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**THE IMPLICATIONS OF MODERN AIR POWER
FOR DEFENCE STRATEGY**

By

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INTRODUCTION

This paper examines four topical issues in air power. The issues are related, and seem significant in the light of contemporary air power doctrine and the experiences of the 1991 Gulf War. In combination they may – emphasising *may* – indicate a revolution in warfare. The issues are the offence versus the defence, the extended battlefield, controlling collateral damage, and the rise of conventional deterrence.¹

THE OFFENCE VERSUS THE DEFENCE

The decision to defend or attack is probably the most important a commander makes. The greatest strategic theorist, Carl von Clausewitz, believed defence to be the stronger form of warfare.² Historically, defence has been the stronger as it is intrinsically easier to organise and conduct than offence. Clausewitz was of course describing wars between armies. While his conclusion may remain correct for the employment of land power, it has been questionable for many years in relation to sea power and largely wrong for air power.

From the earliest years of World War I, the aeroplane has been seen as a weapon system with exceptional attacking qualities. Given the characteristics which in combination make air power unique – speed, pervasiveness, reach, flexibility, the ability rapidly to concentrate massive firepower, and relatively low risks in terms of human lives for one's own forces – that should not be surprising. In general terms, those characteristics make it far easier for an air force to achieve surprise, concentrate force, and establish an advantageous force-to-space ratio – that is, to create conditions favourable for an attack – than it is for either land or naval forces.

By the middle of 1916, the General Officer Commanding the Royal Flying Corps in France, General Hugh Trenchard, was asserting that:

‘an aeroplane is an offensive and not a defensive weapon ... it is the opinion of those most competent to judge that the aeroplane, as a weapon of attack, cannot be too highly estimated’.³

The perceived threat of offensive air power strongly influenced international relations during the inter-war years. Throughout Europe statesmen were haunted by the spectre of strategic bombardment by fleets of marauding bombers, against which it was thought defences would be powerless.⁴ It was because of the manifest offensive potential of air power that successive conferences on international law and disarmament throughout the 1920s and 1930s considered proposals as extreme as completely banning aerial bombing.⁵

¹ My thanks to Group Captain Jo Hamwood and Wing Commander Alan Curr for their valuable comments on the draft of this paper.

² von Clausewitz, Carl, *On War* (ed A. Rapoport), Harmondsworth, Penguin, 1968, pp 113-114.

³ Trenchard, General Hugh, ‘Future Policy in the Air’, in Alan Stephens and Brendan O’Loughlin (eds), *The Decisive Factor*, Canberra, AGPS, 1990, pp 131-132.

⁴ Taylor, A. J. P., *The Origins of the Second World War*, Harmondsworth, Penguin, 1981, p 151.

⁵ Quester, George H., *Deterrence Before Hiroshima*, New York, John Wiley, 1966, pp 77-78, 123.

That spectre was not realised during World War II. The extent to which strategic bombing succeeded during the war remains a contentious subject. For the first two to three years at least, it clearly failed to meet the high expectations of its advocates. Additionally, and notwithstanding Trenchard's belief that the aeroplane is 'not a defensive weapon', the war provided a number of examples to the contrary. Fighter Command's victory in the Battle of Britain from July to October 1940 averted the planned invasion of the United Kingdom; while in the so-called Battle for Berlin from November 1943 to March 1944, the losses inflicted by German night-fighters forced the Allies to attack less dangerous objectives in southern and western Germany.⁶ During a day-time attack against the ball-bearing factories at Schweinfurt on 14 October 1943, the USAAF's Eighth Air force lost 60 of 291 B-17 Flying Fortresses, a rate no combat force could sustain.⁷

Nevertheless, air power's most notable contributions to victory in World War II came primarily through offensive action, with the final 18 months of the allies' combined bomber offensive against Germany and the USAAF's strategic attacks against Japan being the most important examples.⁸ In September 1945 the United States Strategic Bombing Survey concluded that allied air power had been 'decisive in the war in Western Europe ... It brought the [German] economy ... to virtual collapse'⁹ Whether or not the use of the atomic bombs on Hiroshima and Nagasaki was necessary or justified remains a debatable and emotional issue. It is certain, however, that in 1945 no nation could have withstood the United States, with its monopoly of those apocalyptic air delivered weapons. Despite tremendous advances in anti-aircraft defensive systems, the aeroplane was the most potent attacking weapon in the military arsenal.

That potency was curbed to a considerable extent during the major conflicts in Korea (1950-53) and Vietnam (1962-75), when political constraints were imposed on the use of, and the selection of targets for, Western air forces. Additionally, the relative success in Korea of Chinese Mig-15 fighters against the USAF's strategic bombers suggested that the pendulum in the air war might be swinging to the defence.¹⁰ On the other hand, operations such as the 'air pressure' campaign in Korea and Khe San and Linebacker II in Vietnam served as reminders of the battle-winning capabilities of offensive air power.¹¹

Vietnam also provided a crucial technological advance in offensive air weapons. If any one factor had hindered the supremacy of the offence over the defence in air warfare, it had been the comparatively indiscriminate nature of air bombardment. The successful use in Vietnam for the first time of precision-guided munitions increased tremendously the destructive potential of aircraft. As long as a target could be

⁶ Murray, Williamson, *Strategy for Defeat: the Luftwaffe 1933-1945*, London, Chartwell Books, 1986, pp 168-169.

⁷ Frankland, Noble, *The Bombing Offensive Against Germany*, London, Faber and Faber, 1965, pp 77-78.

⁸ Overy, R.J., *The Air War 1939-1945*, London, Macmillan, 1987, pp 119-126.

⁹ MacIsaac, David, *The United States Strategic Bombing Survey*, Vol 1, New York, Garland Publishing, 1976, pp 15-16.

¹⁰ Armitage, M. J., and Mason, R. A., *Air Power in the Nuclear Age*, Urbana, University of Illinois Press, 1985, p 33.

