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Department of Defence  
Air Combat Capability Review



***Part B: Adequacy of Extant Plans for the  
Development of Australia's Air Combat  
Capability to 2045***

*A Submission from the Royal Australian Air Force Staff  
College Association Incorporated*

28 March 2008

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## **1. Introduction**

### **1.1 *Origins of the Submission***

The RAAF Staff College Association Incorporated (RAAFSCA) offers its comments and views for Part B of the Federal Government Review of Australia's Air Combat Capability. The RAAFSCA comprises 187 graduates of the RAAF Staff College (RAAFSC). The College from 1949 to 2000 provided officers of Squadron Leader and Wing Commander Rank (and equivalent ranks from other Services and the Australian Public Service) a one year professional study and training environment to prepare them for senior officer appointments. Many graduates went on to become one and two star officers in the ADF or Department of Defence, and several advanced to three and four star positions, such as Chief of the Defence Force, Chief of Air Force, Chief of Navy, and Vice Chief of the Defence Force.

With the amalgamation of the three single-Service Staff Colleges in 2001, the RAAFSC closed. Although the majority of the RAAFSCA members are, today, retired from Service duty, many are still actively involved in defence associations and academic and defence industry related activities. The current patrons of the RAAFSCA are Air Chief Marshal Angus Houston (a graduate of No 39 RAAFSC Course) and Air Marshal Geoff Shepherd.

The Association offers its comments and opinion based on a wealth of experience and past knowledge of Air Force matters much of which was obtained through operational service.

### **1.2 *Submission Scope***

Many issues identified in the Review Terms of Reference require detailed knowledge of classified platform capabilities or budgetary and cost implications. The RAAFSCA does not have access to such information and has relied on publicly available material in making its observations and comments. Additionally, the range of matters to be addressed in the Review is too great to make a submission on all within the 10,000 maximum words constraint. Thus the RAAFSCA has chosen to address only the following matters:

- a. the emergence of regional and global security threats that have implications for the defence of Australia;
- b. the importance of a defence strategy that protects Australia's mainland, territorial interests and regional stability;
- c. characteristics of the future air combat and airborne strike capability essential to achieve the objective of a secure Australia; and



- d. the importance of 'critical mass' and how that translates into air combat and airborne strike assets, associated systems and personnel plus an increased use of industry resources.

## 2. Regional and Global Security Threats

Setting aside the public view of security threats to Australia – a view that fluctuates depending on many factors, not least of which is the attention given to the topic by politicians, media focus and the presence of Australian troops in conflict hot spots – the continual reassessment of regional and global events by the professional agencies and elements of several government departments provides the Government with robust and realistic advice. Public comment abounds mirroring some of the advice provided to Government. A sample of potential threats that attract the attention of the public would include:

- a. Instability in the international environment generally, eg, from armed conflicts, political upheaval, oppression of citizens, or economic difficulties.
- b. Specific nation states seeking to coerce neighbouring states in disputes over territory, religion, ethnicity, criminality and corruption, or events in the past or present that are perceived as an insult to national pride and standing.
- c. Disruption or denial of trade routes or essential resources, plus actions in the international arena to embarrass or condemn each other.
- d. Action by non-state actors such as terrorists or international criminal elements.

Australia, while today largely immune from the above threats, is an important regional player and a niche global player. At any time in the future it may face one or more of the above challenges to its sovereignty, general good reputation and influence in regional and global affairs.

A serious deterioration in regional or global security could arise for any number of reasons. One does not need to become too imaginative in scenario development to see how Australia could be caught up in a serious challenge to its sovereignty, should events elsewhere threaten another nation's wealth, aspirations or perceived place in the world order. China, for example, has a great appetite for resources to fuel its economic growth. By sourcing large quantities of mineral resources from Australia, it depends on continuation of those supplies for its continued economic growth. Without that supply China's economic growth could stall and while it could rearrange other supply sources the disruption of the expanding production base would be unacceptable to China's leaders. Should future events cause Australia to withhold supplies or to tie supplies to conditions unacceptable to China, one could foresee China attempting to coerce Australia into resuming the supplies. Such tensions could build up over a relative short time and depending on the balance of world power and alliances at that time, China could escalate coercion to a point of actual seizure of one or more of Australia's resource centres. Impossible though this may seem today, history shows that such events have occurred



time and again. While such an event should have a reasonable warning time before armed conflict occurs, history is replete with examples of little advanced warning.

Professor Paul Dibb in a January 2008 paper titled “*The Future Balance of Power in East Asia: What are the Geopolitical Risks?*” concludes:

*“...that the international order in East Asia is on the brink of major and uncertain change. ...Therefore, Australia should hedge against possible turbulence and disequilibrium in East Asia.”*<sup>1</sup>

This warning is but one among many from respected strategic analysts and the message is clear: Australia needs to be well prepared for an uncertain future as the Asian power balance inevitably changes in the next few decades.

