

Chapter 2

Australia's air defence needs

Introduction

2.1 This chapter considers Australia's air defence capability needs, its current air defence capability and the air defence capability promised by the F-35A Lightning II Joint Strike Fighter (F-35A).

Defence capability needs

2.2 The 2016 Defence White Paper (White Paper) outlines Australia's defence strategy and its three strategic objectives:

- to deter, deny and defeat any attempt by a hostile country or non-state actor to attack, threaten or coerce Australia;
- to support the security of maritime South East Asia and support the governments of Papua New Guinea, Timor-Leste and Pacific Island Countries to build and strengthen their security; and
- to provide meaningful contributions to global responses to address threats to the rules-based global order which threaten Australia and its interests.¹

2.3 In order to meet these objectives, the government asserts Australia must 'maintain a regionally superior ADF with the highest levels of military capability and scientific technological sophistication'.²

Air defence capabilities

2.4 The value of air power provided by the RAAF is undisputed. It provides air mobility (the ability to move things through the air); intelligence, surveillance and reconnaissance (ISR); strike (the ability to effect things on the ground and sea from the air); and control of the air (the ability to control the air domain to ensure freedom from air attack, freedom to manoeuvre and freedom to attack).³ Air power provides a task force commander with a greater number of options to address challenges:

The combination of its speed, reach and responsiveness provide the capability to carry out time-critical precision strikes on fleeting targets of opportunity. In the contemporary conflict scenario this is a coveted capability that could potentially reduce the total expenditure if the target that is neutralised is of sufficiently high strategic importance to the adversary. In expeditionary operations, which are becoming more common amongst the forces of the developed world, airlift capabilities are critical to success. While expenditure per unit load of warfighting materiel and provisions may be high in airlift as compared to surface transportation, the

1 Department of Defence, *2016 Defence White Paper*, pp 17–18.

2 Department of Defence, *2016 Defence White Paper*, p. 18.

3 Sir Richard Williams Foundation, *Submission 17*, p. 4.

speed, reach and penetration capabilities of airlift that will sustain a surface force far away from home base cannot be quantified in dollar terms. Overall, expeditionary operations are better served by airlift than being supported by surface-based lines of supply for reasons of security and a much higher degree of assurance.⁴

2.5 The White Paper also describes 'a potent strike and air combat capability' as 'essential to our ability to deter attempts to coerce or attack Australia and our national interests, including the ability to seize the initiative, and defeat potential threats as far from Australia as possible'. The White Paper states that Australia 'must be prepared to carry out offensive strike operations against the military bases and in-transit forces of a potential adversary' and that this will be achieved through 'strategic strike capabilities, including air strike and special operations capabilities'.⁵

2.6 A number of submissions emphasised the importance of maintaining Australia's regional superiority, particularly in the areas of strike and air combat.⁶ Mr Steve Weathers asserted that 'Australia requires an Air Superiority Fighter in order to maintain air dominance in the region'.⁷ Mr David Archibald noted that 'air-dominance provided by fighter aircraft is the prerequisite for the operation and survival of the rest of the RAAF's aircraft, and for the rest of Australia's armed forces'.⁸ The Australian Strategic Policy Institute (ASPI) noted the importance of strong air combat capability:

The ability to wield airpower effectively has been firmly established as a prerequisite for success in high-end war fighting. To be sure, there are many things that the ADF can be called on to do that don't require it, but it's a 'must have' if the nation ever faces a significant military threat.⁹

2.7 However, ASPI explained that 'defending Australia is less demanding than attacking defended territories elsewhere'. ASPI noted that air combat threats to Australia's direct interests and territories are likely to remain modest in size for some time to come and, unlike the United States, Australia does not have global power projection ambitions and is unlikely to unilaterally deploy forces in support of global