¹¹ *ibid.*, pp 34-43, 96-98, 109-111. Khe San took place in January 1968 and Linebacker II in December 1972.

identified, a pin-point hit could almost be guaranteed. The classic case study from the Vietnam War of the significance of PGMs is that of the attacks on the key road-rail bridge at Thanh Hoa, about 80 miles south of Hanoi.¹² Between 1965 and 1972 about 700 sorties were flown against Thanh Hoa with little success. It was the introduction into the USAF inventory of 2000lb and 3000lb electro-optical and laser guided bombs which turned the tables and enabled the Air Force to knock the bridge down in 1972. PGMs seemed to offer a level of destructive power and target discrimination from small numbers of aircraft which could revolutionise the use of conventional air power.

The immense increase in the offensive capabilities of aircraft conferred by PGMs was strikingly apparent during the 1991 Gulf War. While PGMs amounted to only about 10 percent of the total tonnage of bombs dropped by the Coalition air forces against Iraqi targets, they accounted for about 90 percent of the damage to key targets. There were occasions when F-15Es armed with a total of eight PGMs destroyed eight tanks.¹³ The USAF has assessed that precision weapons systems made it possible for a single bomb to be used against targets which in Korea and Vietnam would have required 400 bombs, and in World War II 9000 bombs.

A different but equally significant offensive capability was demonstrated by the F-117 Night-Hawk fighter-bomber, with its combination of stealth and precision attack. Stealth technology degrades the three main functions of air defence, namely, surveillance, fire control and kill probability.¹⁴ Some areas of Iraq (especially Baghdad) were protected by an air defence system more intense than those deployed around Warsaw Pact cities during the height of the Cold War. Yet the F-117s were able to attack key Iraqi targets with little or no direct fighter or electronic warfare (EW) support, and almost invariably remained undetected until their bombs started to explode. Because of their unique offensive capabilities, the F-117s flew more than 30 percent of the Coalition's strategic missions, although comprising less than three percent of the total Coalition air strike force.¹⁵

At a cost of about \$US50 million per copy, the F-117 may seem prohibitively expensive for most defence forces. However, while many countries may not wish to pay for the mature development of stealth characteristics represented by the F-117 (and the B-2), it seems certain that some degree of stealth technology will be incorporated into most future attack aircraft. It is noteworthy that during the Gulf War a number of RAF Tornado GR1s were quickly given a degree of *ad hoc* stealth qualities by the addition of radar absorbent materials, a modification which apparently was both cheap and reasonably effective.¹⁶ If, as seems probable, stealth becomes prevalent in air forces, the advantage of the offence over the defence should increase.

¹² See 'The Tale of Two Bridges', in *Air War Vietnam* (Introduction by Drew Middleton), London, Arno Press, 1978, pp 1-96. The second bridge was the Paul Doumer, against which similar results were achieved.

¹³ Department of the Air Force, White Paper, *Air Force Performance in Desert Storm*, April 1991, p 7.

¹⁴ Vallance, Group Captain A.G.B., 'The Future: Offensive Air Operations', in *RUSI Journal*, Summer 1991, p 24.

¹⁵ Department of Defense, *Conduct of the Persian Gulf War*, Final Report to Congress, Appendix T, April 1992, pp T72-T74.

¹⁶ Waters, Wing Commander Gary, Gulf War Project, *Report on APSC Visit to US and UK*, Canberra, APSC, September 1991, p 32.

So far this discussion has examined the offence versus the defence in general terms. Some comment on the topic in relation to specific roles is necessary. The roles considered below have been placed into three groups: Close Air Support and Battlefield Air Interdiction; Strategic Land Strike, Interdiction and Offensive Counter Air; and Maritime Strike.

Close Air Support and Battlefield Air Interdiction

The roles of CAIRS and BAI involve air strikes over the battlefield in support of ground forces. Targets can include an enemy's infantry, armour, artillery, supplies, reinforcements and lines of communications.

Notwithstanding the generally favourable outlook for offensive air operations argued in the preceding section of this paper, the conduct of CAIRS and BAI must be regarded with some caution, at least in the short term. The problem is the increasing lethality of cheap, easy to operate, battlefield surface-to-air missiles (now known as man-portable surface-to-air defence systems – MANPADS) like the FIM-92A Stinger; and the continuing threat posed to low-flying targets by anti-aircraft artillery.

During the war in Afghanistan between Soviet-backed government forces and the *mujahideen* which finally ended in victory for the insurgents in 1992, the acquisition by the *mujahideen* of Stinger missiles changed the nature of the war. In the early years Soviet aircraft, and especially attack helicopters, exercised a dominant influence over land operations. However, once the *mujahideen* added the Stinger to their inventory, they began to inflict unacceptably high losses on the government air forces. The Soviets and their allies were compelled to fly higher, which reduced the accuracy of their weapons delivery and, consequently, their effectiveness. The change in tactics forced on the Soviets by the Stinger helped swing the war to the insurgents. Similarly, Iraqi anti-aircraft artillery inflicted unacceptable losses on RAF Tornado GR1s attacking airfields during the Gulf War, to the extent that low level strikes were discontinued.¹⁷

Taking the Stinger as an example of MANPADS, the system is inexpensive, relatively easy to operate and very effective within its impressive performance envelope, comprising a speed of Mach 2.0, a range of three miles and an operating altitude of 1640 feet.¹⁸ At a unit cost of about \$US43,000, the Stinger represents compelling cost-effectiveness when compared to a CAIRS aircraft which typically might cost between \$US16 million (F-16) and \$US29 million (F/A-18).

Research and development is continuing to increase the MANPADS threat to CAIRS and BAI aircraft.¹⁹ In the high-threat environment characteristic of the modern battlefield – that is, where there are large numbers of soldiers armed with large numbers of cheap, effective missiles and anti-aircraft artillery – air commanders must be extremely cautious about risking expensive aircraft and aircrews. That warning

¹⁷ While the Tornados caused considerable damage, the RAF lost six aircraft in about 300 sorties. *Australian Aviation*, May 1992, p 37.