### 3. Protecting Australia’s Mainland and Territorial Interests

A national defence strategy that utilizes diplomacy, economic strength and trade, alliances and strong armed forces is the cornerstone of a modern nation state’s security. The RAAFSCA believes that in the next 15 to 20 years Australia may well face a major threat to its security. The rebalancing of the economic structures of the Asia-Pacific area will create changes in geopolitical balance, along with the attendant political uncertainties. While diplomacy and trade will remain important aspects of Australia’s defence, the Government of the day must have sufficient military capacity to support its foreign and trade policies. The nation must possess a credible defence capability that would firstly act as a deterrent to an aggressor seeking to coerce Australia by use of military force, and secondly would give Australia the capability to defend its territory and interests should an actual attack occur.

The Air Force component of the armed forces becomes the ‘front line’ of Defence of Australia given the surrounding sea/air gap. Any nation intent on taking over assets (mineral resources on the mainland, or off-shore petroleum resources in the maritime zones) would struggle to reach those objectives if the Australian air combat and strike capabilities match, or are superior to, those of the aggressor. Combined with highly sophisticated long range surveillance capability plus intelligence, Australia has the means to defend its sea and air gap against offensive air and sea initiatives of all but a few global heavyweights. While numerical superiority may well advantage the aggressor, the logistic challenges of sustained operations would hinder achieving and maintaining the goal, especially if allied and Australian sea and ground forces are also brought to bear. Airborne strike attack on the logistic lines of an aggressor would strengthen the defence of Australia.

But the capability and capacity of Australia to mount air and sea gap defensive and offensive operations over a sustained period of actual combat must be carefully measured,

<sup>1</sup> Professor Paul Dibb, *The Future Balance of Power in East Asia: What are the Geopolitical Risks?* Strategic and Defence Studies Centre ANU Canberra, January 2008 (ISBN 978 0 7315 5482 9)



established and maintained. To provide something short of the necessary level of air combat and strike capability would invite potential disaster in the event of an actual conflict. It would also encourage speculation in any nation that might contemplate the use of force and coercion to settle a dispute with Australia.

Rod Lyon of the Australian Strategic Policy Institute (ASPI) in his paper “*The next Defence White Paper: the strategic environment of 29 January 2008*”, makes the point that:

*“Western military forces – including Australia’s – are optimised for conquest and Decisive battle”.*<sup>2</sup>

Whether this point is accepted or not, the issue remains that Australia’s Air Combat capability must be both a concentrated effort in defence of Australia as well as an effective, persistent and sustained capability.

#### **4. Characteristics of an Appropriate Air Combat and Airborne Strike Capability**

The developed world’s armed forces take a holistic view of air combat, considering all the various components of an air combat capability being just individual aspects of an overarching ‘air combat system’. For allied nations, interoperability between systems is a prime consideration, while air combat can be considered competition between opposing ‘systems’ rather than between individual offensive/defensive aircraft.

With the exception of Singapore and Malaysia (Australia’s partners in IADS), few Asian nations take a systems view of air combat capability, instead restricting their visions to the platform/weapon aspects of air power. This restricted view is very much in Australia’s favour, but cannot be expected to remain for the long term.

The characteristics of an air combat system combine several elements of capability:

- a. Technological (performance) aspects of the platform and its sensors, weapons and communications.
- b. A demonstrable operational impact to deter, and if necessary, defeat a potential adversary.
- c. The size of the force including support and sustainment resources.
- d. The associated air battle management resources that provide additional combat superiority – the so called ‘force multiplier’ effect.

<sup>2</sup> Rod Lyon, *The next Defence White Paper: The Strategic Environment*. ASPI Policy Analysis, 29 January 2008.



- e. The personnel element – available crews and support staffs, standards of training, and tactics developed/practised/employed.

The capability must be available continuously – no gaps – and at least be able to ‘match’ any potential adversaries’ air combat and airborne strike force capabilities. ‘Matching’ does not imply a achieving a campaign defeat of the opposing force, and certainly it does not imply annihilating the opposing force. It means winning decisive air battles to establish, as appropriate, general, area or local control of the air, and it would also include disrupting incursions by sea to maintain sovereign control of territory and vital assets. It also means a capability and capacity to protect and support deployed ground and naval forces, particularly from a hostile air threat.

Selection of the right platform or mix of platforms will be critical in maximising the capability to defend Australia. Open source material indicates that a potential aggressor would possess highly capable air assets, eg, Russian Sukhoi fighters (SU-30 Series), strategic bomber aircraft (Tupolev Tu-22Me Backfire, Tu-95MS Bear and Tu-160 Blackjack), subsonic and supersonic cruise missiles (Russian Kh-55SM/AS-15B Kent) and standoff weapons (Kh-59MK). The ability of an aggressor to mount airborne strikes against vital Australian assets from home base distances of 2,500 nautical miles is claimed using a fleet of Russian Ilyushin IL-78MCK Midas aerial refuelling tankers and with support of the Beriev A-50 Mainstay AWACS and derivative specialised aircraft.

