how best to provide that information to the commander to facilitate quick and effective decision making. One senior RAAF commander has captured this sentiment well, stating that 'bad decisions are the result of bad staff work'.[97] As with the command skills and expertise described above, operational battle staff cannot learn their skills from a book or in a classroom as part of the professional military education process; they need to be experienced and practised in realistic training scenarios. Such scenarios not only connect theory with practice but also allow the various components within a battle staff to learn from each other and integrate to provide coherent, shared support to command.

The need to build commanders and teams focused on operational command highlights the need for an organisational focus on operational command and control capabilities.

Ideally, commanders and their staff should learn, train, and fight together. Like the operational effectiveness of the force as a whole, the effectiveness of a command team reflects the combination and integration of the various elements; it does rest on any single individual or section. Rather than developing operational expertise through individual mastery as required, command teams should develop as a team. By incorporating team-based training and development for commanders and their battle staff as part of the RAAF's raise, train, and sustain function, the RAAF would reduce the friction and inefficiency often associated with formative stages of team-building. This requirement was alluded to in 2015 by then-Air Commodore 'Zed' Roberton, when remarking on his experience as the first commander of the Operation Okra Air Task Group: 'The Task Unit headquarters formed over there was not stood up before we deployed. In fact, the people hadn't even met. There may be a few lessons there, I suspect, for the way the Air Force exercises.'[98]

Friction within an operational command team can vary, from the seemingly inane to the potentially dangerous. Ensuring information is provided in a way that aligns with a commander's preference is critical in an environment in which briefings and meetings are central to decision-making and the how information is transmitted. Although debates over PowerPoint styles are often the butt of jokes within operational command headquarters, how the battle staff present information to their commander matters.[99] One of the battle staff's core roles is to reduce the cognitive burden on commanders such that they can focus their energies and creativity on higher priority issue. Staff should be aware how commanders prefer information to be presented. They must also understand which decisions need to be made by the commander, when they need to be made, and what important factors underlie those decisions.

Thus, familiarity and trust between commanders and staff are important to building effective command teams. If the vital first days of an operation are marked by a command team still forming, learning, and adapting to a commander's, and each other's cognitive processes, the effectiveness of the force as a whole will be reduced. In high-consequence operations, misinterpretations and mistakes within the command team may prove tactically, operationally, or strategically disastrous. Friction will continue to be a feature of high-tempo, high-intensity conflict; it will strain the operational command and increase the risk of commanders making bad decisions and

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97   Air Commodore, Joe Iervasi, made this statement in his introductory remarks to the staff of the Air and Space Operations Centre upon assuming command as Director General-Air in 2014.

98   Air Commodore Steve Roberton, 'Operation OKRA – A Commander's Perspective' (Air Power Seminar, 15 April 2015), https://www.sldinfo.com/wp-content/uploads/2016/04/OpOKRA_Transcript.pdf, p.8

99   Elisabeth Bumiller, 'We Have Met the Enemy and He Is PowerPoint', *The New York Times*, 26 April 2010, https://www.nytimes.com/2010/04/27/world/27powerpoint.html.

battle-staff disseminating misinterpreted direction. In contemporary strategic and operational environments, any friction, no matter how seemingly insignificant, could distinguish success and failure.

Finally, the creation of an organisational structure that supports the training of operational commanders and their battle staff provides an opportunity to identify those with potential for command. Tactical mastery and operational command potential are distinct though related qualities, which makes identifying future command talent difficult. Training evolutions designed to develop and test the capacity of command teams among the range of possible operational scenarios will test the agility, creativity, and critical thinking of tactical operators assigned to battle-staff positions. As those with the attitude and aptitude required to succeed in operational command positions are identified, the creation of structures and personnel management policies that support their ongoing professional development and mentoring in this role will, over time, increase the quality of the RAAF's operational commanders. In this way, changes in the RAAF's organisational design will address the concerns raised by Stringer's quote above and prepare airmen to lead and excel in multidomain operational command.

Conclusion

The RAAF's future success will depend on its ability to balance the need for tactical, technical, and operational excellence. While these three qualities are related, creative design is needed to ensure that the organisation does not pursue one quality at the expense of the others. Developing tactical and technical mastery will continue to challenge the RAAF, as the complexity of individual systems increases and the demands for tactical integration across systems, services, and domains pushes the definition of technical mastery beyond an individual platform to encompass force-wide integration. But this is an area in which the RAAF is traditionally comfortable as an organisation. It is adapting to the complexity of tactical operations by creating the Air Warfare Centre and emphasising realistic and challenge tactical training. Then-Group Captain Rob Denney, reflected on this adaptation as when discussing recent changes made in Exercise *Pitch Black 2018*:

> It is not like the old days where we had an over-arching narrative that drove the day-to-day exercise. It was more about – here is a mission for today. There isn't a giant strategic context behind it. By doing that we find we can create better missions. You can plan and structure them ahead of time.[100]

Developing operational command capacity and talent is more problematic as it requires a shift in thinking beyond the RAAF's technical and tactical comfort zone, to integrate and apply air power in multidomain operations. The RAAF has isolated tactical training from the 'over-arching narrative' and the 'giant strategic context' precisely because the challenges and complications, or friction, that they generated detracted from tactical training outcomes. However, because real-world operations cannot be so isolated, the RAAF must build the skills and capacity to apply tactical excellence in the real world.

