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Inquiry into Australian Defence Force Regional Air Superiority

Contact Persons: **Dr Alan Stephens**
Visiting Fellow

Address: **Strategic and Defence Studies Centre**
The Australian National University
Canberra ACT

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A submission to the
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Dr Alan Stephens

Visiting Fellow
Strategic and Defence Studies Centre
The Australian National University
Canberra ACT

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Introduction

For over sixty years control of the air has been the essential start-point for the Western way of war. By mid-1944 allied air forces had largely asserted their supremacy in both Europe and the Pacific, as a consequence of which the Nazis and the Japanese found their positions increasingly untenable. The permissive air environment was exploited by the allies to conduct uncompromising bombing campaigns which devastated their enemies' armed forces, industries, and cities, and which eventually brought their war economies to their knees. Simultaneously, allied reconnaissance aircraft were free to collect valuable intelligence; airlift was able to add a new dimension to manoeuvre; and strike/fighters shot-up enemy armies, navies, and supplies almost unimpeded. During the last year of the war allied surface forces were able to operate with little enemy air interference. On D-Day 6th June 1944, for example, allied air power flew some 13,000 sorties in support of the Normandy landings, while the Luftwaffe could manage just over one hundred in opposition. As a consequence, the Werhmacht found it was unable to manoeuvre effectively in daylight.

Air dominance was less decisive in Korea and Vietnam, where the combat power of the American-led coalitions was circumscribed in the one instance by politics and in the other by terminally flawed strategic judgments. Nevertheless, in both conflicts, control of the air ensured that, at the least, friendly armies enjoyed an immense tactical advantage that helped win (or save) battles, if not wars.

The lessons derived from those conflicts have been applied to irresistible effect in the past fifteen years in the Middle East, the Balkans and Central Asia. While ultimately the application of joint combat power was the key to military victory in the campaigns in Iraq, the former Yugoslavia and Afghanistan, air supremacy was the indispensable precondition.

Australia's Regional Dominance

In similar vein, the Australian Defence Force has been the dominant air power in the Southeast Asia and Southwest Pacific regions since the end of World War II. Such

has been the extent of that dominance that Australia's army and navy have been able to prepare their operational plans on the assumption that not only will they be free from enemy air attack, but also that they themselves will be able to exploit the skies unimpeded (for manoeuvre, reconnaissance, resupply, medevac, strike, etc).

Invariably superior to any potential regional competitor in both quality and quantity, and supported by an excellent indigenous research and development and industrial base, the Royal Australian Air Force in particular has been the centrepiece of Australian military strategy since the mid-1980s. Formally articulated in the policy information paper *The Defence of Australia 1987*, that strategy has turned on dominating the air/sea gap to Australia's north.

Control of the air has been a prerequisite for every one of the ADF's recent expeditionary operations, including the major campaign in East Timor; and it remains the essential start point if Australia is to manage events in the arc of instability that lies within the air-sea gap, noting here the worrying activities of fascist Islamic groups in Indonesia, southern Thailand, and the southern Philippines, and the almost chronic degree of political volatility in Papua-New Guinea.

Because of the fundamental importance of control of the air, the arrival in the region of high performance fourth-generation fighters such as the Russian-built Su-27/30 'Flanker' and Mig-29 'Fulcrum' has seen questions raised about the ADF's pre-eminent status, with some commentators suggesting that the Flanker series is 'vastly superior' to Australia's current fleet of F/A-18 fighters, and that it will outperform the F/A-18's likely successor, the F-35 Joint Strike Fighter.

But commentary which equates the possession of weapons systems with a demonstrable military capability reveals little comprehension of warfare. Advanced military capabilities demand far more than the mere ownership of technology: they also demand high quality people, excellent training, good doctrine, effective command and control, the ability to conduct joint operations, and networked systems, all working together, a model which is far beyond the capacity of most defence forces, let alone those of the Southeast Asia/Southwest Pacific regions.

Presently, substantial numbers of Su-27/30s are entering the inventories of the Chinese and Indian air forces, and operationally insignificant numbers are being acquired by Indonesia and Vietnam. Should Australia ever find itself in direct military conflict with either of the nuclear-capable, emerging superpowers China and India (in itself a near-ludicrous proposition) without American support, then the capabilities of

the respective combat aircraft are likely to be academic. And in any other hypothetical defence contingency, the ‘platforms equals capabilities’ mentality is some forty years out of date.