To defend against such forces, Australia must possess not only sufficient equally capable air defence aircraft and systems, but have the ability to employ those as a force capability. Herein lies a solution at times overlooked – until the F-35 Joint Strike Fighter is fully in service (probably around 2021/22). The RAAF may not necessarily possess the most capable platforms in terms of range, speed, height, stealth, reliability, weapons load, weapons range, weapons lethality, and sensor capability, but with the planned fleet of F/A-18F Super Hornets and F/A18-A/B platforms (upgraded to near C/D standard), and both Hornet types fitted with optimum weapons systems, Australia can field an air combat and strike capability from its strategically located mainland home bases able to deter and to defeat an aggressor in the sea/air gap. This is because it can mount continuous effective missions efficiently supported by a sound infrastructure of long range surveillance assets (the Jindalee Operational Radar Network and the Airborne Early Warning & Control aircraft) and air-to-air refuelling capability (Airbus A330 MRTT/KC-45 tanker transports). Additionally, Australia possesses a viable air surveillance and battle management capability in strategically vital areas (the TPS-77 Surveillance Radar and the Vigilare Regional Operations Centres). These supporting air combat assets give the defender a significant advantage over the aggressor despite any mismatch in platform or onboard system assets.

Crewing of aircraft with experienced and well-trained personnel is another force multiplier that has enabled Australia to ‘punch above its weight’ in exercises and past operational experiences. As much as the RAAF needs new aircraft and systems, it also needs to retain its experienced combat aircrew and to recruit and prepare the next generation of fighter/strike personnel. Maintaining the platforms and systems is equally important which again demands that the RAAF retains, recruits and trains its maintainers and utilises indigenous industry to the maximum extent possible.



Development of tactics is an area of force capability actively pursued by the RAAF but often overlooked other than at the level of the fighting squadron. A shortfall in equipment capability can be offset by clever advanced air combat tactics derived with a good understanding of opposition capabilities. Consequently, the ability to develop and adapt tactics and the training of air combat instructors are essential force multipliers that must be retained within the RAAF.

These characteristics of air combat capability exist today or will be acquired by 2010. The assets will be improved and strengthened through the new and upgraded capability already identified in Defence Capability Planning for acquisition over the next five years. The Minister for Defence announced on 17 March 2008 that, based on classified briefings he had received, the Government is unlikely to retain the F-111 in service beyond 2010 and that the acquisition of 24 Super Hornet aircraft and related equipment will proceed to bridge the F-111 strike capability gap until the New Air Combat Capability (NACC) is delivered. While the Defence Minister said that he will await the Air Combat Capability Review recommendations before making a final decision, the indications exist that the above approach is the best option. The RAAFSCA agrees with that approach.

What is overlooked in terms of the strategic strike mission is the complexity and cost of integrating newly acquired long range strike missiles onto platforms. The Government has already acquired the Joint Attack Standoff Strike Missile (JASSM) and it is/was to be integrated on the upgraded F/A-18A/B platforms. JASSM is already integrated on the Super Hornets thanks to a USN requirement, thus avoiding a costly and difficult task. While the upgraded F/A-18A/B Hornets can still have the integration work done to carry and launch the JASSM there is less haste and less pressure to do so with the arrival of a squadron of F/A-18F Super Hornets.

However, the FMS acquisition of the Super Hornets also included an FMS acquisition of a range of additional strike weapons and new sensors that provide a strike capability for the RAAF greater than what the F-111 can provide today. The acquisition of the Joint Stand Off Weapon (JSOW), which is a shorter range but less costly missile than the JASSM, provides quantum improvement over the strike capability of the F-111 dropping laser guided Mk 80 series conventional bombs and the AGM-142 Stand Off Weapon. Similarly, the introduction of the Joint Direct Attack Munition (JDAM) into service together with laser guided precision munitions for the F/A-18s provides a credible tactical strike capability.

The F/A-18 upgraded sensor and self-protection systems enhance both the fighting capability and protection for the RAAF Hornet platforms. The APG-73 radar and the AN/AAQ-28 Litening Targeting Pod for the A/B Hornets and the APG-79 AESA radar and the ATFLIR Targeting Pod for the Super Hornets provide a much improved airborne combat radar and target designation system compared with the current capability. While the JSF will bring further advances in these two system capabilities, those mentioned are sufficiently close to the capabilities of a potential aggressor that the gap (and therefore the risk) is not large. Airborne self-protection suites now on order for the A/B Hornets and standard on the Super Hornets (the AN/ALR-67(V)3 Radar Warning Receiver) combined



with modern countermeasures provides appropriate self-protection against air launched and ground based missiles.

Improved sensors plus the introduction of common datalinks and communications takes the air combat and strike capabilities of the F/A-18 into new realms of passive detection, third-party targeting and stealth-like operations. These new air combat capabilities provide greatly increased ability to defend against aggressors and a greatly increased deterrence for any potential airborne attack on Australia's interests.

