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**EMPLOYING SMART TECHNOLOGY IN LOW
INTENSITY CONFLICT**

By

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About the Author

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INTRODUCTION

‘... smart crews and smart weapons used in smart ways must be the way of the RAAF’¹

Before the 1991 Gulf War, at the very mention of infra-red targeting systems, thermal image intensifiers or laser guided weapons, the average citizen (and most military personnel) would nod knowingly but have very little idea of the operational concepts for employment or capabilities of such equipment. The lack of appreciation was understandable given that the only previous public display of precision systems came during the very limited United States campaign in Libya in 1986, when the USAF released F-111F Pave Tack infra-red video of their successful raids on the three selected targets around Tripoli. Before Libya, over a decade had elapsed since the conclusion of the Vietnam War which provided the last opportunity for general public observation of the military at work through the wide circulation of mass media releases.

The Gulf War was the first prolonged opportunity the general public has had to view the operational employment of almost two decades of military technological advances. Observers of the conflict regularly saw targets being unambiguously located at night and then struck with precision using some form of ‘man-in-the-loop’ guidance system attached to lethal weapons. The high degree of aircraft immunity from enemy attack was another notable aspect of the Gulf War. Those two attributes – being able to see in the dark and to strike with precision – have transformed the layman’s understanding of modern warfare, whilst the immunity from enemy attack was achieved through being able to invoke a benign environment over the battle area. Initially air superiority and eventually air supremacy over Iraq enabled the allied forces to maintain that benign environment above the lethal and unjammable rifle, gun and man-portable missile fire which constituted the majority of the low level air defence system. While stealth technology played a part in that, it was not all-pervasive: many traditional air platforms were able to penetrate Iraqi air space and operate with immunity thanks to that benign envelope at medium to high altitude over most targets.

‘The decisive character of our victory in the Gulf War [was] attributable in large measure to the extraordinary effectiveness of air power’.² However, the Gulf War was a long way from what the Australian Government’s strategic guidance terms ‘credible contingencies’. The very mention of low level conflict (LLC), escalated low level conflict (ELLC) or more substantial conflict (MSC) is normally enough to guarantee a vigorous debate within the Australian defence community. Proponents of endorsed guidance will argue that in Australia’s region of direct military interest, LLC or ELLC are the only credible threats likely to emerge in the near future with little warning; while opponents will argue that the high level capabilities evident in the Gulf War are quickly spreading to our region. Regardless of either position, guidance tells us that LLC or ELLC is what the Australian Defence Force (ADF) should be prepared to

¹ Funnell, Air Marshal R. G., ‘A Small Air Force and its Air Power’, Transcript of the 1987 Sir Ross and Sir Keith Smith Memorial Lecture, Adelaide, October 1987, p 14.

² United States Secretary of Defence R. Cheney, as reported by J. T. Correll, *The Semifinal Verdict*, *Air Force Magazine*, Washington, June 1992, p 6.

counter in the short term and that our force structure and training must be aimed at perfecting defence against those credible contingencies. 'More substantial conflict involves high level, sustained military operations against Australia or within the RDMI which would require the entire Australian Defence Force and possible support from alliance partners to combat'.³

What many analysts, large sections of the general public and even some members of the ADF do not realise is that within the RAAF the three offensive air groups, namely the Tactical Fighter Group (TFG), Maritime Patrol Group (MPG) and the Strike Reconnaissance Group (SRG), all operate with equipment similar to that observed during the Gulf War. The TFG's Hornets are now operating with a forward looking infra-red (FLIR) and will eventually be equipped with a laser target detector and ranger (LTDR) capability; the MPG's P-3 Orion aircraft operate a FLIR for target identification; and the SRG's F-111Cs have all been modified to carry the Pave Tack infra-red targeting and laser designation system. Much of the footage shown on TV during the Gulf War came from the recorded images of USAF F-111F aircraft conducting Pave Tack strikes at night using laser-guided or data linked TV or IR guided bombs (the so called 'smart' bombs). Even the F-117 Stealth fighter/bomber employs an infra-red and laser targeting system which is almost identical to the RAAF's F-111C Pave Tack system. Whilst the sophisticated infra-red targeting equipment installed in the three different RAAF aircraft was procured for employment in higher levels of conflict than is deemed credible at present, the application of such technology in LLC or ELLC could give Australia the edge it needs to combat the enemy without allowing our response to become disproportionate to that threat.