4 Sanu Kainikara, *The Art of Airpower: Sun Tzu Revisited*, (Air Power Development Centre, 2012), p. 65.

5 Department of Defence, *2016 Defence White Paper*, pp 94–95.

6 For example: Mr Chris Mills, *Submission 1*, pp 2–3; Mr Michael Price, *Submission 2*, pp 13–14; Dr Jai Galliot, *Submission 3*, p. 1; Mr Danny Nowlan, *Submission 6*, pp 1–6; Mr David Archibald, *Submission 8*, pp 4–9; Air Power Australia, *Submission 9*, pp 1–3; Mr Steve Weathers, *Submission 10*, pp 1–2; Mr John Peake, *Submission 11*, pp 1–5; Mr Marcus Kollakides, *Submission 12*, pp 4, 8–9; Name withheld, *Submission 13*, pp 1–2; Name withheld, *Submission 14*, p. 6; Mr Eric Palmer, *Submission 19*, p. 6; AIRCMDR Ray Perry (Retd), *Submission 22*, pp 2–3; Mr Peter Larard, *Submission 25*, pp 1–2; Mr Gary Bates, *Submission 29*, p. 2; Mr Robert Gottliebsen, *Submission 34*, pp 1–3; and Mr Peter Goon, *Submission 36*, pp 2–8.

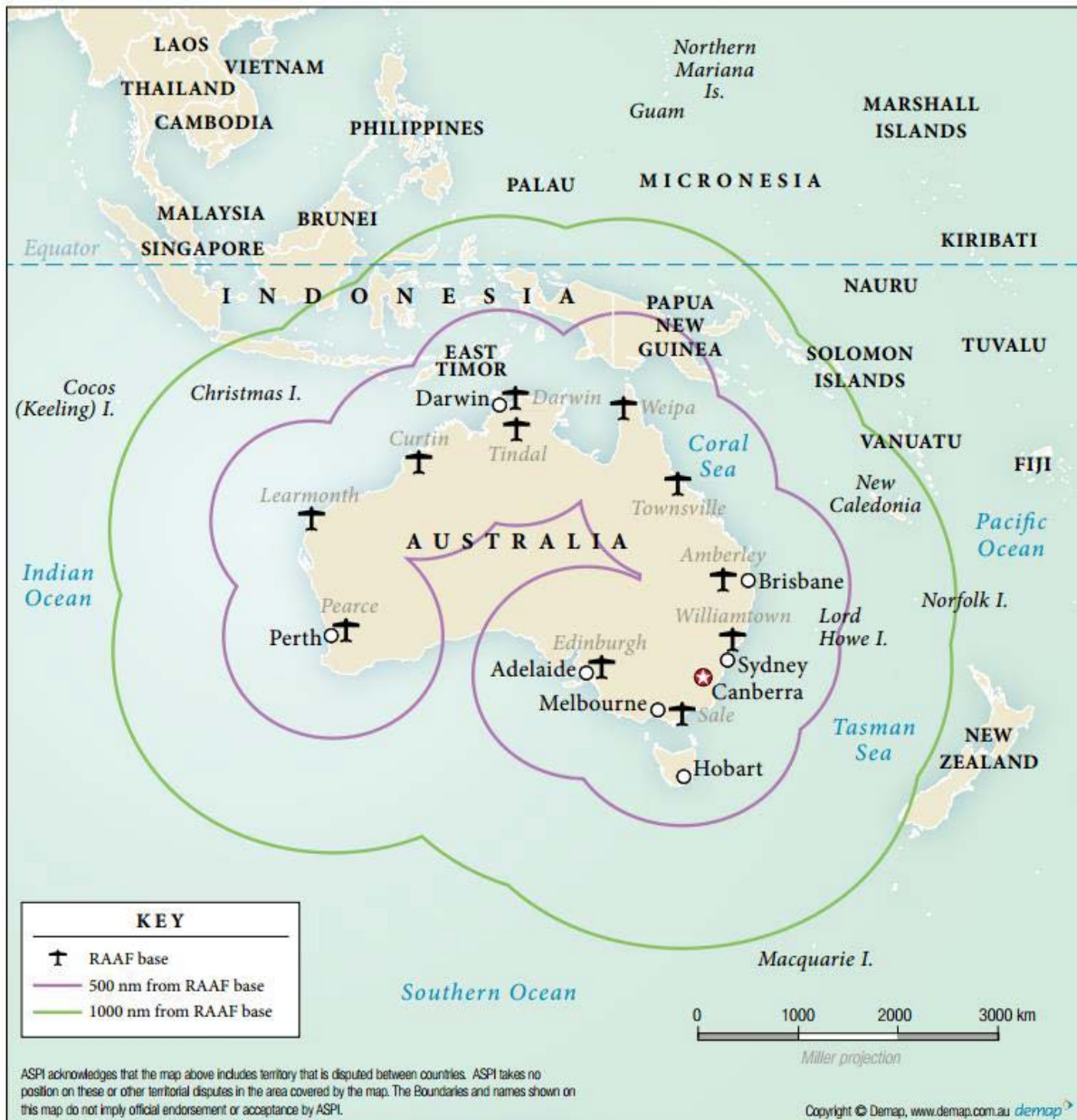
7 Mr Steve Weathers, *Submission 10*, p. 1.