The F-35 CTOV Joint Strike Fighter will provide Australia with a truly fifth generation combat aircraft. It incorporates technological advantages that will transform Australia's air combat capability, taking it well beyond that of the F/A-18 fleet. The current debate on F-22 versus F-35 has both camps convinced of their claims. The fact is the F-22 capability is well known now and that of the F-35 is still being tested and has yet to be proven. However, as the F-35 design, production and system architecture has taken much from and built upon several aspects of the F-22 program, there is every reason to expect that the F-35, at maturity, will have similar combat and system capabilities to the F-22 and it will fulfil the strike fighter role using its own unique characteristics – many of which are an improvement over the F-22. The step-up in air combat and strike capability for the RAAF though the introduction of the Joint Strike Fighter will be measurable and reassuring.

Purchasing a limited number of E-18G (Growler) electronic warfare assets would boost Australia's intelligence gathering as well as providing additional offensive and defensive capabilities. The discussion can only be developed in a classified environment; nevertheless, the force-multiplier effect of an airborne electronic warfare capability would provide both a war-fighting advantage for the RAAF and it would act as another deterrent to any potential aggressor.

## **5. Critical Mass for Air Combat and Airborne Strike Assets Beyond the F/A-18 Fleet**

This section addresses the number of New Air Combat Capability aircraft required to retain a critical mass able to fulfil the expected Government's requirements for Defence of Australia. Achieving that critical mass would, as a by product provide the Australian Government the ability to contribute to a coalition operation in or beyond Australia's region, the capability espoused by Defence 2000 (the current Defence White Paper). The 2008 White Paper may introduce a different requirement for the use of Australia's air combat and strike capability based on a new strategic assessment. But for the purpose of this submission the same assumption is used – the RAAF must have the capacity to concurrently sustain one large and one medium sized operation in separate locations and also to conduct separate strike missions not necessarily a part of those operations, ie, four squadrons.

Factors that contribute to the required fleet size for New Air Combat Capability include not only the number of operational squadrons, but also the size of operational/training squadrons, the number of maintenance support assets, the pilot establishment, anticipated



flying hours and desired fleet life. This submission can only suggest possible 'metrics' for those factors based on past experience of the RAAFSCA members and public release material. The submission acknowledges that specialist staff within the Department of Defence will be advising Government from a position of considerable knowledge, current experience and guidance drawn from classified material.

A future Air Combat Group equipped with the F-35 JSF for both air combat and strike roles could comprise two operational wings, each fielding two operational squadrons. Those operational squadrons would need support from an additional training squadron. Each operational squadron would conduct operations as a stand-alone entity, and the demanding air battle of the future would ideally use a four ship formation as a basic flight. An appropriate squadron size would be three flights; therefore a squadron would have 12 on-line operational aircraft with an additional four aircraft to account (at any one time) for two being in operational maintenance/repair and two being in deeper level maintenance. The squadron size would thus be 16 aircraft with a wing size of 32 aircraft and a fleet size of 64 operational aircraft.

A training squadron would typically require 12 on-line aircraft plus allow for two additional aircraft to be in maintenance at any one time. For fleet sustainability an additional five aircraft would normally be required for maintenance training. Finally, allowance for attrition over the life of the aircraft would usually add another 12 aircraft to the fleet size. That brings the critical mass to not less than 95 aircraft. But having built the requirement of platforms to that number, the critical mass should not focus on aircraft numbers but rather on the number of squadrons, because optimum air combat and strike capability comes not from individual aircraft capability but the employment of squadron capability. In that regard, for a deployed operation of an extended time, the employment of squadrons with one deployed, one working up and one reconstituting establishes a clear critical mass requirement for three squadrons for a large sized operation with one other squadron available for a second smaller sized operation and/or specific strike missions.

This assessment does not take into account the available pilot-to-aircraft ratio or the extent of in flight training compared to use of a modern simulator. Crewing of combat aircraft is a perennial problem for most air forces, and the RAAF is no exception. A minimum crewing ratio is 1.5 pilots per aircraft. The ratio takes into account that simulation training will be a strong feature of fighter combat training with the F-35. Nonetheless, to maintain the level of combat proficiency believed necessary to give Australian pilots the edge over aggressors in actual combat, aircrew will still require a significant amount of time in the air – 170 hours per pilot per annum is suggested.

This leads to the utilisation of the aircraft - the Annual Rate of Effort (hrs) – and thus the aircraft life depending on the fleet size. The RAAFSCA analysis suggests that a fleet of around 95 to 100 aircraft is the optimal size to achieve a critical mass that will preserve a credible JSF operational capability for 25 years or more. To drop below that size fleet would mean that either the number of operational squadrons fielded in a conflict or the number of aircraft per squadron must reduce, as might also the amount of flying training provided to aircrew. Such a lesser number of aircraft could be flown more frequently to achieve the desired sortie rate for operational and training missions provided a greater



number of trained combat aircrew can be raised. However, flying each aircraft at higher rates of effort will obviously shorten the life of the fleet.

## 6. Force Multiplier - Infrastructure

A “critical mass” of four operational squadrons depends on the support of other assets and modern state-of-the-art weapons systems. These assets include an AEW&C capability and aerial refuelling together with air combat and strike weapons such as short, medium and longer range air-to-air missiles and standoff strike weapons with varying standoff ranges for specific target types. Modern combat radars and other onboard sensors provide situational awareness thus making the aircraft more than a fighter/strike platform. This additional capability requires an enhanced networked communications capability to be fully effective and operationally useful. The RAAFSCA analysis suggests that increased emphasis be given in the future to capability such as the Tactical Targeting Network Technology (TTNT), a new set of data link hardware and waveforms. This matter may well be addressed in classified considerations of the NACC capabilities.