An air platform has not amounted to a capability in its own right since at least the time of the American-led war in Indochina, when strike/fighters engaged in control of the air and bombing missions over North Vietnam could not operate effectively unless supported by an extensive ‘package’ of airborne enabling forces, including electronic jamming, suppression of enemy air defences, intelligence processing, and tankers. While the technical means through which those kinds of services are delivered has in some cases changed since the 1960s, the requirement has not.

Furthermore, and most significantly, Airborne Early Warning & Control has since been added to the matrix, thus introducing an information network dimension which has fundamentally changed the nature of air combat. And in the next few years, a handful of advanced defence forces, including the ADF, will integrate data from even more networked control and/or information sources (satellites, unmanned aerial vehicles, ground radars, navy ships, army formations, etc) into the total system. The end result will be an unequalled degree of situational awareness, which historically has represented a combat advantage of the highest order.

To reiterate, very few defence forces will be capable of mastering the necessary concepts, systems, and organisational and personnel issues associated with network-centric warfare. In Southeast Asia and the Southwest Pacific, for the foreseeable future, only Australia and Singapore can realistically aspire to construct NCW capabilities. Even if other states acquire all of the necessary hardware and software, the challenge of making everything work as a system will be beyond them, at the least until 2020.

For the ADF, the construction of an NCW-enabled air superiority system will involve, among other things, intellectual and financial investment in the F-35 Joint Strike Fighter, the Wedgetail AEW&C aircraft, the A330-200 multi-role tanker/transport, stealthy standoff weapons, air warfare destroyers, and an upgraded command and control system. Additionally, the F/A-18 Hornet strike/fighter will be upgraded and will remain the primary control of the air weapon until it is replaced by the F-35 around 2015.

The key question at this stage is: what kind of performance can we expect from the networked air superiority system the ADF is assembling? The answer lies not in simplistically comparing the flight performance of individual platforms but, rather, by assessing the total system.

There is a consensus amongst air defence professionals (fighter pilots, battle managers, commanders) that the key to victory in the twenty-first century will be to dominate the beyond-visual range domain. Of the thirty-one Iraqi fast jets shot down in air-to-air combat during the 1991 Gulf War, twenty-two were victims of the Aim-7 Sparrow missile, which has a range of around fifty kilometres (that is, BVR), while only nine fell to the Aim-9 Sidewinder, with its range of about twenty kilometres (that is, within-visual range). The trend is obvious, and has been consolidated by the widespread replacement in Western air forces of the Sparrow by the Aim-120, with a range in excess of 100 kilometres.

In an environment where making the first detection almost invariably leads to the first kill, the recent upgrade of the F/A-18s' on-board radar is significant. Much more significant, however, is the integration of the Link 16 data-transfer system to allow the Hornets to 'talk' with the network of enablers that will detect hostile targets hundreds of kilometres distant. These enablers will include the over-the-horizon Jorn radar, AEW&C, AP-3C Orion surveillance aircraft, satellites, possibly smart tankers, and eventually high-altitude unmanned aerial vehicles. Within that kind of environment, aggressor Su-27s/30s without a comparable network could 'turn and burn' to their heart's content, but the evidence shows that most would be shot down before their pilots even realised they were at risk.

Should the network leak and the aggressors manage to close to within visual range, the crucial factors become the combined skills of the pilots and their controllers (situational awareness, allocating targets to shooters, etc), and the quality of the respective air-to-air missiles, sighting systems, and counter-measures. Here, the RAAF's acquisition of the British Asraam short-range missile, with its helmet-mounted sight-cueing and high off-boresight firing envelope, has given Australia's fighter pilots an outstanding weapon.

The eventual arrival of the F-35 will only enhance the ADF's control of the air capabilities. Clearly there are risks involved in choosing an aircraft that has not yet flown, but that was also the case when the F-111 was ordered in 1963; and unlike the F-111 the F-35 has already benefited from an extensive flight demonstrator program,

and from lessons learnt during the development of the world's only other very low observable (stealthy) fighter, the F-22A.