UNDERSTANDING THE CAPABILITY

The current F-111 Pave Tack system and the F/A-18 equivalent operate using similar principles. Any object hotter than absolute zero radiates heat regardless of the time of day or night. The wavelength of that radiation varies with the temperature; consequently, different objects will give off a different 'signature' depending on size, mass and substance. Hence, those clear pictures of bridges and buildings seen on TV during the Gulf War were nothing more than objects radiating different wavelengths of infra-red energy. The important aspect is that the radiation occurs at night just as well as in daylight; therefore, no degradation of target identification occurs when the sun goes down. What could not be seen on those film clips from the Gulf War was the powerful laser spot on the target which is perfectly harmonised to the 'cross hairs' or reticle in the centre of the screen. The aircraft weapon systems operator has the ability to select and refine the aimpoint as well as controlling when the laser is activated or deactivated. The MPG's P-3 FLIR has no laser potential and therefore it has no offensive potential other than aiding maritime target identification. Consequently, even though the ability to identify maritime targets at night is a significant capability, the P3 will not be further evaluated in this paper.

Once a laser spot is correctly positioned on the desired aimpoint a 'smart' bomb may be released and will guide itself to the illuminated point on the ground. The laser

³ Air Power Studies Centre, AAP 1000 *The Air Power Manual*, RAAF Base Fairbairn, Canberra, 1990, p 63.

beam, being nothing more than invisible light, is not affected by aircraft speed, altitude, gravity or wind; consequently, the bomb can achieve a direct hit regardless of numerous environmental factors which traditionally have affected the accuracy of aerial bombing. The accuracy achieved is independent of release altitude, so during the Gulf War the high altitude 'benign environment' previously referred to was established and yet direct hits were routinely demonstrated. Indeed, the technique is so accurate that specific aim points on individual targets are now required. 'It is no longer enough ... for intelligence to report a target within a given complex of buildings. Targeteers want to know which part of what building. A precision-guided weapon may be able to hit it on the nose'.⁴

Smart bombs are nothing more than dumb bombs with a 'smart' kit attached to them. In the case of laser bombs, a general purpose 250, 500 or 1000kg dumb high explosive weapon has a laser detector and guidance unit added to the front of the bomb body and enlarged stabilisation fins added to the rear. The three dumb bombs then become GBU-12, GBU-16 and GBU-10 'smart' weapons respectively. Other smart weapons rely on difference guidance systems, which provide flexibility in attack options depending on where the desired or optimum release point is. For the purposes of this paper only the laser-guided weapon will be discussed; although, even in some LLC and definitely in ELLC, more weapon sophistication will be required to prevent delivery platform attrition. The position of the benign envelope, or the optimum release point, becomes a critical factor in any conflict, but is of pivotal importance to the resource-constrained 'little league'⁵ ADF. 'The increased efficiency of shooter aircraft means we need fewer of them to hit the same number of targets'.⁶

Alternatively, with the RAAF's limited resources it can hit more targets without needing additional platforms. Either way PGMs can be classed as force multipliers and that is exactly what a 'little league' ADF needs.

THE BENIGN ENVELOPE

The avoidable loss of any TFG or SRG asset during employment in LLC or ELLC cannot be condoned, for the ADF has too few assets to risk unnecessarily. If both types of platform are going to be practical for employment in credible contingencies, then that employment must not unnecessarily endanger those limited national assets. Conversely, if the detection advantages of infra-red sensors and the precision accuracy of laser weapons can be brought to bear against a potential enemy without unnecessarily endangering the platform, and if there is not a higher priority mission for the platform to be employed on, or a more economical way of dealing with the threat, then it would be to the nation's advantage to use the platform accordingly.

⁴ Correll, *The Semifinal Verdict*, p 6.

⁵ A term used extensively to describe the size of the ADF in comparison to major world powers in Criss, P.J. and Schubert, D.J., *The Leading Edge: Air Power in Australia's Unique Environment*, Canberra Papers on Strategy and Defence No. 62, Strategic and Defence Studies Centre, Australian National University, Canberra, 1990.

⁶ Correll, *The Semifinal Verdict*, p 6.