There is also a concern within the RAAFSCA that five tanker/transport may prove inadequate into the future. This concern arises from several issues:

- a. The RAAF will shortly be in a position where it can only conduct long range air combat operations when tanker support is available.
- b. The ADF is currently deployed in a number of separate theatres, straining air lift capacity.
- c. While the new A330 tanker/transport has strategic lift ability with the potential to be of major benefit to the ADF, there are insufficient platforms on order to allow this potential to be developed.

These interrelated matters require further analysis within the Department of Defence to understand their effect on Australia’s desired air combat capabilities.

## 7. The RAAF’s Expeditionary Air Force Objective and Air Combat and Strike Capability

The 2000 Defence White Paper described Australia’s air combat capability as one which will: “...allow Australia more scope to determine the pace and location of hostilities...impose major defensive costs on an adversary contemplating hostile action against us...provide excellent support to Australian forces deployed abroad and...offer a valuable option of contributing to regional coalitions.” The RAAFSCA believes that this description remains appropriate for the future, but that the experience of RAAF operations over the past ten years underscores that the RAAF must complement and operate in synergy with other ADF capabilities, and for the RAAF to be fully effective and relevant, it must be interoperable with Australia’s allies and partners.



As part of its evolving restructuring for the future, the RAAF introduced the 'Future Air and Space Operating Concept' (FASOC) which articulates the objective of the Air Force capability upgrade outlined in the current Defence Capability Plan (DCP). FASOC also describes how the future force created by the DCP will operate up to about 2025. The intention is that the RAAF will be a networked, *expeditionary force* capable of creating a broad range of tailored effects, consistent with the requirements of a joint military and whole-of-government National Effects-Based Approach to Australia's security. It will operate seamlessly in the joint environment, be able to integrate with the US, UK and other allied forces, and it will be interoperable with coalition and regional partners.<sup>3</sup>

The ADF generally requires an *expeditionary capability*, because the expansive geography of Australia and its territories makes all deployments, even domestic deployments, expeditionary in nature. Whether the air combat force is defending Australia or undertaking operations abroad with allies and coalition partners, it needs to have the characteristics of an *expeditionary air force*. Achieving an expeditionary capability is mainly about the structure of the air combat force and its supporting infrastructure. Expeditionary Air Force characteristics also strongly support establishment of the Squadron as the primary Air Force operating entity, with the two wing structure providing consistent management of "like" operations. The previous Air Commander Air Vice-Marshal John Quaife explained that well:

*"The challenge for Air Command is to maintain and foster the development of the RAAF's ability for the command and control of air operations, ... The process has taken us well beyond a bureaucratic re-organisation. The recasting of Training Command as a Force Element Group has seen the RAAF's former Training Command bases become part of Combat Support Group and therefore part of our expeditionary effort. As a consequence the RAAF has been able to broaden its approach to expeditionary support operations. The old structure was based on an expectation that operational deployments would be isolated events of limited endurance. Our experience over the past ten years indicates that a far more enduring and complete expeditionary capacity is what we require. We have revised our approach and structure such that we can now draw on all our people across the entire Combat Support Group to deliver the expeditionary capability."*

4

The RAAF's No 396 Expeditionary Combat Support Wing (396ECSW) today provides the Combat Support Group with a diverse range of combat support and fixed base services, including ongoing support to the bare bases in northern Australia. The Expeditionary Combat Support Wing also provides the capability to activate and support aerospace operations from forward or deployed locations to meet contingency requirements. The wing's role includes command and control of airbase and fixed and bare base services, and a range of airbase supply and flight line services. The RAAFSCA

<sup>3</sup> Australian Air Publication AAP1000-F 'The Future Air and Space Operating Concept', RAAF Air Power Development Centre, Canberra ACT, March 2007, pp7

<sup>4</sup> Air-Vice Marshal John Quaife, Air Commander Australia, Address to the Chief of Air Force Show Conference, 'Smaller Air Forces and the Future of Air Power', Melbourne VIC, 19 March 2007, pp3



believes that this re-structuring of the support arrangements for air combat force is essential for the expeditionary nature of the RAAF operations today and in the future.

## 8. Network Centric Warfare (NCW) and Air Combat Capability

Military experts and leading academic strategists agree that in future air conflicts air power will be utilized as a vital first stage and enduring campaign requirement. For Australia, this pre-eminent role results from the overarching air power capability which includes but is not limited to air combat and strike missions. Future air power provides a gateway to waging battle differently, eg, combat aircraft are now also important intelligence, surveillance and reconnaissance (ISR) platforms. Air power using upgraded 4th and 5th generation combat aircraft will bring to a military force three basic, but complementary capabilities:

- a. Information superiority, achieved by synthesising intelligence, surveillance and reconnaissance operations that are persistent and high-fidelity.
- b. The ability of air power to influence the battlespace in both conventional and unconventional ways.
- c. The ability of air power to respond in a timely and proportionate manner to create precise effects with limited collateral damage.