Unlike any other manned aircraft likely to appear in Southeast Asia in the next thirty years, the F-35 has from the outset been designed for network centric warfare. It will possess an exceptional suite of active and passive fully-integrated sensors and data fusion avionics, and as the region's only VLO platform it will enjoy a unique degree of BVR superiority. Stealth will not guarantee success, but it does confer an immense advantage. In a United States Air Force simulation involving a single VLO F-22A and five non-stealthy F-15s, the F-22A pilot reportedly knew where the F-15s were 'all the time' while the F-15s 'were not able to pickup and understand' where their opponent was. Consequently the F-22A 'shot down' all five F-15s within three minutes. It is reasonable to assume that the F-35 will be similarly effective. Should close-in fighting eventuate, the F-35's manufacturers claim it will combine the best high-speed/low-speed manoeuvrability characteristics of the F-16 and F-18.

The Changing Face of Control of the Air

Notwithstanding the ADF's continuing regional pre-eminence in the traditional setting – that is, in a theatre-level air combat environment – control of the air is, like everything else associated with national security, being affected by changes in the tactics used by interest groups (including governments) to pursue their objectives, a shift for which September 11 has become the symbol. The two main drivers of change are terrorism; and the continuing spread of ballistic, cruise, and short-range surface-to-air homing missiles. The end result is that while the traditional mission remains valid, the task is becoming much more diverse and complex.

Counter-terrorism provides the start point, as it has for so many security measures introduced since September 11; and here, control of the air has assumed a character that is perhaps not yet fully appreciated. The visit to Australia in October 2003 by United States president George W. Bush provided a striking illustration.

For some twenty-four hours the citizens of Canberra could hear and often see RAAF F/A-18 fighters maintaining a standing combat air patrol overhead the national capital to protect President Bush against a range of possible terrorists actions. The Hornets reportedly were armed, and were authorised to shoot-down 'suspicious planes' during the arrival and departure of Air Force One and to prevent possible

suicide air attacks against the president's accommodation, the national parliament (which he addressed), and so on.

A similar operation was mounted during the Commonwealth Heads of Government meeting at the Queensland resort town of Coolum in March 2002, when patrolling F/A-18s apparently were authorised to shoot-down any unauthorised aircraft that came within forty kilometres of the venue.

These operations should be regarded as remarkable, for at least two reasons. First, they bear little resemblance to the traditional application of control of the air. And second, with the exception of the hasty deployment of a squadron of RAAF F-86 Sabres to Darwin in 1964 during a period of heightened tension with Indonesia, the patrols flown overhead Coolum and Canberra were the first and only control of the air missions conducted in the direct defence of Australian security since World War II.

We can expect to see more of the same, and variations thereof, noting the frequent need for such measures overhead many cities around the world since September 11.

An equally unconventional challenge to Australia's continuing ability to control the air may come from shoulder-launched man-portable air defence system missiles (manpads).

On 8 January 2004 a United States Air Force C-5 airlifter taking-off from Baghdad apparently was hit by a surface-to-air missile; similarly, on 9 December 2003 a C-17 was hit. Other details are not clear, but both aircraft landed safely. More information has emerged regarding the civilian DHL Airbus A300 cargo jet at which two Russian-made SA-14 Gremlin manpads were fired on 22 November 2003. One missile hit the A300's left wing, which caught fire; again, the pilots managed to land safely. At least fourteen other attempts have been made to shoot-down civilian aircraft with manpads in Iraq in the past two years; additionally, a substantial number of US Army helicopters has been shot down by SA-7s and rocket-propelled grenades.

The manpads threat is not confined to Iraq. Two SA-7 Grails were fired unsuccessfully at an Israeli B-757 taking-off from Mombassa, Kenya, in 2002; while overall, in the past twenty-five years, some thirty-six missiles have been launched against civil aircraft around the world, leading to twenty-four crashes and 500 fatalities. Scores of military aircraft, especially helicopters, can be added to that total. During the USSR's invasion of Afghanistan from 1979 to 1989, for example, *mujahideen* foot soldiers armed with 'Stinger' manpads shot down so many

helicopters that the Soviets were forced to make fundamental changes to their tactics, a shift which many analysts believed altered the course of the war.

The surprising thing is that more attacks have not been made. A manpads is not difficult to transport, prepare, aim and fire. Both the SA-7 and the SA-14 are light enough for one or two people to carry and fire, and both missiles take less than a minute to assemble, aim and launch. Hundreds of thousands of shoulder-fired missiles have been manufactured in the past three decades, and Russian authorities have warned that 'tens of thousands' of manpads may have been stolen in the chaos that followed the disintegration of the USSR. Anything from 50 000 to 100 000 may be available on the international arms black market, with an SA-7 reportedly costing a mere A$7500.