Achieving a benign operational envelope with existing ADF resources should not be difficult in LLC and may still be possible in some ELLC, depending on target location. In LLC authorised targets will normally be either in the air/sea gap surrounding Australia or on the Australian mainland. In either region, the enemy would not be expected to be employing more sophisticated defensive systems than man-portable low level air defence (LLAD) missiles. Such missile systems may be radar guided, but will more likely rely on shoulder fired infra-red or laser guidance technology to target the aircraft. Normally, LLAD systems have a maximum effective altitude of approximately 10,000 feet. If intelligence advises that the enemy is not missile equipped, then the danger envelope shrinks to around 5000 feet for small calibre weapons during daylight and to almost ground level at night. Regardless of the sophistication of the enemy, in LLC the ADF could expect to operate aircraft above 10,000 feet with almost total impunity. As has been previously explained, the modern aircraft's laser system accuracy does not degrade with increasing altitude. Consequently, the RAAF should be able to provide precision support to surface forces 24 hours a day, provided the target can be detected and the aircraft remains above or outside the engagement zone of enemy defensive systems.

PLATFORM REQUIREMENTS

Whilst the ability to operate at altitude and still strike targets with precision is the fundamental requirement if technologically-advanced aircraft like the Hornet and the F-111C are to be employable in LLC, additional essential criteria must be satisfied.

Secure and Long Range Communications

Secure long range communications are a fundamental requirement for the employment of both aircraft types in situations which require real-time specific intelligence to be passed onto airborne crews anywhere in what could be a vast area of operation (AO). If secure communications are not available then a code system can be employed. Fortunately, the Hornet possesses secure HF and UHF, whilst the avionics-updated F-111 will have identical systems. A further requirement is for those secure communications to be compatible with all potential surface agencies whether they be on land, sea or in the air.

In addition to conventional air-to-ground communication, command and control organisations require secure high definition facsimile and secure telephone systems between all agencies. Finally, the intelligence picture obtained and recorded during the sortie must be transmitted without delay to the appropriate command authority. Ideally, images should be transmitted live, although aircraft range and equipment currently prevents real-time broadcast.

Recording of Evidence

Precise recording of target position and date time group are two fundamental requirements for any platform involved in the prosecution of LLC or ELLC targets. The inability to record the infra-red image, or the production of the image without those two essential elements of evidence, will not be acceptable because an enemy can be expected to appeal in international forums regarding disputed or contested

engagements to gain sympathy for his cause. Therefore, the accurate production of evidence will be essential. At present only the F-111C can meet the evidence requirement and the TFG will need to develop ways of recording the Hornet's infra-red image if it is to satisfy this need.

Multi-Role Capability

For a platform to have utility in LLC or ELLC, it must possess a true multi-role capability. Fortunately both ADF platforms have the required capability, although the F-111's air defence capability is limited to attacking benign targets because the aircraft's high wing loading limits its turning performance. The definition of multi-role in this context also means that the aircraft must be able to be re-roled in flight between land, sea and air targets. Again, both⁷ aircraft have the capability to simultaneously carry the appropriate weapons to permit target prosecution with precision air-to-surface and air-to-air weapons as applicable.

The requirement for multi-role capability cannot be over emphasised. If Australia's response to any LLC is to be proportionate, then minimum defence resources must be employed in countering the threat. Economy of effort remains an important principle of war even in LLC. If the aircraft is truly multi-mission, then economy can be achieved by using a single platform to investigate and, if authorised, prosecute several targets on land, sea and in the air during a single mission. Aircraft, aircrew and weapons must be capable of all missions.

Financial considerations make the option of using Hornets or F-111s attractive. The costs and time delays associated with moving conventional land and sea forces to intercept and destroy LLC targets will invariably exceed those of one aircraft employing a single, precision munition to eliminate the threat. Obviously each contingency will have to be considered individually; however, the flexibility afforded by a truly multi-role aircraft provides the government with an important option, one neither previously nor widely acknowledged. A disproportionate response may be avoided by employing minimal air power assets in preference to conventional land or maritime forces, while at the same time giving the government the politically attractive option of demonstrating a mature graduated response.