To achieve these capabilities Australian air power will advance into what is commonly termed Network Enabled Capability (NEC) – linking sensors, decision makers and weapons systems so that information can be translated into synchronized and overwhelming military effect at optimum tempo. NEC is a UK Defence term and is similar to Network Centric Warfare (NCW) and Network Enabled Operations (NEO) the preferred ADF term. Australia's expansive geography and the sheer size of its Exclusive Economic Zones make monitoring and protecting its sovereign territory a significant challenge. Control of the airspace above the territory and maritime approaches, is especially crucial and the key to the solution is achieving the Network Enabled Operations capability. The RAAF's F/A-18 fleet should achieve an appropriate measure of network enabled capability by around 2015, but a much improved capability will arrive with the F-35 JSF air combat systems.

To bring this notion into the domain of actual air combat rather than the theoretical world of ideas and concepts, sentiments expressed by the (then) Air Commander Australia at the 2007 CAF Conference are useful:

*“Our operational re-shaping within Air Combat Group revolves around a deliberate effort to rebalance the Group’s ability to deliver control of the air and the tactical engagement of targets. We must preserve our ability to independently strike strategic targets, but our emphasis needs to shift towards the close integration of our combat power with that of ground forces. This transformation must focus on the soldier supporting the airman and the airman supporting the soldier – as equal partners. To that end we have been working to develop a robust Joint Terminal Attack Controller capability and*



*we are in the formative stage of developing a Special Tactics Squadron capability. This work will support the deployment of specialist airmen to facilitate the close and effective integration of air power with both conventional land forces and special operations units.”<sup>5</sup>*

Network enabled operations from an air combat perspective will involve decisions made and communicated in near real-time using precise command and control communication systems. Essentially the RAAF will possess on-mission, real-time operational flexibility by working in conjunction with networked operational and support systems. Air power platforms, their planners, commander, communications, sensors and weapons, as well as their supporting systems will all be part of the network.<sup>6</sup> The ultimate aim is real-time or near real-time “sensor to shooter” data transfer with the “Commander’s intent” providing the guidance for operational action. The aim of “Information Operations” is to enhance ADF decision-making while reducing that of potential and real adversaries.

The current Defence Capability Plan (DCP) has a number of projects aimed at taking the RAAF combat capability from being a marginally networked force to one that is fully networked by around 2016. As these projects deliver new capability, the RAAF air combat force will be fully networked with other indigenous military and national security capability. Four major developments in the DCP will bring this about:

- a. Introduction of wide-bandwidth high resolution data and communications connectivity across the force.
- b. Persistent surveillance and reconnaissance air platforms with high-fidelity sensors.
- c. Improved integrated and adaptive command and control systems leading to a superior capability in battle management decision making.
- d. New and improved operational systems providing multi-mission capability.

The RAAFSCA believes that these DCP projects must be progressed without any disruption if the all- F/A-18 air combat force is to carry the responsibility of providing the capability to defend the nation in the sea/air environment as well as contribute to regional (and global security) in the next decade and through to the introduction of the New Air Combat Capability. The RAAFSCA also believes that decisive “Information Operations” will not be possible without the contribution that air power can make. This contribution, in turn, depends on the availability of reliable high bandwidth communications capabilities. It is possible, even likely, that more needs to be done to enhance communications capabilities. The RAAFSCA believes that more needs to be done to enhance communications capabilities, thereby facilitating NEO. However, due to the classification of this subject the Association accepts that more detailed analysis needs to be conducted in an appropriate forum.

<sup>5</sup> Air Vice-Marshal John Quaipe, Air Commander Australia, Address at the CAF Air Show Conference 19 March 2007, Melbourne pp 5.

<sup>6</sup> Australian Air Power AAP1000-F, The Future Air and Space Operating Concept, Air Power Development Centre, Canberra ACT, March 2007 pp22



The RAAFSCA suggests that 'Information Operations' is not a standalone capability, nor is it the preserve of any one Service element. Rather it is an essential element of the modern battlefield. As stated by a former US Army Chief of Staff: "Information is the currency of victory on the battlefield"<sup>7</sup> The modern air platform is essential in attaining decision superiority. The air power characteristics of persistence, perspective, reach, penetration, responsiveness and versatility suggest that not only is an NEO capability essential in maintaining air superiority but that the F/A18 fleet of the next decade and the F-35 JSF which will replace that fleet will be at the forefront of Australia's overall Network Centric Warfare effectiveness.

## 9. People and Industry

The challenge for the RAAF beyond 2015 is far greater than transitioning to a new air combat capability. The RAAF will need to combine its retained legacy capabilities with the new capability to create an integrated and networked force for the future. If the RAAF in the future goes to war in a coalition force, it cannot rely on obtaining missing capability from allied air forces as it has done in the recent past. The air combat force must be self-sufficient and self-reliant as a coalition element.