¹⁸ Nicholas, Ted G., *US Missile Data Book, 1988* (12th ed.), Data Search Associates, Fountain Valley, 1987, pp 2-107/110.

¹⁹ See 'Manportable SAMs and Target Acquisition', in *Jane's Defence Weekly*, 25 April 1992, pp 712-713.

assumes particular significance in the case of multi-role CAIRS and BAI aircraft which may be needed for other, possibly more important, roles.

The obvious response to the threat posed by MANPADS is the one adopted by the Soviets in Afghanistan and the Coalition in Iraq, namely, to attack either from a higher altitude or a greater distance. (Significantly, the Soviets did not have PGMs.) As was the case in Afghanistan, that response has in the past usually resulted in less accurate weapons delivery and, therefore, degraded support for ground forces.

The problem of battlefield air support may be resolved in the medium-term by the use of such technologies as precision weapons systems, Global Positioning System (GPS) and ring laser gyros. Those systems should enable ground forces and pilots to coordinate close air support from much greater distances – that is, with the aircraft remaining outside the range of battlefield SAMS – but with the necessary degree of weapons delivery accuracy.

Strategic Land Strike, Interdiction and Offensive Counter Air

The experience of the Gulf War can also be used to make some useful observations regarding strategic land strike, interdiction and offensive counter air operations.

During the war with Iran from 1980 to 1988, Iraq's forces killed hundreds of thousands of Iranian soldiers using exactly the kind of defensive combat Saddam Hussein planned to fight in Kuwait.²⁰ In the event, Saddam's reactive, defensive posture against the manoeuvre and firepower of the Coalition's air campaign proved extraordinarily inept, and graphically demonstrated the problems which can arise from a primarily defensive approach. Once the Coalition had taken the initiative through the air offensive, the Iraqis' defensive outlook and posture limited their options. They seemed incapable of adopting an alternative strategy. Only the offensive use of Scud missiles gave the Iraqi campaign any reasonable success, and that was limited to the political arena.

The Coalition offensive air campaign was the most effective in the history of warfare. It must be appreciated, however, that the success of that campaign was based squarely on an extraordinarily comprehensive Suppression of Enemy Air Defences (SEAD) operation. Many key Iraqi targets were protected by an intensely concentrated and apparently powerful anti-aircraft defence system. Yet the Coalition's SEAD operations made that system effectively useless within three days. Having established air supremacy, the Coalition's strike aircraft were then free to attack Saddam's largely static army so forcefully that, after a 40 day air campaign, only three days of land war were needed.

The point here is that it would be misleading to suggest that the success of air power as represented by the Gulf is likely to be indicative of future offensive air actions. Plainly, it will not. No country in the world other than the United States could have mounted the intensity of the Gulf SEAD operation. For example, at one moment in time early in the war, there were 200 High Speed Anti-Radiation (HARM) missiles

²⁰ Defence Secretary Richard Cheney, in *Conduct of the Persian Gulf War*, Final Report to Congress, April 1992, p ii.

homing in on Iraqi targets simultaneously; while during the course of the air campaign around 1000 HARMs were fired. The great majority of air forces will never be able to afford anything remotely like that, let alone provide such supporting technologies as AEW&C, J-STARS and the necessary range of electronic warfare measures.

At the same time, other aspects of the Coalition's offensive air campaign appear to have enduring and widespread relevance. The combination of stealth technology and precision-guided, stand-off missiles has greatly enhanced an attacker's ability not only to inflict damage, but also to minimise exposure to risk. In all but conflicts involving massive air defences like those of Iraq, smaller, conventionally armed air forces can be expected to strike vital targets accurately using long range, stand-off weapons. The aggressor will enjoy a favourable force-to-space ratio, which in turn will make the defender's problem of constructing a reasonably secure air defence system prohibitively expensive. In that context, it is noteworthy that the USAF has assessed that most nations have about 600 critical strategic targets and around 3000 aim points.²¹

When friendly SEAD is limited or unavailable, surface-to-surface missiles (SSMs) can be used against heavily defended, high value targets, such as C3I and air defence systems. It is likely that strikes against vital targets in the future will involve the coordinated use of aircraft and SSMs, at least in the early, higher risk stages. The F-117 and Tomahawk Land Attack Missile (TLAM) attacks against Baghdad during the first days of the Gulf War provide an example. The wider use of SSMs is, however, likely to remain limited, at least in the medium term. While missiles have obvious advantages in high risk areas, they also are inflexible, indiscriminate once programmed, and expensive. A TLAM, for example, costs about \$US2.3 million and has a conventional warhead of about 1000lbs of explosive, compared to a Mk 84 Laser Guided Bomb (LGB) costing about \$US22,000 and with the same warhead. For one per cent of the cost of a Tomahawk, the LGB delivers the same amount of explosive.

That leads to the third point in this section, which concerns the relative cost-effectiveness of the offence and the defence. It is extremely difficult to assess the cost of the air defence system established by Saddam Hussein, and which failed so dismally. With components such as radars, fighter aircraft, C³I, hardened shelters, surface-to-air missiles and anti-aircraft guns, sums in the order of several billions of dollars would have been involved.²² For that fortune, Saddam ended up with a static, inflexible system. Once it had lost the initiative as a *defensive system*, it was useless. If the same investment had been made in flexible, multi-role forces, Saddam would have at least had the option of changing his strategy. There is little doubt that his ability to force a favourable military *or political* conclusion to hostilities would have been far better had he been able to shift to an offensive campaign against comparatively vulnerable Coalition targets such as surface ships, troop concentrations and rear echelon facilities and personnel. By emphasising the defensive, Saddam

²¹ Waters, *Gulf War Project*, p 43.