8 Mr David Archibald, *Submission 8*, p. 6.

9 Australian Strategic Policy Institute, *Submission 47*, p. 27.

interests. ASPI advised that 'the single most important task of the RAAF is to raise the costs and risks of threatening Australian territory to any would-be aggressor. A key part of the role of Australia's future air combat capability will be the way it enables or conducts maritime denial operations'.¹⁰

Figure 2.1—F-35 combat radius with and without single air-to-air refuelling



Source: Australian Strategic Policy Institute, *Submission 47*, p. 32.

10 Australian Strategic Policy Institute, *Submission 47*, pp 30–31.

Current air defence capabilities

2.8 Australia's air combat capability is currently provided by the RAAF fleets of F/A-18 Classic Hornet (air control and strike) and F/A-18F Super Hornet.¹¹ In 2004, the ASPI report, *A Big Deal: Australia's future air combat capability*, noted that, whilst the RAAF's F/A-18 and F-111 aircraft had provided Australia with potent air combat and strike capabilities over the last two (and now three) decades, 'the cost of keeping both fleets operating has risen substantially while their effectiveness in the twenty-first century regional threat environment has diminished'.¹²

2.9 Defence advised the committee that 'Australia's air combat capability needs have been 'derived through extensive and detailed consideration for a strategic baseline that reflects Government's expectations of the air combat force'. Defence explained that these expectations require an air combat capability that is able to defeat airborne threats, prosecute attacks against both land and sea surface targets, and support Australia's land and maritime forces.¹³ The White Paper outlined Defence's acquisition plans to achieve these capabilities:

The ADF will be equipped with a potent and technologically advanced strike and air combat capability over the next decade, building on the current fleet of 24 F/A-18F Super Hornets, six E-7A Wedgetail Airborne Early Warning and Control aircraft and five KC-30A air-to-air refuelling aircraft. In addition to 12 EA-18G Growler Electronic Attack aircraft which will enter service from 2018, 72 F-35A Lightning II Joint Strike Fighters will begin to enter operational service from 2020 to replace the Classic Hornets. Options to replace the Super Hornets in the late 2020s will be considered in the early 2020s in light of developments in technology and the strategic environment and will be informed by our experience in operating the Joint Strike Fighters. The Government will also acquire new air combat training systems as part of the Key Enablers capability stream.¹⁴

F-35A Lightning II Joint Strike Fighter

2.10 Defence advised the committee the F-35A is the 'most advanced, affordable multi-role fighter capable of meeting Australia's strategic need for a highly effective air combat capability'. Defence explained that the F-35A will replace the aging F/A-18 A/B Classic Hornets. The F/A-18 A/B will be progressively withdrawn from service between 2018 and 2022, whilst the F-35A will transition into service in Australia from 2019 to 'ensure continuity in Australia's air combat capability'.¹⁵ The Chief of the Air Force, Air Marshal Leo Davies, told the committee that the F-35 is the 'best and only option' for the replacement of the F/A-18 A/B Classic Hornets:

11 Department of Defence, *Submission 55*, p. 8.

12 Australian Strategic Policy Institute, *A Big Deal: Australia's future air combat capability*, 2004, p. 3.

13 Department of Defence, *Submission 55*, p. 8.

14 Department of Defence, *2016 Defence White Paper*, pp 94–95.

15 Department of Defence, *Submission 55*, p. 8–9.

Air Force has operated the fighter force and the ability to conduct control of the air pretty much since our inception. We will be retiring our Classic Hornet fleet in the early twenties and we have gone through a process of determining the best replacement aircraft type for the Classic Hornet. In Air Force's view, and in my view, the joint strike fighter represents the best and only option for the replacement of the Classic Hornet.¹⁶

2.11 Defence assured the committee that the F-35A's ability to satisfy the Government's expectations of the air combat force was 'subject to comprehensive analysis involving the full scope of available tools and techniques conducted over many years, including thousands of simulation runs and a series of human-in-the-loop mission simulator experiments'. Furthermore, Defence noted that 'the best available performance data for both the F-35A and advanced threat systems were employed for these efforts'.¹⁷

Fifth-generation air combat capability

2.12 Lockheed Martin explained that there are five key elements that define fifth-generation fighters: very low observable (VLO) stealth, fighter performance, sensor fusion, net-centric operations and advanced air-defence environments.¹⁸ When asked to explain the key differences between fourth and fifth generation fighters, Mr Jeff Babione, the Executive Vice President and General Manager of the F-35 Program at Lockheed Martin, emphasised the stealth, network-centric capability and sensor fusion provided by fifth generation fighters, noting that these advantages cannot be simply added to fourth-generation fighters but must be designed from the beginning:

There are several attributes that define a fifth generation airplane from a Lockheed Martin and a customer perspective. Number one is stealth—its ability to evade enemy radars, in particular. One of its key features in breaking the kill chain that you talked about earlier today. Also, advanced avionics or subsystems for electronic attack and radar. In the case of the F35 we have the electronic optical tracking system and the distributed aperture systems. These are multispectral devices that are not currently on fourth generation airplanes. In fact, this is the only fifth generation airplane that has those built in. In addition you have a network-centric capability. As others have testified today, the F35 is actually a node in a network of fighting, whether it be other F35s, land forces or sea forces. Finally, sensor fusion. That is what we think really separates fifth generation from fourth generation. It takes all of those advanced avionics, the ability to interpret its current stealth conditions, integrating that into the battle space environment, automatically detecting targets and providing that information in a fused situation for the pilot. So the pilot does not have to integrate that; the pilot simply has to act on what the aircraft has determined. You cannot make a

16 Air Marshal Leo Davies, Chief of the Air Force, Department of Defence, *Committee Hansard*, 22 March 2016, p. 65.

17 Department of Defence, *Submission 55*, p. 8.

18 Lockheed Martin, *Submission 46*, p. 6.

fourth generation airplane into a fifth generation airplane. It has to be designed from the very beginning.¹⁹

2.13 The Chief Executive of Northrop Grumman Australia, Mr Ian Irving, affirmed that 'the F-35 is a fifth generation capability' which 'cannot be compared easily with fourth generation aircraft due to the tremendous advances in sensor capabilities that are equipping the F-35'. Mr Irving asserted that the F-35's ability to acquire and transmit information from the environment to joint forces via networks provides it with 'significant advantage over other aircraft in inventory today'. Mr Irving noted that, combined with the stealth capabilities of the F-35, this 'provides an advanced situational awareness capability that will deliver significant combat advantage to the Royal Australian Air Force'.²⁰

Multirole fighter

2.14 Lockheed Martin emphasised the F-35's versatility as a multirole fighter advising that the F-35 combined stealth, fusion, fighter performance and maintainability as well as 'extensive interoperability with legacy systems and networks with international coalitions and other participant countries':

The F-35 offers the unprecedented ability to rapidly deploy and penetrate enemy battlespace, seize the initiative, and deter an opposing force. Its unique blend of 5th Generation capabilities provides numerous military options in the presence of advanced, integrated enemy air-defence environments.