Additionally, the RAAF approach to utilisation of people and defence industry has matured significantly in recent years. The RAAF accepts, as does the whole ADF accept, that people are as valuable a resource as any other element of the fighting force. Levels of skill, experience and training, professionalism generally, and maturity of thought and emotion are key drivers for combat success. Similarly, with an increasing percentage of support and maintenance being provided by defence industry, the RAAF is now dependent on industry even for support in operational areas. The new environment of integration of industry in a combat force and the emergence of highly capable service and civilian people involved in operational deployments represents a national capability which must be retained, harnessed to its full extent and managed appropriately.

### 9.1 People

The permanent RAAF workforce of 13,800 is moving to 14,200 but indications are that on present wastage and recruitment levels there will be a shortfall of between 700 and 1900 by 2017. The shortfall may be avoided through a change in economic conditions within Australia should there be a sustained downturn of the economy and young people turn to the Defence forces for employment opportunities. Additionally, the shortfall can be offset through an increased use of Defence industry resources. Nonetheless, this personnel matter remains one of the most difficult challenges for the RAAF in establishing the force size needed to sustain air combat capability at the level sought by Government. The RAAFSCA cannot add much more to that discussion but knows that the matter is receiving constant attention within Air Force Headquarters.

<sup>7</sup> General Gordon Sullivan, Former US Army Chief of Staff, US Joint Publication 3-13, Joint Doctrine for Information Operations, 09 October, 1998.



## 9.2 **Industry**

By the time the JSF is in inventory, a much stronger partnership between Defence and industry will be needed, particularly in terms of:

- a. In-service support
- b. Shared workforce planning
- c. Training
- d. Deployments of industry personnel and assets offshore
- e. Infrastructure and cost sharing between industry and Defence
- f. Surge capacity

Closely related to this is the need for a parallel relationship between Defence, the original equipment manufacturers (OEMs) and Australian industry. This partnership will be needed to:

- a. transfer intellectual property, technical rights and training for support of the system; and
- b. integrate Australian industry into global supply chains to ensure commercially viable workloads.

Such partnerships can only come about through strong relationships underpinned by shared risk and trust. Successful relations grow from people, their attitudes, and team dynamics. Effective partnerships require compatibility of cultures, a joint focus on service delivery, and flexibility. These, in turn, will develop relationships that are sustainable over the long-term. The RAAFSCA suggests that the full partnership should encompass Defence/DMO, the aircraft and system manufacturers, Defence's support contractors, and the myriad of subcontractors to the major parties. Formality and legal procedures should be countenanced only as a last resort.

## 10. **The Future Air Force Beyond 2025**

This submission focuses mainly on the transition of the RAAF's air combat capability from the current fleets to the future F/A-18 fleet of upgraded A/B and new F models. It comments on the capability enhancement from the New Air Combat Capability proposal to acquire the F-35 JSF aircraft system but confines its views to the status quo at around 2025. The Air Combat Capability Review seeks comment on the extant plans for the development of air combat capability to 2045. The RAAFSCA is aware of the publicly available plans expressed principally in the Future Air and Space Operating Concept document (AAP1000-F). While the Association could review and comment at length on that publication, the preference is to make one general observations and to express support for the thrust of the vision portrayed.

In the section 'An Evolving Concept for Future Air Power' the publication explains:



*“Operations undertaken by our Air Force in the future will have at their foundation the creation of appropriate and measured effects by advanced air systems through precise control of the battlespace. Fundamental to this will be accurate and timely Intelligence, Surveillance and Reconnaissance (ISR), seamless Command and Control (C2) and decision systems, and flexible adaptable people and platforms.”<sup>8</sup>*

That summary embodies the intent of the capability upgrades expected from the projects in the current Defence Capability Plan, and there is strong support among the RAAFSCA members for those. Yet, the statement goes on to acknowledge that until the new capability systems are delivered and in service, there will remain uncertainty - to some degree - on the true functionality of the new capabilities and synergies with other systems. The stated belief is that much of the advantage to be gained from the new capabilities will rely on Air Force specialists to explore and exploit the potential of the new systems, and consequently to test and devise new ways of conducting and sustaining operations. The RAAFSCA believes that the rate of progress in developing NCW capabilities and the systems which support these capabilities is such that critical and continuing review of the suitability of projects in progress will be critical in achieving the Air Combat capability required to maintain air superiority or even equality. This may be achieved within the Kinnaird process<sup>9</sup>, but the RAAFSCA believes that the DMO team could well be augmented by industry specialists contributing to a continuing review process.

Other than that observation, the vision of the future RAAF and especially for the air combat operations is stimulating and challenging. RAAFSCA members look forward to seeing the transition of the air combat capability from the current state to the future state, confident that the RAAF and the Department of Defence will meet the challenges.

## 11. Conclusion

The aim of this RAAFSCA submission is to comment on just four aspects of the future air combat capability of the RAAF. The limitation occurs because, for some other aspects of the overall consideration, an in-depth knowledge of aircraft performance is required and in other aspects classified information is needed to fully analyse issues. Additionally, the RAAFSCA is confident that the Departmental team convened to conduct the Part B review and to receive public submissions has the knowledge, information and skills to come to the right conclusions and appropriate recommendations. The views and opinions expressed above nonetheless represent knowledge and experience of current, recent and former generation Air Force officers with many years of professional contribution to air combat and strike policy, practice and management.