²² Iraq's air defence system included a multi-layered, automatic data linked detection command and control system. It integrated over 700 non-shoulder launched SAM launchers, 6000 anti-aircraft artillery pieces and an air force of 550 combat aircraft such as the MiG-29 and Mirage F-1. Department of Defense, *Conduct of the Persian Gulf Conflict*, An Interim Report to Congress, July 1991, pp 2-4.

denied himself those two most powerful characteristics of air power, flexibility and versatility.

A final, brief comment must be made regarding the critical importance to offensive air operations of command, control, communications and intelligence. It is essential for the war-winning capabilities of modern strike aircraft to be supported by a reliable and accurate target information system.

Maritime Strike

Maritime surface forces are probably more vulnerable to offensive air operations than any other form of military hardware. Since 1921 when General Billy Mitchell's attack aircraft sank a number of decommissioned warships during trials off the American east coast,²³ surface ships operating without air cover have been at risk. The warning provided by Mitchell's demonstration (which was dismissed or even derided by some senior naval officers) was given dramatic operational expression during World War II through such actions as the sinking of the *Prince of Wales* and *Repulse*, and the battles of the Coral Sea, Midway and the Bismarck Sea.

More recently the success of Argentinean Super Etendard aircraft armed with Exocet missiles during the 1982 Falklands War demonstrated the continually increasing problem faced by naval surface forces. The Argentineans had only five Super Etendards and five Exocets suitable for air launch. Only three Exocet sorties were flown, but the Super Etendards made a major impact on the war, disabling the destroyer HMS *Sheffield* and sinking the container ship *Atlantic Conveyor*.²⁴ None of the Super Etendards was lost. Using the impersonal yardsticks of cost-effectiveness and battle damage, those statistics indicated war-winning potential.

The Royal Navy is one of the most powerful maritime forces in the world, complete with organic fighter aircraft protection. Yet it is highly unlikely that the British task force could have retaken the Falkland Islands had the Argentineans been equipped with a more substantial maritime strike fleet. Against a force of, say, 40 Super Etendards with access to a stockpile of several hundred Exocets, it is almost certain that the British task force would not have gotten within hundreds of miles of the Falklands before sustaining unacceptable losses. The Royal Navy's task could have been made more hazardous still had the Argentineans used a more formidable missile. The AGM-84 Harpoon, for example, has a range of about 100 miles, three times that of the Exocet, and thus makes the defensive problem far more difficult.

The remarkable performance of multi-role aircraft and modern air-delivered weapons in the Gulf War indicates that the attacker's advantage in the maritime sphere will continue to grow. It is an advantage that the United States Navy understands. The USN deployed six Carrier Battle Groups to the Gulf area, half of its total naval aviation strength. Because of the vulnerability of naval surface forces, fully two-thirds of all aircraft sorties flown from the USN carriers were used simply to defend the Coalition navy from possible attack.²⁵ Indeed, former USAF Chief of Staff General

²³ Mitchell, William, *Winged Defense*, New York, Kennikat Press, 1971.

²⁴ Middlebrook, Martin, *The Fight for the 'Malvinas'*, London, Viking, 1989, pp 116-121.

²⁵ Schemmer, Benjamin F., 'Six Navy Carriers Launch Only 17% of Attack Missions in Desert Storm', in *Armed Forces Journal International*, January 1992, pp 12-13.

Michael Dugan has suggested that the combination of stealthy aircraft and stand-off PGMs may eventually make surface naval combatants obsolete.²⁶

THE EXTENDED BATTLEFIELD

For centuries the traditional model of war was two-dimensional. Planning almost invariably included two basic assumptions. First, it was accepted that the enemy forces in the field had to be defeated. Second, those defeated forces would then be pushed back to allow attacks against the enemy's centres of gravity.²⁷ Only when those centres of gravity were threatened or had been attacked would final victory be achieved. Thus, seizing and controlling territory was fundamental to the conduct of war, as it alone was likely to provide access to an enemy's centres of gravity.²⁸

That traditional model came under challenge when air power extended warfare into the third dimension. Writing in the early 20th century, the great air power theorist Giulio Douhet argued that the definition of the 'battlefield' should be extended.²⁹ Because of the aircraft's range, speed, relative invulnerability and unparalleled striking power, and its predicted ability to create fear and panic among the enemy's population, it was logical, Douhet stated, for aerial bombardment to be directed not at an enemy's fielded forces, but rather at population centres and the national infrastructure. In other words, the battlefield was to be extended by offensive air operations.

Douhet's visionary concept of conducting direct and immediate attacks against an enemy's centres of gravity redefined the battlefield to include, in effect, the entire area between protagonists' countries. The translation of theory into practice proved, however, to be largely beyond the technical and doctrinal capabilities of air forces for the next half century. The strategic bombing campaigns waged during World War II epitomised those problems.

For most of the campaign in Europe, the USAAF and the RAF were unable to agree on whether they should use precision attacks against specific targets or indiscriminate area attacks against civilian morale. The USAAF advocated the former strategy, the RAF the latter.³⁰ The RAF position was arrived at partly by default, as the accuracy achieved by Bomber Command crews in the early years of the war was abysmal;³¹ and partly from the belief of the AOC Bomber Command, Sir Arthur Harris, that attacks on civilian morale could quickly end the war. Despite the declaratory USAAF policy, American crews also encountered problems. Precision is a relative term. The

²⁶ Interview with author, Canberra, 9-4-91.

²⁷ Drew, Colonel Dennis M., 'After Desert Shield: Warfare from the Inside Out', in *Air Force Times*, 2 March 1992.

²⁸ *ibid.*

²⁹ Douhet, Giulio, *The Command of the Air* (trans. D. Ferrari), Washington, 1983, p 28.

³⁰ Frankland, Noble, *The Bombing Offensive Against Germany*, London, Faber and Faber, 1965, esp. pp 59-62.