As the only 5th Generation multirole fighter available on the international market, the F-35 transforms the battlespace. It allows for a shift in doctrine that takes advantage of the full capability of the F-35 Lightning II, from stealthy surveillance to the full spectrum of combat operations – in highly integrated contested air-defence environments. Representing a true quantum leap in fighter capability, the F-35 will ensure the RAAF's asymmetric advantage.²¹

2.15 United States Lieutenant General Christopher Bogdan, Program Executive Officer for the F-35, advised the committee that the F-35 is 'of vital importance to the security of the United States and its allies, including Australia'. Lt General Bogdan asserted that the F-35 will 'close a crucial capability gap' and will strengthen security alliances:

The F-35 will form the backbone of air combat superiority for decades to come. It will replace the legacy tactical fighter fleets with a dominant, multirole, fifth-generation capability to project and deter potential adversaries. The F-35 will become a linchpin for future coalition operations

19 Mr Jeff Babione, Executive Vice President and General Manager of F-35 Lightning II Program, Lockheed Martin, *Committee Hansard*, 22 March 2016, p. 51–52.

20 Mr Ian Irving, Chief Executive, Northrop Grumman Australia, *Committee Hansard*, 22 March 2016, p. 39.

21 Lockheed Martin, *Submission 46*, pp 6–7.

and will help to close a crucial capability gap that will enhance the strength of our security alliances.²²

2.16 Lockheed Martin extolled the F-35's 'advanced sensors, sensor fusion and data links' which 'provide multi-spectral situation awareness that is shared in real time with other F-35 aircraft'. Lockheed Martin explained that these advanced features 'support cooperative operation and increase flight-group effectiveness and survivability' as well as making 'other ADF assets more effective when they are integrated into combined operational environments in concert with the F-35'.²³

Plan Jericho

2.17 The White Paper emphasised the importance of investing in and better connecting communications, sensor and targeting systems across ADF platforms.²⁴ This is reflected in the RAAF Plan Jericho, which aims to 'develop a future force that is agile and adaptive, fully immersed in the information age, and truly joint'. The RAAF asserted that an integrated and networked force will be essential to future capability:

In the future, responding to global and regional events will be more difficult, as the proliferation of technology and the advancement in potential adversaries' capabilities pose new challenges to the Australian Defence Force...Developing an integrated, networked force will be the difference between simply owning fifth generation aircraft and being a truly fifth generation Air Force.²⁵

2.18 The Sir Richard Williams Foundation (SRWF) advised that the focus of air capability has shifted from speed to information, noting that 'information is now the most precious commodity a combat aircraft can provide'.²⁶ Chairman of the SRWF, Mr Errol McCormack, explained that the integration of systems made possible by the F-35A will change the way the Air Force operates:

The F35 should not be considered as just another fighter replacing Hornets in service. The F35 will be a communications node capable of sharing information electronically between sections of the force. That fact has already been the catalyst for a change in thinking on development of the Air Force through Plan Jericho. The plan was named after Operation Jericho, which knocked down the walls of a Gestapo prison in France. We are now knocking down the walls between elements of the Air Force as well as the Navy and Army. Each Air Force system—such as airborne early warning and control aircraft, Growler electronic warning systems, or tankers—by itself is very capable, but if used in an integrated system they will change the way the Air Force operates. The ability to share the operational picture