In terms of the future threats to Australia that would see the employment of air combat and strike to defend the nation, the RAAFSCA believes that in the next 15 to 20 years

<sup>8</sup> Australian Air Publication AAP1000-F, The Future Air and Space Operating Concept, Air Power Development Centre Canberra ACT, March 2007, pp25

<sup>9</sup> Defence Procurement Review 2003, Malcolm Kinnaird, AO, Chairman Department of Defence Publication



Australia may well face a major threat to its security. Whether or not that threat is something as serious as that postulated in this submission is not the issue. The fact is that the ADF, and in this case the RAAF, must be capable of defeating a worst case scenario of a direct armed incursion on Australian territory. With that capability, a deterrent effect is provided which should lead to the avoidance of such an event.

The air combat component of the armed forces becomes the 'front line' of Defence of Australia given the surrounding sea/air gap. Highly sophisticated long range surveillance capability plus intelligence, ensures Australia has the means to receive early warning of a potential hostile act involving another nation's sea and/or air forces. The RAAF requires, at all times, the air combat and strike capability and capacity to successfully defend the sea and air gap against offensive air and sea initiatives. With the continuing growth of highly capable aircraft and weapons systems in the region, the RAAF is involved in a competition to maintain its edge in air combat and strike capability. Australia must ensure its Air Force is superior to all but a few global heavyweight Air Forces.

The delays in securing a satisfactory replacement or upgrade for the F-111s and the prospect that the F-35 JSF may not be delivered in the original timeframe has led to a need to fill the gap in the RAAF's air combat and strike capability. The RAAFSCA believes a sensible solution to bridge that gap is to proceed with the acquisition of a squadron of Super Hornets, equipped with the sensors and weapons that make that aircraft a formidable strike and air combat platform. But it should only be considered as an interim solution, and the F-35 JSF should continue to be considered the optimal solution because its strike and air combat capabilities are far superior to the Super Hornet and only the F-35 will provide the level of capability needed to match/exceed the increasing capability of regional Air Forces.

But the New Air Combat Capability F-35 platform itself is not what will bring the improved capability needed by Australia. The RAAF must have the capacity to concurrently sustain one large and one medium sized operation in separate locations and also to conduct separate strike missions. This means that the number of platforms and the way in which those are organised are vital to establishing the critical mass able to defeat the threat from advanced and capable aircraft and systems that would pose a threat to Australia. The RAAFSCA analysis concludes that to obtain critical mass, the New Air Combat Capability requires two wings each comprised of two squadrons and that the squadrons are organised into three flights each having four aircraft. Then the maintenance support, training and allowance for attrition over time points to a requirement for 95 new 5<sup>th</sup> generation platforms.

The F-35 program, should Australia proceed to acquire that aircraft and system, would, on present indications, provide a satisfactory transition from the upgraded F/A-18A/B aircraft to the early deliveries of F-35 followed by an orderly transition from the Super Hornets to the later deliveries of the F-35 optimised for the strike role. Such an approach seems both reasonable and responsible and it would provide the best solution available today for ensuring the evolution of the RAAF's air combat and strike capability remains viable in the context of the threat scenario through to 2025. After 2022/23 when the last of the F-35s are fully entered into service, the RAAF will have a much improved



capability for air combat and strike that will balance any increase in the threat level or opposing capabilities.

## 12. Recommendations

As a result of its considerations, the RAAFSCA recommends that:

- a. The Australian Government proceed with its intentions to retire the F-111 in 2010 and to replace that strike capability through the acquisition of 24 Super Hornets with standard sensors and weapons.
- b. The Australian Government confirm its acquisition of the F-35 JSF to provide a New Air Combat Capability system from the next decade to midway through this century.
- c. Critical mass be achieved with the F-35 JSF through not only the number of platforms/systems acquired (that number is recommended to be no less than 95) but also through the organisation of the F-35 into flights, squadrons and wings (the squadron being the key fighting entity to maximise the F-35 air combat and strike effectiveness).
- d. Irrespective of which operational aircraft/systems are available in either the near term or when the New Air Combat Capability is available, the RAAF should combine its retained legacy capabilities and the new capability to create an integrated and networked force for the future. This involves not only the introduction to service of emerging technologies such as Tactical Targeting Network Technology (TTNT) and new data link hardware and waveforms, but also supporting systems such as tanker transport assets and air surveillance, battle management and airspace control systems.
- e. The RAAF Air Combat and Strike Group, as part of the expeditionary air force concept, should continue to adjust to the reality that full capability in the future will only be achieved through the integration of industry in support of combat forces and the emergence of highly capable service and civilian people involved in operational and supporting deployments.
- f. NCW capability should be seen as a rapidly emerging force multiplier which must be supported by continuing professional review in a classified environment.



### 13. Team Acknowledgement

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