Long Range and Endurance

Australia's unique environment demands unique solutions for defence. A huge land mass, inadequate road/rail infrastructure and limited defence resources means that conventional transportation of sea or land forces takes substantial time, effort and money. The only quick way to traverse the distance involved is to use air. Even when used, air can present problems given the vastness of the land if the aircraft has limited range. Any aircraft operating in the AO must have adequate range and endurance, when armed in the appropriate multi-role configuration, to meet all potential tasking requirements from existing and planned land bases.

⁷ As the Hornet laser has been delayed and until an operational system is available, PGMs can only be released using ground or F-111 'buddy' lasing for guidance.

In the case of the F-111, range and endurance requirements can be met with internal fuel, whilst the Hornet has a reduced, but still useful, capability without air-to-air refuelling (AAR). If AAR is employed then the aircraft are comparable, albeit with the Hornet attracting higher support costs and carrying fewer weapons.

Cockpit Workload

The ability to interdict a LLC type target presents the greatest challenge to an airborne crew using infra-red detection systems. The greater the scale of conflict the more 'conventional' the targeting becomes. However, at the bottom end of the contingency scale, LLC provides many challenges. Widely dispersed targets with the enemy employing hit and run tactics may be the order of the day (or night); guerrilla style tactics may be prevalent. Whatever the enemy does, it will not be predictable; consequently, any ADF response will have to be reactive, with pre-planned missions being in the minority.

The ability of air power to react during daylight to the anticipated types of threat has been demonstrated during numerous recent conflicts. Single seat tactical fighters, combined with ground or forward air controllers, developed a level of proficiency during the Vietnam War which permitted the interdiction of many elusive targets during daylight. However, the problem becomes far more difficult when the same target has to be engaged at night in a remote AO with no access to conventional ground or air controlling assistance. Under such circumstances the sensor operator has to devote his total attention to the area of search, and considerable time in the target area may be required to determine the precise tactical situation before interdicting action can be taken.

To say that a single seat aircraft has no capability in such an environment would be unfair given the early stage of employment of the Hornet's infra-red pods. However, the TFG may well find that a dual Hornet is the most appropriate platform to employ in the night offensive air support (OAS) role, or that the concept of operation is not appropriate to the sensor, platform or pilot. What the RAAF has discovered is that under many circumstances the two-man F-111C crew, operating at benign altitudes at night, can detect, monitor and, if ordered, surgically eliminate a wide variety of targets covertly using a single PGM.

CONCEPT OF OPERATIONS

Doctrine

The three distinct air campaigns acknowledged in RAAF doctrine are: control of the air, air bombardment and air support for combat forces. Of the three campaigns, air bombardment, which is defined as the offensive use of air power to strike at an adversary's sovereignty, is the most unlikely in the early stages of any LLC, but will definitely be a consideration for the government if an enemy does not desist or if the conflict escalates. However, control of the air and air support for combat forces are critical roles for the RAAF if the enemy is to be successfully countered at the LLC stage. Air superiority and air power in support of land, sea and air operations will be of pivotal importance, with attacks on the enemy's homeland remaining a 'big stick'

option for government. That is not to say that there is no requirement for strike forces. Even in peacetime, or when approaching LLC, deterrent forces have a role to play. The deterrent effect achieved with the routine peacetime demonstration of an effective air bombardment capability may be sufficient to deter the commencement of LLC. Previously, this deterrent effect has been the *raison d-etre* for the ADF's submarine and F-111C strike forces, but in the F-111's case this may change if the aircraft can demonstrate utility in all levels and theatres of conflict without degrading or detracting from its primary strategic strike role.

Whilst 'air campaign' refers to 'a controlled series of related air operations aimed at achieving a single, specific, strategic result or objective',⁸ an examination of likely operations will give a clearer picture of the employment of modern, technologically-advanced aircraft in credible contingencies. The six operations which can be conducted in prosecuting air campaigns are: counter air, independent strike, aerial reconnaissance, surveillance and electronic warfare, airlift and combat support. Of the six operations, only airlift is not related to the subject of this paper.