An advanced manpads typically has a range of five kilometres, a ceiling of 4000 metres, and a speed around mach 2.0. When combined with the relatively slow climb and descent rates of airliners, those performance characteristics establish a threat envelop around airports about eighty kilometres long, ten kilometres wide and 4000 metres high. At a major hub, a dozen or more wide-bodied jets might be inside that envelope at any one time. The difficulty of detecting and then neutralising a manpads threat within the heavily urbanised areas that surround many airports is self-evident.

One response would be to equip airliners with military-style anti-missile defence systems (flares, lasers), a possibility which is presently being examined. Proscription is also under consideration, with efforts being made to establish a control regime for the production and sale of manpads, one such call coming from world leaders at the Asia-Pacific Economic Cooperation meeting held in Bangkok in October 2003. But previous attempts to control arms flows have been largely unsuccessful, and anyway, in this case, the horse would appear to have already bolted.

A much more immediate, proactive response to this most disturbing control of the air challenge is required. One possible approach may have been identified by the highly professional and innovative Israeli Defence Force, for whom the catalyst has been the imperative to establish a safer operating environment for the helicopters which are an integral part of their activities in the occupied territories.

Slower and less robust than fixed-wing aircraft, helicopters are highly vulnerable to ground fire, including manpads, rocket-propelled grenades, and a range of infantry weapons. Self-defence systems are available but, as the US Army's

disastrous experiences with its Apache attack helicopters in Afghanistan in March 2002 and in Iraq in March 2003 demonstrated, helicopters are best employed after control of the air has been achieved in the traditional manner, that is, by fixed-wing fighter and ground attack aircraft.

But the kind of threat posed by a suddenly-emerging manpads team or a fleeting gunman is unlikely to be countered by the traditional method. Consequently, in a most inventive concept, the IDF is developing sniper posts for its Black Hawk helicopters. Mounted on the side of the choppers, the posts consist of a platform and gunnery chair which remain relatively stable even during turbulence and aircraft manoeuvring. A sharp-shooter with a long-range sniper rifle is carried on the platform and is responsible for seeing and picking off suddenly-appearing militants before they can fire their anti-aircraft weapons.

At the other end of the threat scale, ballistic and cruise missiles constitute another growing non-traditional control of the air problem, American defence secretary Donald Rumsfeld having stated that the number of nations armed with medium- to long-range ballistic missiles is likely to 'double in the next decade or two'. The performance of these weapons also will improve, with North Korea's developmental Taepo Dong-2 missile reportedly having a range of around 15 000 kilometres; India's Agni-III about 4000 kilometres; and China's CSS4 and CSS5 both with intercontinental range.

There is no little irony in the fact that the Scud surface-to-surface missiles which caused so much concern in the two wars with Saddam Hussein's regime, and which continue to be a primary vehicle for the efforts of a number of 'rogue' states to develop long-range ballistic missiles, is a derivative of the Nazis' World War II V-2 ('Vengeance') weapon. The British Royal Air Force had no viable control of the air system against the V-2, and it remains a moot point whether one exists against its successors. Initial fulsome claims made on behalf of Patriot anti-missile batteries during the Gulf War in 1991 were subsequently found to have been grossly exaggerated, while no Scuds were fired in 2003. And while the Israelis have expressed confidence in their Arrow anti-missile system, which was declared operational in March 2000, it remains unproven in combat.

Still, the danger posed by medium- and long-range missiles armed with nuclear, chemical or biological warheads is simply too great not to demand a proactive response. For all the controversy associated with the US's long-standing

effort to develop a national missile defence system, which many critics assert is technologically impracticable and at some A$100 billion unaffordable, we should not be surprised that numerous nations are interested in either contributing to such a system or developing their own. It is no coincidence that the country presently most at risk, Israel, has had an operational anti-missile defence system (the Arrow-2) in place for five years, and the country next at risk, the United States, has made the development of an NMD one of its highest security priorities.

