

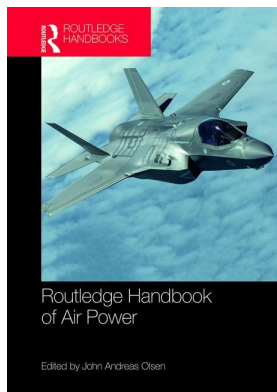
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## **Routledge Handbook of Air Power**

John Andreas Olsen

### **Air Power Theory**

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# 3

## AIR POWER THEORY

*Phillip S. Meilinger*

Before the aircraft was even invented, farsighted thinkers and writers speculated about flight and how the air would become a medium of war. Ancient cultures conjured winged gods and goddesses tossing thunderbolts, and Renaissance sages imagined flying ships that rained death from the skies. By the end of the eighteenth century, balloons were capturing the imagination, and a little more than a century later technology had advanced to the stage of heavier-than-air flight. Despite the doomsayers, some early airmen, such as Orville Wright in America and Clément Ader in France, opined that the new invention would be used only for peaceful purposes and, indeed, would help to eliminate war. The airplane and the destruction it could deliver would make war so horrifying that nations would be deterred from using such methods (Howard 1987: 416; Ader 2003: 3). This idea soon proved to be an illusion.

By the beginning of the twenty-first century, air power had begun to dominate war on land and sea. Unfortunately, air theorists seldom synchronised their ideas with the technology they espoused. Between the First and Second World Wars they spun ideas that were years ahead of the abilities of aircraft and weapons of the time. Post-Second World War, military leaders virtually abandoned the field of air power thinking to civilian academics who devised theories of nuclear war and deterrence. The Vietnam War was a watershed that led to a renaissance in air power theory. In today's world, preoccupied with terrorist threats and collapsing nations, air and space technology has leapt forward into pre-eminence, but the methods and doctrines needed to employ it successfully against these threats have lagged behind the technology.

### **The early years**

The Wrights first flew in 1903 and barely a decade later aircraft were used as weapons in the First World War. That war smashed empires, spawned dictatorships, caused the deaths of millions, and had a profound effect on the conduct of war. The heavy loss of life convinced military leaders that tactics and strategy had to be altered, so radical solutions received greater consideration than they would ordinarily have. This demand for alternatives gave airmen a receptive audience. Moreover, original thinkers such as J. F. C. Fuller and B. H. Liddell Hart – both of whom were British Army officers during the war – imagined a new theory of war centring on air power, reinforcing the airmen's credibility. Fuller stated: 'As the aeroplane is the most mobile weapon we possess, it is destined to become the dominant offensive arm of the

future' (Fuller 1935: 209). Liddell Hart was more effusive: 'Aircraft enable us to *jump over* the army which shields the enemy government, industry, and people, and *so strike direct and immediately at the seat of the opposing will and policy*' (Liddell Hart 1925: 37; emphasis in original). Nonetheless, the path to a coherent theory of air power was steep and rocky, partly because air warfare differs fundamentally from surface warfare.

The Italian general and air theorist Giulio Douhet noted as early as 1909 that air power was an intrinsically strategic weapon in ways that traditional surface forces were not: the centres of gravity or vital centres of an enemy country were, in theory, always within range of aircraft. Those centres consisted of the industrial, political, economic and population loci that made a country function (Douhet 1942: 15, 27–28). Airmen have often hailed this ability to operate routinely with strategic effects; however, the specific ways in which to employ air power strategically differed significantly.

An opponent's vital centres had long been the ultimate goal of armed forces, but because they were generally well behind the frontier and heavily defended it was difficult to reach them. War therefore became a contest between armies: the losers in battle exposed their country's interior to the victor. Often, actual destruction or even occupation proved unnecessary: with the interior exposed and vulnerable, the loser sued for peace. Military theorists over the centuries therefore equated the enemy army with the main centre of gravity, because when the army collapsed, so did resistance. The First World War demonstrated that such attritional contests had become too bloody to serve as rational instruments of policy.