³¹ An independent survey commissioned for the British War Cabinet in mid-1941 (the Butts Report) concluded that, of all the Bomber Command aircraft which reported successful attacks, only one third had in fact got within five miles of their target. If all the aircraft despatched were included, that proportion was reduced by another third. Sir Charles Webster and Noble Frankland, *The Strategic Bombing Offensive Against Germany*, Vol I, London, HMSO, 1961, pp 178-179.

USAAF's claim to have followed a policy of precision bombing rings hollow against the background of the horrific fire bombing raids against Japanese cities by General Curtis Le May's 20th Air Force in 1945, and the two atomic attacks.³²

Inaccuracy was compounded by planning inconsistency. For the first three years of the war, constantly shifting demands and changing target sets largely served to undermine Douhet's concept of using the bomber to extend the battlefield.

Eventually, developments like the Norden bomb sight and target marking by the RAF's elite Pathfinders started to improve matters. In the meantime, though, far too much of the strategic bombing conducted by all protagonists was directed against civilian populations. That strategy was not only ethically reprehensible but, as post-war surveys showed, a failure. Civilian morale did not collapse to the extent expected. That is, the inclusion of civilian morale as a centre of gravity was strategically, psychologically and morally wrong.

It was only in the last 18 months of the war that the allied Strategic Bombing Offensive was applied systematically against Germany's military centres of gravity, with attacks being *sustained* against those centres until the objective was achieved.³³ Once used in that fashion, bombing achieved decisive results, albeit at high costs.³⁴

Because of air power's perceived inability during World War II to prosecute sustained and decisive attacks against an enemy's centres of gravity, a general scepticism developed towards the war-winning capabilities of strategic bombing. The resolve shown by the population of North Vietnam in the face of heavy conventional bombing by American air forces during the second Indo-china War strengthened public scepticism.

The Vietnam experience confirmed the crucial importance of target selection to the concept of the extended battlefield. During vital periods of the war, individual targets often were personally selected by US President Lyndon Johnson and his Secretary of Defence, Robert McNamara.³⁵ The argument has been made that, instead of choosing targets for their military value, Johnson and McNamara tried to use strategic bombing to send 'messages' to the North Vietnamese, rather than as a means of pursuing military objectives.³⁶ Thus, target selection was not necessarily militarily rational; and the bombing campaign was not necessarily applied in a sustained fashion.

Following the traumas of Vietnam, airmen in a number of Western air forces, and particularly the USAF, embarked on a fundamental re-examination of their doctrine. A revised model of the extended battlefield was one outcome of that re-examination. Unlike Douhet, however, the strategists of the 1980s and 1990s were better able to match their ideas with existing military capabilities.

³² See Sherry, Michael S., *The Rise of American Air Power*, Newhaven, Yale University Press, 1987, pp 257-292.

³³ Overy, *The Air War 1939-1945*, pp 119-126.

³⁴ MacIsaac, *The United States Strategic Bombing Survey*, pp 15-16.

³⁵ Vogt, General J. W., in Richard H. Khon and Joseph P. Harahan (eds), *Air Interdiction in World War II, Korea and Vietnam*, Washington, 1986, pp 66-68.

³⁶ Summers, Colonel Harry G., *On Strategy: A Critical Analysis of the Vietnam War*, Novato, 1982, esp. pp 63-90.

There are two central components to the new version of the extended battlefield. First, as noted above, there is a match between hardware and concepts. Through the use of advanced technologies, powerful, discriminating strikes can be made with a low degree of risk. Second, the confusion over target selection – that is, centres of gravity – which characterised strategic bombing during World War II and Vietnam has been resolved.

A comparison of two diagrams depicting the principles of air attack in the context of the extended battlefield illustrates the point. The first (Figure 1) is based on concepts recorded in about 1923 by Australia's first authoritative air power analyst, Air Vice-Marshal H. N. Wrigley;³⁷ and the second (Figure 2) on concepts developed some 60 years later by USAF planners, principally Colonel John A. Warden, prior to the Gulf War.³⁸ While Warden's model was developed specifically for the Gulf, it has general relevance.

Both diagrams reflect the inherent and unique qualities which enable the air weapon to by-pass fielded forces and obstacles, and to concentrate immense firepower rapidly against an enemy's homeland. However, while Wrigley's diagram then fails to establish the relative importance of targets, Warden's precisely identifies not only the centres of gravity, but also the priority in which they should be attacked. Attacks start at the centre of Warden's 'five strategic rings' and work outwards. Note that command and control capabilities are the most important target, and an enemy's fielded military forces the least important. Note also that there is no place in either model for terror attacks on civilian populations. Details of the priorities within target sets in Warden's model are listed as Figure 3.

Contemporary thinking on the extended battlefield does not end there. During World War II, the technical and doctrinal shortcomings of air power meant planners tended to focus on one set of targets at a time. In other words, (perceived) centres of gravity were attacked sequentially. By contrast, Coalition air forces in the Gulf attacked strategic, operational and tactical targets simultaneously. As colonel Dennis Drew from the USAF's School of Advanced Air Power Studies has explained, Iraq was attacked from the 'inside out'.³⁹ Using Warden's model, Coalition air power struck directly at Iraq's centres of gravity over the extended battlefield. The flexibility and dominance of the Coalition's air forces made it possible to conduct that 'extended' air campaign on a *parallel* or *simultaneous* basis rather than *sequentially*.

The effect on Iraq's war-making capabilities was devastating. While losses of personnel and equipment were disastrous, the rapid and almost total loss of any ability to control or even influence what was happening was militarily more significant. Iraqi forces which had been deployed to hold ground – a tactic which for centuries had been the *sine qua non* of success in battle – became a liability rather than an asset as they were simply by-passed by Coalition air forces seeking targets *within* the Iraqi's vulnerable, key strategic framework. As Drew concluded, the extended, parallel air

³⁷ Stephens, Alan and O'Loghlin, Brendan, (eds), *The Decisive Factor: Air Power Doctrine by Air Vice-Marshal H. N. Wrigley*, Canberra, AGPS, 1990, p 30.