While this shift in mindset is significant, the RAAF can approach the expertise in the operational realm in a similar way used to develop technical mastery. Training, exercises, mentoring, and repeated exposure to complex mission and operating environments are the hallmarks of the RAAF's approach to developing tactical mastery. As technology enables the realistic simulation of operational scenarios, and the ADF continues to develop operational concepts and exercise programs, opportunities will increase to apply the Air Force approach to technical mastery to operational command team development. The RAAF must ensure that its structure capitalises on this opportunity and meets the challenge of developing strong multidomain operational command teams.

While structure will provide the framework within which the RAAF can develop the desired organisational attributes, structure alone will not create them in the force. People, as individuals and in teams, will play a crucial role in the organisation's success. Accordingly, education and personnel management policies will also need to be developed and refined as the organisation seeks to develop Australian airmen to perform within the

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100 Max Blenkin, 'Demanding Scenarios and Uncrowded Airspace-Exercise Pitch Black 18', *Australian Aviation*, 27 October 2018, http://australianaviation.com.au/2018/10/exercise-pitch-black-18/ (accessed 29 October 2018)

tactical and operational levels of warfare. While education and personnel management are beyond the scope of this paper, if the RAAF changes its organisational structure, it is imperative that other areas of organisational policy be reviewed and modified as required to maximise the benefits gained by shifts in the RAAF's approach to developing its professional mastery.

CONCLUSION

Change should never be pursued for its own sake. In an age where innovation has become a buzzword for progress, there is temptation to throw out the old and replace it with new without duly considering what the future truly requires. The history of the RAAF's organisational structure demonstrates a willingness and ability to experiment with and develop different structural approaches to meet the demands of situations within the constraints of resources, geography, personnel, and capability. The latest expression of this experimental approach, the FEGs, has served the RAAF well for the past 30 years. The FEG structure has shown not only an ability to generate high-quality air power across all air-power roles, but also a degree of adaptability in meeting new challenges and capitalising on new opportunities. But the world has changed since the FEG structure was implemented in 1987; the assumptions that underlie the RAAF's operational structure must be reviewed and updated.

The strategic, operational, and technological landscape continues to change. This paper has thus not advocated any specific, concrete structural ideas to guide future RAAF force generation. Instead, it has focused on identifying broad trends that will influence the future character of and requirements for Australian air power. From these trends, the paper has identified and described a set of design criteria that should influence any discussion about the future of the RAAF's structure. There will be other factors and considerations that have not been mentioned in this document but should also inform the discussion that must be had. It is now up to the reader and those with whom they may engage to identify these factors, assess their significance, and use them to develop the RAAF's future structure.

This paper opened with a quote from Richard Rumelt, a professor of business strategy at UCLA: '[p]erformance is the joint outcome of capability and design.'[101] The RAAF has invested heavily in developing its capabilities to the extent that, by 2025, the RAAF will be one of the world's most capable air forces. The challenge now is for it to ensure that its organisational design matches the capabilities of its systems and people with the emerging strategic and operational reality. There is no perfect nor enduring solution to this complex challenge; the RAAF's structure will need to evolve as changes in the strategic, operational, and technological context continue to unfold. The key to the RAAF's future success as the provider of air power in the joint force will be its ability to adapt its people, systems, and structure to capitalise on the opportunities and meet the challenges of the future.

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101 Rumelt, *Good Strategy, Bad Strategy,* p. 133

ACRONYMS

ABW	Air Base Wing
ACAUST	Air Commander Australia
ADF	Australian Defence Force
AFTG	Air Force Training Group
AI	artificial intelligence
ALG	Air Lift Group
AOSG	Aerospace Operations and Support Group
ATG	Air Task Group
AWC	Air Warfare Centre
C2	command and control
CAS	Chief of the Air Staff
CSG	Combat Support Group
DCAS	Deputy Chief of the Air Staff
CDF	Chief of the Defence Force
CDFS	Chief of Defence Force Staff
FEG	Force Element Group
HQJOC	Headquarters Joint Operations Command
INTERFET	International Force East Timor
ISR	Intelligence, Surveillance and Reconnaissance
ISREW	Intelligence, Surveillance, Reconnaissance, and Electronic Warfare
MPG	Maritime Patrol Group
MTF	Mobile Task Force
OC	Officer Commanding
OG	Operational Group
OSG	Operational Support Group
RAAF	Royal Australian Air Force
RAF	Royal Air Force
RTS	raise, train, and sustain
SCG	Surveillance and Control Group
TAF	Tactical Air Force
TTG	Tactical Transport Group
UAV	Unmanned Aerial Vehicle
UCLA	University of California, Los Angeles
USAF	United States Air Force