Air power offered a potential solution while also introducing a new set of problems. If the enemy army was no longer the main target, then what was? Airmen now had to become familiar with the specific workings of a nation. Knowing that a country depended on its railroads, steel mills, electrical power grid, factories and other specific assets was interesting, but not all of these targets could be struck, so which were the most important? Selecting targets thus became the essence of air strategy. Yet simply because something could be targeted did not mean it was valuable, and a valuable asset was not necessarily targetable. Thus, when perceptive air planners noted that intangible factors such as religion, nationalism, tradition and culture also played crucial parts in holding a country together during war, the problem became daunting, and over time has become even more complex.

Douhet identified the population as the prime target for air attack. He viewed civilians as prone to panic, and the limited experience garnered from the First World War seemed to support that contention. The bombing strikes in Italy, though sporadic, caused widespread absenteeism and evacuation from the cities. Relatively limited in number and scale though these strikes were, they had disproportionately large psychological effects. To Douhet, the implications were obvious: he was convinced that dropping bombs on a country's major cities would cause such disruption and devastation that revolt and subsequent surrender were inevitable.

A complete breakdown of the social structure cannot but take place in a country subjected to this kind of merciless pounding from the air. The time would soon come when, to put an end to horror and suffering, the people themselves, driven by the instinct of self-preservation, would rise up and demand an end to the war – this before their army and navy had time to mobilize at all!

(Douhet 1942: 58)

A pragmatist, Douhet rejected arguments that attacks on civilians were immoral. To him, war itself was inhuman, and in the war just experienced there were no innocents. Offering a paradox common among other air theorists such as Wright and Ader, he maintained that air

warfare would be so horrible it would be humanizing. Certainly many thousands would die, but many millions died in the old form of war. A short, violent and decisive conflict dominated by air power was much preferable to another world war that might drag on for years and wipe out an entire generation (Douhet 1942: 9–10, 61, 181).

By contrast, Douhet's American and British counterparts saw in air power the hope of winning wars by destroying things rather than people. Air doctrine in both Britain and the United States during the interwar years focused on an enemy nation's industrial infrastructure, not its population. According to this economic view of war, the modern state depended on mass production of military goods: ships, aircraft, tanks, trucks, artillery, ammunition, uniforms and all the rest. Moreover, most airmen took an even broader view, arguing that essential resources such as electric power, steel, coal, chemicals and oil were also military targets and actually of greater importance because they constituted the building blocks for other types of manufactured military goods needed to sustain a war effort. The key was to disrupt these economic and industrial processes (Biddle 2002).

In America the Air Corps Tactical School (ACTS) further refined this concept. Hal George, Ken Walker, Don Wilson and others devised a theory that sought out industrial bottlenecks – those factories or functions integral to the effective operation of the entire system. Their theory, termed the 'industrial web', envisioned a country as an integrated and mutually supporting system, but at the same time viewed this web as inherently fragile: if the right bottleneck target were struck the entire edifice would come crashing down (Sherman 1926: 218; Wilson 1971: 19–25; Hansell 1972: 6–49). It was this doctrine – unsupported by combat experience – that the Army Air Forces carried into the Second World War.

The Royal Air Force (RAF), led by Air Chief Marshal Hugh Trenchard for the decade after World War I, took a slightly different approach. Trenchard had witnessed the extreme reactions of the population and their political leaders to the German air attacks on Britain in 1917 and 1918; indeed, these raids by German Zeppelins and Gotha bombers had prompted the formation of the RAF. He argued, as did Douhet, that the psychological effects of bombing outweighed its physical effects (Boyle 1962: 577–578). However, Trenchard did not believe that attacking the people directly was the way to produce that psychological trauma.

I emphatically do not advocate indiscriminate bombardment, and I think that air action will be far less indiscriminate and far less brutal and will obtain its end with far fewer casualties than either naval blockade, a naval bombardment, or sieges, or when military formations are hurled against the enemies' strongest points protected by barbed wire and covered by mass artillery and machine guns.