³⁸ Warden, Colonel John A., quoted in Waters, Gulf War Project, pp 42-45.

³⁹ Drew, Colonel Dennis M., 'After Desert Shield: Warfare from the Inside Out'.

campaign against Iraq represented a (successful) holistic attempt to collapse the 'entire enemy power structure almost simultaneously'.⁴⁰

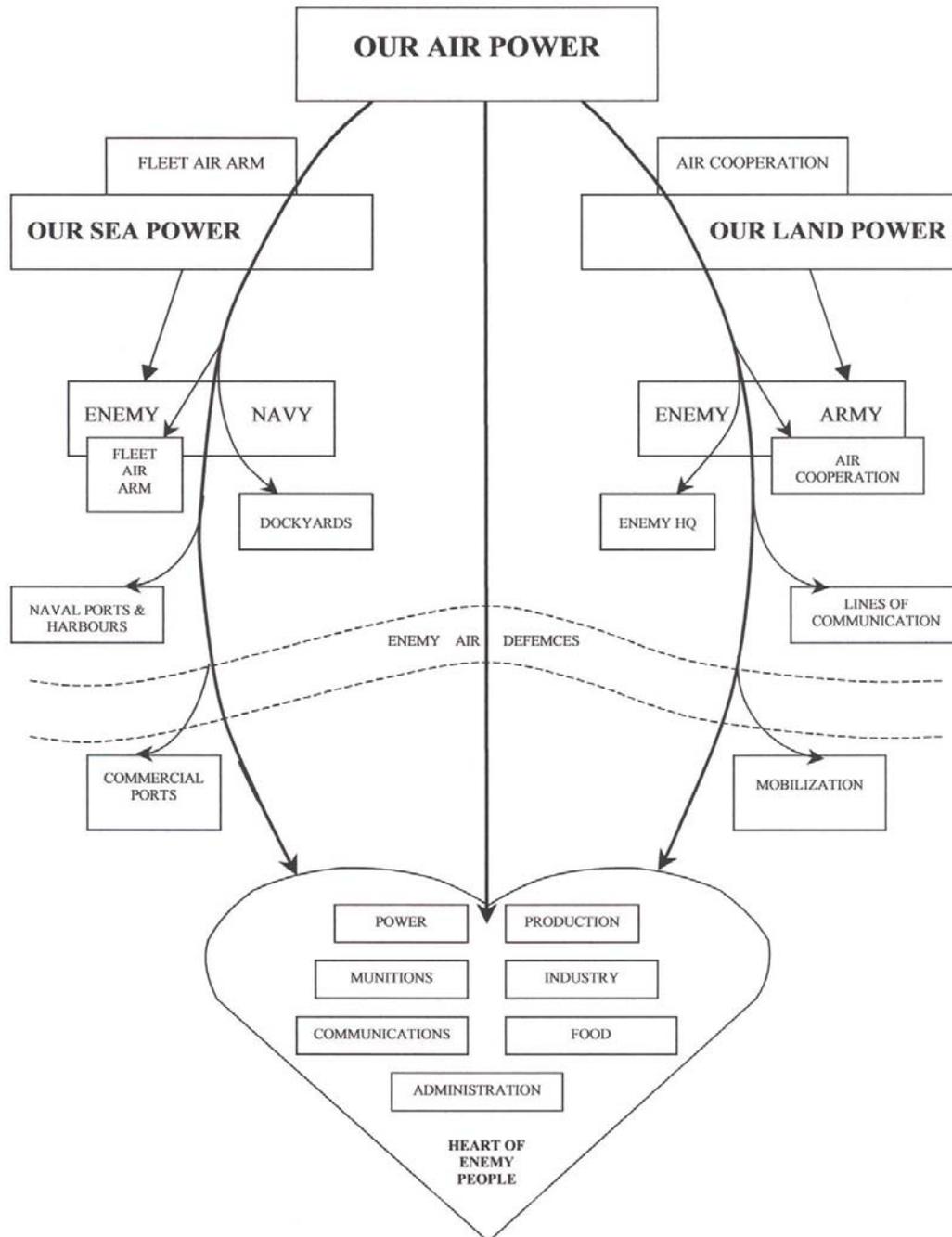


Figure 1 - Principles of Air Attack

⁴⁰ Drew, Colonel Dennis M., 'After Desert Shield: Warfare from the Inside Out'.