22 Lieutenant General Christopher Bogdan, *Submission 56*, p. 3.

23 Lockheed Martin, *Submission 46*, p. 3–6.

24 Department of Defence, *2016 Defence White Paper*, pp 94–95.

25 Royal Australian Air Force, *Jericho: Program of Work*, 2015, p. 1.

26 Sir Richard Williams Foundation, *Submission 17*, p. 11.

between systems will ensure that commanders with the best possible information can enable aircraft to engage enemy based on other than their own picture. For example, a Hornet could use an F35-derived picture to engage a target. Development of similar systems on ships and ground-based systems is also underway. Plan Jericho is designed to make people think of using a system of systems when planning acquisition, concepts of operation and training. An integrated Australian Defence Force is greater than the sum of the parts, and acquisition of the F35 has been the catalyst for this change in thinking.²⁷

2.19 Lockheed Martin advised that the F-35 is designed to be a 'key net-enabling node in a system of systems, gathering and transmitting data across the defence network'.²⁸ Lockheed Martin outlined the F-35's role in Plan Jericho, describing the F-35 as 'revolutionary network-enabled capability' that will be 'fundamental to transforming the RAAF into a 5th Generation-enabled force'. Lockheed Martin emphasised the importance of networked capability:

Future Defence operators will need to deploy and harness the multiplying effect of a contemporary, fully integrated Command, Control, Computers, Communications (C4) Intelligence Surveillance and Reconnaissance (ISR) system. The networked C4ISR system must be capable of delivering outcomes and effects in each of the operating domains, namely: air, land, maritime, cyber and space. Improved C4ISR will provide greater understanding of an evolving operational environment to enable more informed decisions to be made and facilitate efficient and effective directed responses.

With its impressive suite of ISR capabilities, the F-35 will act as a catalyst for achieving that sought-after networked-warfare capability. It permits appropriately protected enabling systems to support the transfer of critical data, from the strategic level through to the tactical edge.²⁹

2.20 SRWF expressed its support for Plan Jericho and the F-35A's role in the plan.³⁰ SRWF noted that fifth generation fighters are an essential part of the defence 'digital ecosystem', which enhances overall capability across various platforms:

The ADF is well along the path of creating a very capable digital ecosystem both in the air (AEW&C Wedgetail, MQ-4C Triton, P-8A Poseidon, C-17 Globemaster and Gulfstream 550), on the ground (Advanced Field Artillery Tactical Data fire control system, upgrades to ground based air defence and better communications links) and at sea (Anti Ship Missile Defence upgrades, Collins Class upgrades, Air Warfare Destroyer and Landing Helicopter Dock).

27 Mr Errol McCormack, Chairman, Sir Richard Williams Foundation, *Committee Hansard*, 22 March 2016, p. 14.

28 Lockheed Martin, *Submission 46*, p. 7.

29 Lockheed Martin, *Submission 46*, p. 4.

30 Sir Richard Williams Foundation, *Submission 17*, p. 2.

What makes the F-22 and F35 special is not just that they have unmatched sensors and stealth, but that they make everyone else in the ecosystem more capable.³¹

2.21 ASPI also emphasised compatibility of systems with allies as an increasingly important element of capability, especially with regards to Australia's involvement in overseas operations:

...it is the systems that are important. You also have to put it in the context of the sort things that our Air Force actually does...we go and fight in coalition operations with the United States. Having the same equipment that equips many United States squadrons—and I include the Super Hornet in that as well as the F35—we would be on the same footing as the US Air Force and US Navy.³²

2.22 The committee received a considerable number of submissions questioning the ability of the F-35 to meet Australia's air defence needs. The concerns raised by these submissions and suggestions for potential alternatives are discussed in Chapter 4 of this report.

31 Sir Richard Williams Foundation, *Submission 17*, p. 8.

32 Dr Andrew Davies, Director of Research/Senior Analyst, Australian Strategic Policy Institute, *Committee Hansard*, 22 March 2016, p. 25.