*(Trenchard 1928)*

Instead, Trenchard advocated something similar to the Tactical School's idea: a country's industrial infrastructure was the appropriate target. He reasoned that the disruption of the normal life of the people – the loss of jobs, wages, services, transportation and goods – would be so debilitating that the people would demand peace. In short, whereas the Americans wished to bomb industry to destroy capability, Trenchard sought to bomb industry so as to fracture the national will (Meilinger 1996).

Another RAF officer, Wing Commander John Slessor, was a World War I combat pilot who later commanded an army cooperation squadron from 1925 to 1928. Afterwards, he worked on Trenchard's personal staff, and in 1931 was assigned to the faculty of the British Army Staff College. This broad background, combined with a first-rate mind, made Slessor one of the most original air thinkers prior to the Second World War.

Slessor's seminal book *Air Power and Armies* was based on his lectures at the Staff College and posits a war in which the British Army has been deployed to the Continent. Slessor argued that the enemy army's lines of supply and communication were the key targets. Significantly, he did not think only in tactical terms on this matter; rather, he maintained that the enemy's entire transportation system must be disrupted and neutralised. If this were accomplished, not only would the army be unable to offer effective resistance, but the entire country would be paralysed. This paralysation – also effected by destruction of the enemy's command and control network – would in turn have a decisive effect on not only the enemy's capability, but also its will (Slessor 1936: 97, 111, 122–147). In essence, Slessor was advocating a strategic- or operational-level air interdiction campaign. During the Second World War, RAF leaders, notably Air Chief Marshal Arthur Tedder, pushed strongly for just such an air campaign against Germany in 1944. This 'transportation plan' was successful in ensuring the success of the Normandy landings by severely restricting the flow of German reinforcements to the lodgement area. In addition, the wholesale destruction of the German rail and bridge systems in Western Europe had devastating effects on Germany's entire war effort (Tedder 1948: 106–115).

Others took an unusual approach to strategic air targeting. Although General Billy Mitchell would by the late 1920s fluctuate between a strategy akin to that of Douhet and one closer to that of the ACTS, his writings immediately after the First World War were different. In his first book, Mitchell called for the use of air power to destroy the military forces of the enemy. In other words, he saw victory occurring in the time-honoured method of the decisive counterforce battle (Mitchell 1921: 15). Only now, aircraft could accomplish such destruction in a quicker and more efficient fashion. Mitchell saw fleets as even more vulnerable than armies, and his bombing tests of 1921 and 1923 in which aircraft sank several battleships reinforced this belief: 'Neither armies nor navies can exist unless the air is controlled over them' (Mitchell 1925: XV).

Such an idea – in essence, the use of air power in a tactical role that would have strategic effects – had existed since the early days of flight. Trenchard, for example, believed during the First World War that the primary mission of air power should be to help ground forces achieve their objectives (Boyle 1962: 183–188). He would later change his opinion. In Italy, Douhet's ideas on strategic bombing would give way to those of Amedeo Mecozzi, who favoured tactical air power, pushing for a force structure composed of fighters, attack aircraft and medium bombers (Corum 1997: 159–162). A similar belief prevailed in France, which also focused on tactical air power between the World Wars (Cain 2002).

In Germany, a traditional land power, this notion took root with tenacity. After the war, German combat officers who had fought on the Western Front studied the lessons of the war and determined that mobility had been lost and must now be regained for future success. Under the direction of General Hans von Seeckt, the German military embraced this notion, and so was born what would later be termed *blitzkrieg* – lightning war. Ground forces would be mechanised and motorised, and tanks would play a major role in the offensive. The Luftwaffe would concentrate on the development of fighters and medium bombers for the express purpose of aiding this rapid ground assault (Corum 1992: 144–169).

In Russia this same intellectual journey took place with the same results (Hardesty 1982). In short, France, Germany and Russia did not develop a true strategic bomber during the Second World War; instead, they focused on tactical air power to support the ground forces.