Other nations that have expressed strong interest in national missile defence systems include India and Pakistan (against each other), and Japan (against North Korea). And as Iran's position on nuclear weapons continues to generate unease, there is growing interest within the European community. Japan's proposed architecture of Patriot PAC-3 land-based systems and Aegis-frigate/SM3-missile sea-based systems may provide an affordable prototype for countries other than the US, and for whom a realistic objective would be to protect a specific point from a specific threat. By contrast, the Americans' objective for their NMD is to build a defensive shield that would protect the entire country against all threats.

Australia's decision to participate in the US's NMD may be driven more by the dictates of alliance politics than by the need for protection from any (presently non-existent) regional missile threat. Regardless of the politics of the decision, both the Jindalee over-the-horizon long-range radar system and the proposed acquisition of several advanced air warfare destroyers could be useful components of any US-led world-wide air defence structure, as well as perhaps providing the basis of a 'poor man's' anti-missile defence architecture for Australia.

A common feature of the manpads and ballistic missile scenarios is that, in contrast to the threat which gaining control of the air traditionally has removed – namely, enemy aircraft conducting strike, reconnaissance, and manoeuvre missions - the problem here is ground-based. It is this menace that is driving the US Army's interest in developing a theatre-level equivalent of NMD, titled Enhanced Area Air Defence System, which aims to protect deployed land forces from the collective menace of rockets, artillery rounds, mortar shells, cruise missiles, manned and unmanned aircraft, short-range ballistic missiles, and manpads. Expected to defend an area out to a radius of forty kilometres, EAADS would utilise a range of sensors and kinetic- and directed-energy weapons.

Like the IDF's helicopter sniper posts and NMD, EAADS implicitly acknowledges the changing face of control of the air; specifically, if focuses on ground-based responses to emerging threats.

Indeed, in an air defence threat environment that has become far more difficult to manage, land forces may have to assume greater responsibility in general for gaining control of the air. There is any number of precedents, two of the more noteworthy being the capture of Luftwaffe airfields, and therefore the negation of Nazi air power, by advancing allied armies following the Normandy invasion in June 1944; and the breaching by Ariel Sharon's armoured columns of the Egyptians' previously impenetrable (to the Israeli Air Force) ground-based air defence system along the Suez Canal during the first week of the Yom Kippur War in 1973.

To take the point further, in the weeks leading up to the start of Operation Iraqi Freedom in 2003, Australian, British and American Special Forces played a critical, clandestine role by ensuring that western Iraq was free of Scuds which might have been fired at Jordan and Israel in an attempt to broaden the impending conflict. Again, given the nature of current threats, we may see this non-traditional kind of approach to achieving control of the air being applied more often.

Air Warfare Destroyers

Special mention must be made of the ADF's proposed acquisition of three air warfare destroyers at a cost of some A$6 billion. As noted above, those ships may have a role to play within an American-dominated global missile defence system. However, their value against other emerging threats such as short-range, surface-to-air homing missiles, surface-skimming cruise missiles, and a wide variety of highly mobile, rapidly launched anti-aircraft weapons is questionable; furthermore, their vulnerability to a coordinated attack by high-speed, air launched anti-ship missiles should be cause for concern. Precisely how such ships might contribute usefully to, say, an operation similar to the one mounted in East Timor, remains unclear. In short, these vessels are inflexible, of dubious operational relevance, and hugely expensive.

Conclusion

Reduced to its basics, warfighting consists of attack and defence. Because irresistible precision attacks by manned aircraft have become the West's greatest asymmetric advantage, and because that advantage in turn depends on first establishing control of

the air, the traditional method of gaining air superiority remains valid; furthermore, that method also removes a major potential danger (manned strike aircraft) to friendly surface forces.

The challenge for the ADF is to construct a network-centric air combat capability at a time when severe budgetary pressures have been imposed by the combination of an exceptionally demanding operational tempo, the high running costs associated with aging platforms, and a pressing need to modernise. Despite those pressures, we can be confident that the ADF's existing and emerging control of the air system will be capable of maintaining its long-standing regional superiority within the traditional theatre-level setting.

But as the threat of long- and short-range missiles grows, the face of control of the air is changing. If Western defence forces in general and the ADF in particular wish to retain the immense comparative advantage inherent in air supremacy, and if they wish to be able to protect their own vulnerabilities, they must be prepared to introduce organisational practices which will represent a significant departure from the past. Specifically, it may be the case that land forces will have to assume an increased responsibility for control of the air.