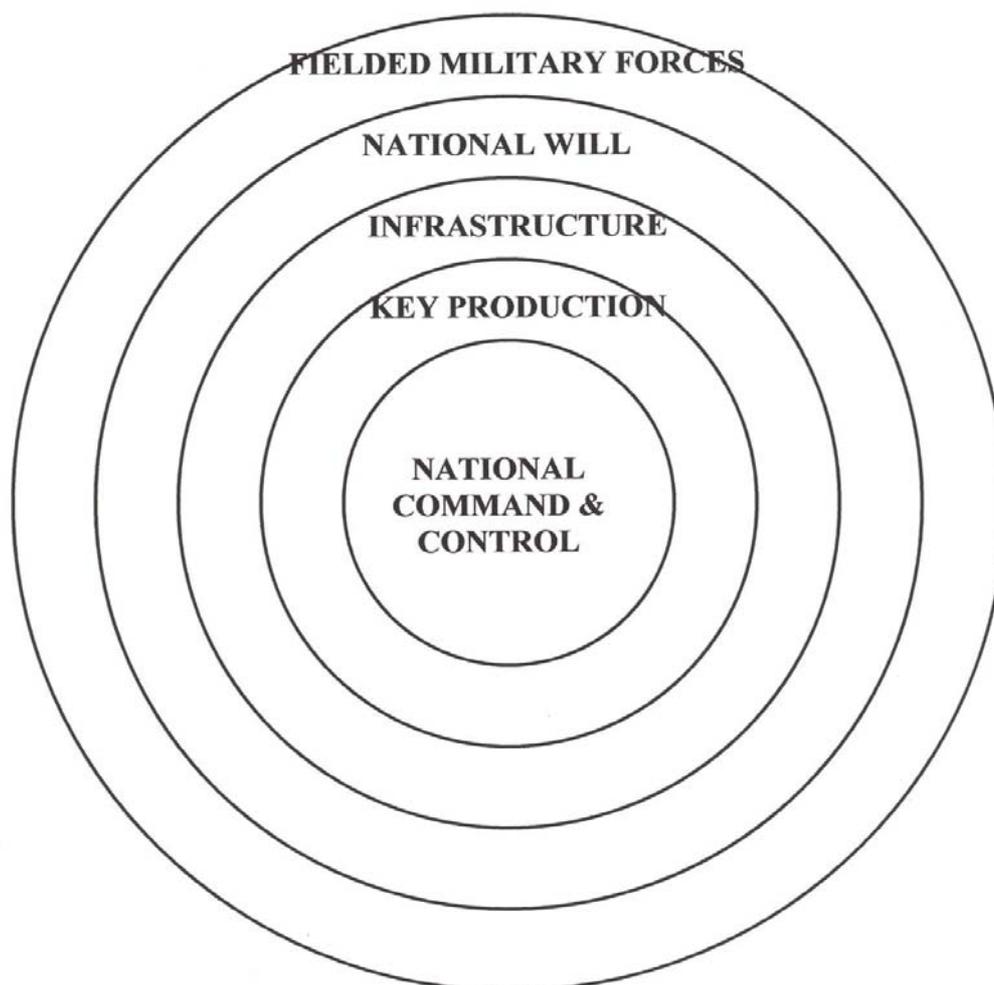


Figure 2 - The Five Strategic Rings

Several related technological and conceptual issues must be mentioned to conclude this section. Air power's ability to fight an extended battle is likely to improve rapidly. Continuing developments in such technologies as night vision equipment, Global Positioning System, air-to-air refuelling, stealth, precision weapons systems and PGMs will enhance the already formidable, existing capability to carry out precision attacks against a wide range of targets, at great distances, for 24 hours a day.

It is now pointless for airmen to distinguish between 'strategic' and 'tactical' weapons systems.⁴¹ 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. There is a message there for all strategists.

⁴¹ Indeed, in the Gulf War B-52s attacked 'tactical' targets, and F-15s, F-16s and F-18s attacked 'strategic' targets.

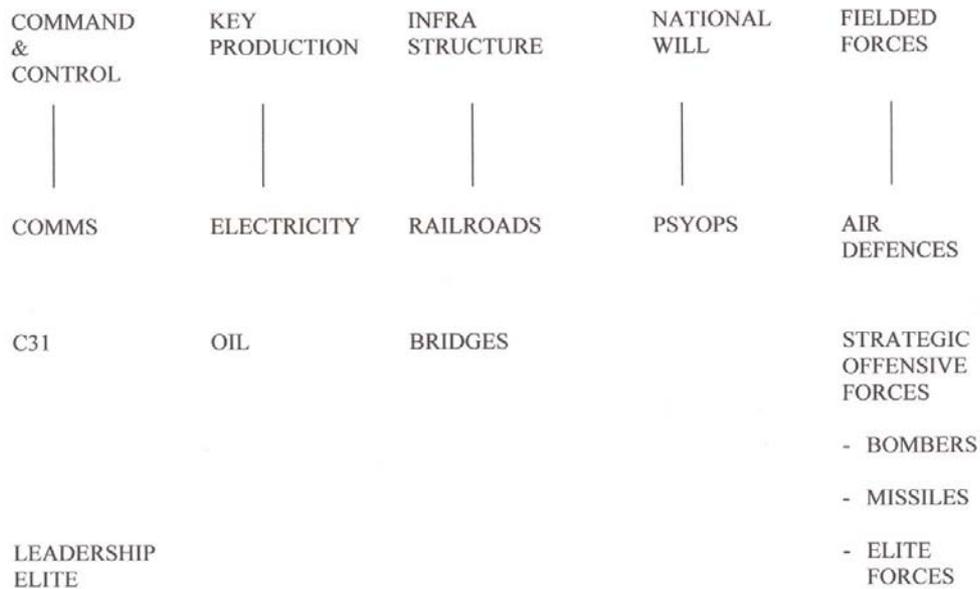


Figure 3 - Target Systems

Controlling Collateral Damage

The ability to control collateral (that is, unintended) damage is central to offensive operations and the concept of the extended battlefield. The issue also is important for defence planners in democracies, where wars invariably and properly are conducted under intense public scrutiny, and where public reaction to a perceived excessive use of force (for example, the bombing of North Vietnam) can influence strategy and bring down governments.

If over the years any one factor has invalidated the thinking of air power theorists, it has been the comparatively indiscriminate nature of air bombardment. During World War II, tens of thousands of civilians died from the ‘collateral’ consequences of horrific bombing attacks such as those against Hamburg, Dresden, Coventry and Tokyo. Despite major improvements to aircraft, weapons, delivery systems and crew training, ‘precision’ remained a relative word. The apparent war-winning results of aerial bombing often were obscured by public anger at collateral casualties and damage. Thus, instead of providing the foundation for the predicted dominance of the air weapon, bombing instead became something of a rod for air power’s back.

Even the advent of the ultimate air-delivered weapon proved to be a two-edged sword. As Korea and Vietnam showed, the use of nuclear weapons would almost certainly be circumscribed. Short of global war, weapons of mass destruction were unlikely to be used. Thus, until air forces acquired a weapon that was both destructive and discriminating, the concept of air power winning wars by itself was likely to remain an illusion.