The operations can be further defined. Counter air operations break down into two subsets, namely offensive counter air (OCA) and defensive counter air (DCA). OCA involves the destruction of enemy air power on the ground, which in the early stages of LLC may not be an option. DCA involves denying the enemy control (or access to) the air over friendly territory and thereby negating enemy air attacks, air insertions or resupply. Consequently, DCA will be of prime importance during all levels of contingency. 'The control of the air in time and space is the prime campaign of the RAAF'.⁹

Independent strike operations can involve strategic land and maritime strike as well as interdiction missions and would be independent of concurrent surface campaigns. Maritime strike missions are likely from the outset in any level of contingency, with strategic strike and interdiction becoming likely only in the higher levels of conflict.

Aerial reconnaissance, surveillance, electronic warfare and airlift operations are crucial for all air operations and for many sea and land force operations; therefore, they are applicable to all levels of conflict. The final operation is Combat Air Support, where direct firepower support is given to surface forces in contact with the enemy. Combat Air Support for land operations is further broken down into Close Air Support (CAIRS) and Battlefield Air Interdiction (BAI). In the maritime sphere Anti-submarine Warfare (ASW) and Anti-surface shipping warfare are the final elements of combat air support.

Applying the doctrine to credible contingencies leads to the conclusion that DCA, strategic maritime strike, reconnaissance, surveillance, electronic warfare, airlift, CAIRS and BAI are all likely operations in LLC. If the conflict escalates, then OCA, strategic land strike and interdiction can be added to the possible air operational roles.

⁸ *AAP 1000*, p 40.

⁹ *ibid.*, p 107.

Platform Performance

The precise nature of the Hornet's FLIR and the F-11C's Pave Tack performance cannot be described here for a number of reasons, not the least of which is the author's inability to accurately portray the dynamics of any likely scenarios. For those who observed the recent Gulf War on TV and witnessed the pinpoint accuracy of such systems, then perhaps further description is unnecessary. Two attacks which were replayed repeatedly on news broadcasts come readily to mind and may help readers comprehend the application of modern technology in LLC. The first was the attack on a reinforced bunker where the PGM was aimed at and penetrated the ventilation duct on top of the building; and the second when a car passed over a bridge just before bomb impact. Both events adequately define in unclassified terms the resolution achievable with the RAAF's F-11C Pave Tack pods.

The Hornet infra-red system provides a comparable resolution to the F-111's, but does not as yet possess the capability to augment the reconnaissance-surveillance capability with a self-contained offensive precision laser designator. If the Hornet's pilot work load, together with the range and endurance factors, can be shown not to be limiting factors, then its applicability to the specialised form of air support being discussed in this paper may equal that of the F-11C. However, because of the current limitations of the Hornet's system, the remainder of this paper will address only the F-111's Pave Tack contribution in credible contingencies.

Definitions

Two new definitions have evolved from development work by the RAAF in exploring the application of Pave Tack technology to credible contingencies. The ability to provide a real time 24 hour-a-day surveillance or reconnaissance of selected areas of interest has been defined as Pave Tack Tactical Reconnaissance (PTACRECCE). Combining that reconnaissance capability with the self-contained laser permits the accurate or precise employment of precision weapons against surface targets. The new term, Precision Air Support (PAS), applies to the employment of precision guided munitions (PGMs) in any theatre of war and in any level of contingency. The accuracy achievable with PAS weapons exceeds anything previously attained by air platforms. Consequently, PAS is applicable just as much to CAIRS or BAI as it is to interdiction or strategic land or maritime strike missions.

Implications for the ADF

'The precision now possible with modern air weapons is likely to be applied to increasing effect in the future, in most levels of conflict, and in most kinds of terrain. At this early stage, it might be argued – cautiously – that air power's unique ability to apply offensive force rapidly and decisively within the concept of the extended battlefield, while controlling collateral damage, may indicate a revolution in warfare'.¹⁰

¹⁰ Stephens, Alan, *The Implications of Modern Air Power for Defence Strategy*, Air Power Studies Centre, RAAF Base Fairbairn, Canberra, 1992, p 26.

Using the attributes of the Pave Tack F-111C, the RAAF can employ PTACRECCE in all potential operations, from the night time identification of enemy aircraft on DCA missions, through all areas of the air/sea gap surrounding Australia, and finally on friendly territory to observe, report and accurately record a wide variety of potential enemy activities. In all scenarios the PTACRECCE mission can immediately take the offensive by the employment of PAS, if the Rules of Engagement (ROE) permit. Even if the extant ROE prevent hostile action, the long range and endurance of the F-111, when combined with proven long range communications, permits the crew to stay on station and maintain covert surveillance of the target whilst reporting the enemy activity to the appropriate command agency. The extended surveillance time afforded by the F-111 may even permit government to re-evaluate the threat, amend the ROE and authorise a PAS strike before the aircraft needs to return to base.

The alternatives available to the ADF are few. The dispatch of conventional land or maritime forces takes time and considerable resources, which in turn risks the Australian response becoming disproportionate to the threat. With the concept of PTACRECCE and PAS, a single aircraft can literally cover the entire AO in minutes, and if authorised, destroy the enemy or reduce his capability to sustain operations with perhaps a single PGM. This represents a mere fraction of the financial costs associated with alternative options.

In human resource terms, F-111 involvement is even more appealing because in the process of eliminating the infiltrators no Australian military personnel come within the lethal range of any enemy weapon system – the benign altitude is invoked and the aircraft remains unthreatened, whilst Australian surface forces are also not placed at risk.

For such an action to be successfully conducted, many ADF resources must operate as a team. The intelligence and surveillance organisations of Federal, State and Defence authorities must provide the initial trigger of enemy activity. If the threat is an airborne target, the National Air Defence Centre must detect and direct the intercept. In the F-111's case, the previously mentioned manoeuvrability limitations will require caution before committing the platform to an identification mission. Wherever possible, the Hornet must be the preferred platform for the identification of unknown air threats unless the intelligence system can guarantee that the track is not an enemy fighter. For ground threats the initial trigger must be provided to warn of enemy incursion. Precise location details are needed if PTACRECCE contact is to be achieved and this requirement may well mean that air is not an option in intercepting the enemy. What has been proven during development work and recent realistic exercises is that rapid reporting of enemy activity is essential in LLC and ELLC if the enemy is to be intercepted before he disperses. Once dispersal has taken place the ADF task of interception becomes far more difficult and our response will become disproportionate to the threat. Lord Tedder foresaw the need for joint operations as early as 1944 when he said:

I do not myself believe that any modern war can be won either at sea or on the land alone or in the air alone ... In other words, war has changed to three dimensions, and very few people realize that.¹¹

¹¹ Terrain, J., *The Right of the Line*, p 601.

Unfortunately, until all ADF commanders appreciate the capability of the technologically-advanced aircraft, then all too frequently Lord Tedder's observations will go unheeded. An enemy involved in LLC, or any other level of conflict for that matter, can be defeated economically if the ADF is prepared to operate as a team and use the most appropriate resources available. In an assessment of the Gulf War, Gary Waters wrote 'Combined arms contributed to success. Modern warfare is all about joint operations, yet the very strength of such operations demand strong single Service capabilities'.¹² The same applies in the 'little league' ADF today.

Command and control networks need review if the utility of the technologically-advanced aircraft is to be fully exploited. Time taken to respond is the main enemy. The ADF and civilian law enforcement agencies must be able to transit the appropriate detection information immediately to the operations area controlling the air platform. In the case of the F-111, the AO operating base must contain the appropriate communication infrastructure to scramble alert aircraft or re-task airborne aircraft. The maxim of unity of command is paramount with a true multi-role aircraft like the F-111, which can support the Land, Maritime and Air Commanders on a single LLC mission. The traditional command techniques of giving the environmental commanders operational control of specific assets for defined periods may unnecessarily waste resources. An 'in support' command concept is preferred, with priority going to the commander with the more immediate threat. The high transit speed of modern aircraft means that a single platform can normally cover large Australian AOs in relatively short timeframes, thereby guaranteeing the essential flexibility required to put this concept in practice. 'Timing for maximum effect requires a central control and coordination because of the interrelated activities of air power. However, for any small air force, centralised control must not be allowed to reduce the responsiveness of limited numbers of assets'.¹³

From an RAAF perspective the correct employment of SRG assets in any LLC will require the aircraft to be on short notice alert 24 hours a day for the duration of the contingency. Such requirements do not normally require additional manning over peacetime levels. Augmentation may be required if the contingency becomes prolonged and will definitely be required if the conflict escalates. However, the greatest impact of using an F-111 in LLC is on current RAAF doctrine. In the AAP 1000, *The Air Power Manual*, Chapter 9 discusses Combat Air Support Operations and states, *inter alia*:

Effective Close Air Support necessitates immediate acquisition of the target and accurate attacks. The problem of target acquisition has been compounded by the increased speed of aircraft employed in the CAIRS role, terrain in the areas where tactical air operations have been undertaken in recent years, and for many future potential battlegrounds, the hostile air defence environment which may necessitate one-pass attacks at extremely low level.¹⁴

There are further considerations of Close Air Support. CAIRS is very difficult to conduct in bad weather, or at night. Further, there is always a substantial risk to

¹² Waters, Gary, *Gulf Lesson One – The Value of Air Power: Doctrinal Lessons for Australia*, Air Power Studies Centre, RAAF Base Fairbairn, Canberra, 1992, p 286.

¹³ AAP 1000, p 102.

¹⁴ *ibid.*, p 175.

the friendly forces who are being supported ... Finally the vulnerability of CAIRS aircraft and particularly armed helicopters to modern, easily accessible, should-fired surface-to-air missiles (SAMS) cannot be overstated. Aircraft used in the CAIRS role in the future will almost certainly suffer heavy attrition losses, particularly aircraft that are not designed specifically for this role.¹⁵

The section dealing with CAIRS concludes by saying:

However, CAIRS should only be provided where an acceptable degree of attrition can be expected and where it is explicitly acknowledged that scarce air resources are being diverted from other roles.¹⁶

Those three quotes illustrate how dynamic doctrine has to be if it is to reflect current capabilities. Quite understandably, many Land Force personnel reading the AAP 1000 have reached the conclusion that they will not get Hornet aircraft CAIRS in time of conflict. *The Air Power Manual* was written in 1990 and in the two intervening years a significant change has occurred. Technology combined with new thinking and tactics now permits an element of the RAAF to provide air support under certain conditions with precision at night whilst not risking platform attrition. Also, in the new environment, there is no need to rush and release the weapon on the first pass; there is no need for high speed; and the support can be provided by an aircraft which was not designed for the CAIRS role. Doctrine should be reviewed and amended to reflect that there are now new and perhaps smarter ways of providing the capability.

Before F-111s can be employed on CAIRS missions, the high level command decision has to be taken regarding the platform's availability for such tasking. The initial decision will probably be taken at CDF level. The logical answer is that if there is no higher priority tasking, then the CAIRS mission can and should be flown. Attrition on a PAS CAIRS mission should not be a consideration if correctly flown, and given that the aircraft's configuration for CAIRS will be identical to that required for DCA, strategic land and probably maritime strike, then a combat air support mission like CAIRS will not prevent airborne re-tasking to a higher priority mission should one arise.

Implications for the Enemy

From the perspective of the enemy, an adversary with PTACERCCE and PAS capability severely compounds the conduct of LLC and ELLC operations. The sanctuary of night has been stripped away. No longer can the cover of darkness be used to manoeuvre or rest. Psychologically, the impact of PTACRECCE and PAS on inserted troops will be immense. Unobserved infiltration on or over the moat surrounding Australia will be made that much more difficult. The vulnerability to convert detection by Australian aircraft flying at high altitude means that the insertion may be monitored and forces destroyed at a time and place of Australia's choosing. Detected enemy forces will be oblivious as to where the attack came from or how to counter it.

¹⁵ *ibid.*, p 176.

¹⁶ *ibid.*, p 176.

ESCALATION

This paper has concentrated on LLC because in many ways the problems of employing technologically-advanced aircraft in the manner being suggested are far more challenging when the enemy is widely dispersed and his actions predictable. As the scale of conflict escalates, the problems associated with detection should become easier because the tactics can be expected to become more conventional and the numbers of the enemy more substantial. That is not to say that ELLC or MSC will be easier on the Nation than LLC, but that the problems associated with employing infra-red technology and PGMs should become easier when greater options for targeting exist.

The problem of platform availability will be compounded when OCA, strategic strike and interdiction missions become options. Such missions will place additional demands on the scarce TFG and SRG resources. However, as previously stated, resource allocation should rest with CDF or his Joint Force Commander, acting on advice from his environmental commanders. The advantages of requiring only a few different configurations to accommodate all missions means that both the Hornet and the F-111 can be easily diverted to a lesser mission if weather or other changed circumstances preclude OCA or strategic missions on a particular night. Conversely, the aircraft and crews can just as easily be returned to their primary mission if conditions in the offshore target area suddenly improve.