As noted above, the successful use for the first time of precision-guided munitions in Vietnam must therefore be recognised as a turning point in air power doctrine. The corollary of ‘surgical strike’ is minimal collateral damage.

The Gulf War confirmed the discrimination of PGMs. In addition to the war-winning results achieved by offensive air operations, the Gulf was remarkable for the almost complete lack of unintended casualties. Even though the built-up area of Baghdad was subjected to an intensive bombing campaign, few civilians were killed.⁴² Indeed, the one incident which caused the death of a large number of civilians and created international concern – the bombing of the *Al Firdus* bunker – was deliberate, as Coalition planners believed the bunker was a communication centre and, therefore, a legitimate military target. It is noteworthy that while the bunker was hit precisely with heavy loss of life, the adjacent residential and commercial buildings were untouched.⁴³

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. If wars must be fought, that would be a welcome revolution.

The Rise of Conventional Deterrence

Deterrence theory rests on the ability to persuade a potential adversary, through the threat of military retaliation, that the costs of using military force to resolve political conflict will outweigh any benefits.⁴⁴ Deterrence can be applied either offensively, through the credible threat of unacceptable counter-action against an aggressor; or defensively, through the capability to make any attack unacceptably expensive. Thus, offensive deterrence could take the form of a threat to invade, or punishing and disabling strikes; and defensive deterrence that of being capable of preventing an enemy from achieving his objectives.

Three components of deterrence emerge from those definitions. First, any nation adopting the strategy must possess the capability to conduct plausible military actions. Second, the threatened use of that capability must be credible. Finally, the intention to use the capability must be clearly communicated to potential aggressors.⁴⁵

The concept of deterrence has almost invariably been associated with nuclear weapons and the Cold War. At that level, deterrence is generally considered to have succeeded. Clearly, at the least it has not failed. A key factor there has been the

⁴² For comment on the control of collateral damage, see Department of Defense, *Conduct of the Persian Gulf War*, Final Report to Congress, April 1992, pp 131-133, 155, 166.

⁴³ Mason, Air Vice-Marshal R. A., quoted in Alan Stephens (ed), *Smaller But Larger: conventional air power into the 21st century*, Canberra, APSC, 1991, p 19.

⁴⁴ Howard, Michael, ‘Deterrence and Reassurance’, in *Foreign Affairs*, Vol 61, No 2, Winter 1982-83, pp 309-324.

⁴⁵ Guertner, Gary L., Haffa, Robert and Quester, George, *Conventional Forces and the Future of Deterrence*, Strategic Concepts in National Military Strategy Series, US Army War College, March 1992.

obvious threat of nuclear weapons. Only a handful of the thousands of warheads possessed by the superpowers would have to reach their targets to inflict unacceptable damage.

The notion of deterrence was also used by strategists before Hiroshima, that is, in relation to conventionally-armed forces.⁴⁶ For example, the perceived threat of Nazi Germany's bombers was a major factor in the appeasement of Hitler by the European powers in the late 1930s.

Nevertheless, two significant problems have in the past tended to invalidate conventional deterrence. First, unlike a nuclear exchange, the risks of conventional conflict could be perceived as being relatively modest. There have in fact been numerous instances where apparently inferior forces have attacked; that is, they were *not* deterred, as logic would suggest they should have been. Argentina in the Falklands and Vietnam against France and then the United States are recent examples. Second, some strategists have argued that because deterrence relies primarily on influencing an enemy's perceptions, it cannot provide sufficiently certain guidance for force structure planning.⁴⁷ A major difficulty, that argument continues, is that the military capabilities relevant to a conventional deterrent posture may not be useful should deterrence fail.⁴⁸ Thus, analysts have tended to see conventional deterrence as too vague, excessively scenario-dependent, and too unreliable to serve as a guide for force structure planning.

Some of the military capabilities which were displayed in the Gulf War suggest that those kinds of judgments are obsolete. Compelling indications emerged that non-nuclear air power is now so strong and effective that conventional deterrence is both feasible and credible.⁴⁹ The reach, pervasiveness, speed, striking force and flexibility demonstrated during the Coalition air campaign are precisely the qualities needed to support either a defensive or an offensive strategy of deterrence. Those same capabilities also make modern air power effective across the full range of defence contingencies. In other words, the concern that formally endorsing deterrence as a national defence strategy might distort force structure planning is misplaced, at least as far as air power is concerned.

As defence budgets shrink, the wisdom of expending limited resources on inflexible, one-dimensional assets (surface ships, missile- and artillery-based air defence systems, large regular armies, armour, and so on) must be questioned. Instead, it might be more constructive for strategists to examine the potential to substitute air assets for less flexible, less capable force elements. For example, with the growing capacity of air forces to sustain a presence and protect large areas, the next generation of aircraft can be expected to intrude further into traditional naval roles such as long range patrol, surveillance and escort. That approach to force structuring would be cost-effective, non-threatening to national sovereignty (unlike sea and land power, air power cannot threaten invasion by occupying territory), and would facilitate broad force reductions. Thus, the concept offers great potential to promote security stability.

⁴⁶ See Quester, *Deterrence Before Hiroshima*, *passim*.

⁴⁷ Dibb, Paul, *Review of Australia's Defence Capabilities*, Canberra, AGPS, 1986, pp 35-36.

⁴⁸ *ibid.*, pp 35-36.

⁴⁹ Guertner et al, *Conventional Forces and the Future of Deterrence*, p 11. The F-117 attack aircraft, for example, achieved a probability of target destruction of about 0.8, a remarkably high figure.

In combination, the dominance of the offence over the defence, the doctrine of the extended battlefield, and the ability to control collateral damage are likely to make conventional deterrence – either defensive or offensive – based on air power an increasingly credible, affordable and constructive strategy.