The benign environment may also be more difficult to achieve as the ADF aircraft move further off-shore. OCA, strategic strike and interdiction presupposes operations over enemy territory. Whilst Coalition forces were able to operate above Iraq with immunity, ADF platforms, lacking similar ECM resources, would require weapons which permit standoff outside the enemy's missile engagement zone (MEZ). Alternatively, if penetration of the MEZ is unavoidable then the platforms must be given the protective systems necessary to deflect the enemy's aim. Again, the systems and weapons required must match the threat if attrition is to be contained.

Finally, air superiority for the duration of overflight of enemy territory is now highly desirable. Packages of strike and fighter escort aircraft will need to operate conjointly to achieve that superiority for the desired duration of the strike. The high altitude approach and attack may not be practical because of the increased warning time given to the enemy. A combination of low and high altitude, or all low level may be required. However, regardless of specific tactics, a simple rule is that as the enemy increases his defensive capability the ADF has to be prepared to counter with a combination of technology and tactics – smart crews and smart weapons, used in smart ways.

THE FUTURE

The techniques recently developed by the RAAF to offer the PTACRECCE and PAS capability in the F-111C to the ADF does not represent the end of the road in tactics development. The utility of both the F-111 and the Hornet to defend the nation has not reached maturity. The imagination of all personnel concerned with the defence of Australia is what determines the ultimate utility of both aircraft. Aircrews, land, sea and air commanders, military support personnel – in fact, anyone with an interest in

the defence of this nation – must continually challenge themselves to think of smarter ways of employing all available assets. Vested interests, blinkered thinking and empire building attitudes must not be allowed to prevail. Perhaps composite wings may be a way of enhancing operational efficiency, perhaps the RAAF needs a Ready Deployment Force, or perhaps the procurement of better standoff weapons and anti-radiation missiles is needed. The ability to penetrate hardened targets may become a fundamental requirement requiring specialized weapons. And all the time everyone needs to be looking for cheaper and more efficient ways of conducting operations. The resources of Australia are going to be limited for the foreseeable future and every cent must be spent wisely.

CONCLUSION

Versatility, mobility, self-reliance and combat power are the stated essential criteria for the ADF to counter an aggressor at any level of conflict. With the Pave Tack modified F-111C, the ADF has a single, self-contained weapons platform which meets all essential capability criteria. The Hornet has a similar capacity. Land, maritime and air targets can be detected, identified and engaged anywhere in Australia's area of direct military interest. In most conditions the real-time imagery available 24 hours a day from the technologically-advanced F-111 and Hornet, when combined with the accuracy achievable with precision guided munitions, means that the RAAF can play a hitherto unrecognised major supporting role for most land and maritime ADF operations regardless of conflict levels. The new roles are in addition to the F-111's traditional deterrent precision strike and reconnaissance obligations, and the Hornet's air defence commitments. Significant shifts in current thinking, doctrine and procedures may be required to formally blend the new roles into the ADF lexicon.

'It is now pointless for airmen to distinguish between "strategic" and "tactical" weapons systems. Air strategists should not allow themselves to be constrained by traditional ideas of range, size or types of target sets, but rather should focus their thinking on the extended battlefield, in its fullest sense'.¹⁷ That judgement identifies the way ahead. In the roles this paper is proposing for the RAAF, the aircrew skills required to detect a small raiding party in Northern Australia at night are, in the main, identical to those employed on a strategic strike mission offshore. Moreover, the system operated to detect the group and the weapons employed against the target will most likely be identical to those used on the strategic mission. Finally, aircrew know that even if they take off on a night PAS CAIRS mission, they have the skills, aircraft and weapons on board to safely be re-tasked onto any other target over the full spectrum of offensive air operations.

'The conduct of air power roles should not be tied to specific airframes, nor to "traditional" methods necessarily. Flexibility in planning and use of all resources proved to be the key to success in the Gulf War'.¹⁸ The same applies to the RAAF today in all credible contingencies.

¹⁷ Stephens, *The Implications of Modern Air Power for Defence Strategy*, p 23-24.

¹⁸ Waters, *Gulf Lesson One*, p 288.