Japan was unique. It had both a strong army and a powerful navy but did not establish a separate, independent air force. Instead, it built air arms for both services: the mission of the Army Air Service was to support ground troops and that of the Imperial Japanese Naval Air Service was to scout and to support and protect the fleet. Both contingents consisted largely of fighters, attack aircraft and medium bombers (Evans and Peattie 1997: 332–340).

## **Post-war nuclear theory**

One would expect that the massive and decisive use of air power in the Second World War would have spawned an outburst of new ideas in the years following 1945; surprisingly, that did not occur. The atomic strikes on Japan had both a catalysing and a numbing effect on military leaders worldwide. The new weapon appeared to revolutionise warfare in ways that made prior experience obsolete. The atomic and then nuclear ages redefined war. As a consequence, a different group of theorists emerged who attempted to explain the use of military force in this new age.

Alexander P. de Seversky, a Russian fighter pilot and ace during the First World War, had immigrated to the United States. Having lost a leg in combat, he turned to engineering. He built an air refuelling device in the early 1920s and eventually founded his own aircraft company. His designs were years ahead of their time, and his P-35 was the ancestor of the famed P-47 Thunderbolt. He also became a prolific spokesman and advocate for air power. His technical acumen and combat experience made him an authoritative commentator on air-centred issues (Libbey 2013).

During the Second World War he stressed the importance of strategic bombing and in his popular work *Victory through Air Power* he detailed how Allied bombers would bring Germany and Japan to their knees. (The book was a best seller and was even turned into an animated movie by Walt Disney.) After the war, de Seversky toured war-torn Europe and Japan and was awestruck by the devastation unleashed by bombing – especially by the atomic bombs. He therefore wrote about the need for an atomic-capable air force to deter the Soviets or, if necessary, defeat them (Libbey 2013: 22–41).

De Seversky was an important transitional figure between the air theorists of the interwar years, mostly uniformed airmen, and those of the atomic/nuclear era, most of whom were civilians. After de Seversky, who enjoyed using his Air Corps Reserve rank of major throughout his life, a new breed of civilian academics – Bernard Brodie, Herman Kahn and Thomas Schelling, for example – with little or no experience in war emerged to define and articulate theories of nuclear war. Since there was virtually no experience with this type of war, these academics were seemingly as capable of devising a theory of nuclear war as were uniformed professionals. The ideas they proposed – balance of terror, mutual assured destruction, strategic sufficiency and the like – were elegant, reasoned and served the West well throughout the Cold War era. Significantly, these ideas were largely theoretical and based on logic, not experience (Mueller 1997: 290–305; Ball and Richelson 1986). In this sense they were not unlike the interwar ideas of airmen, which were also largely devoid of concrete examples and instead relied on theory and on the development of weapons and technologies that would exist sometime in the future. At the same time, the very thought of nuclear war was so horrible that theorists hoped that the mere existence of such weapons would deter war.

Regrettably, military airmen too easily abandoned the intellectual field to the civilians. At the same time, the military accepted the premise that future wars would involve nuclear weapons. As a result, few airmen gave serious thought to the use of conventional air power at the strategic level.

## **The impact of the Vietnam War**

The Vietnam War had many negative effects on the United States and its military services. One positive aspect, however, was the growing realisation that nuclear war theory was an interesting intellectual exercise, but hardly likely to be implemented – if only because the superpowers

were so well prepared to wage such a catastrophic form of war. At the same time, Vietnam demonstrated that tactical air power might not be a war-winning weapon. Although US Air Force, Navy and Marine Corps aircraft dropped enormous bomb tonnage on North Vietnam, the vast majority of the objects struck were interdiction targets (Thompson 2000: 307). The policy of Gradual Escalation, devised by civilian advisors to President Lyndon Johnson in Washington, called for an air campaign that offered Hanoi both carrots and sticks: carrots in the form of an easing of air attacks on North Vietnam, as well as other diplomatic and economic inducements, and sticks in the form of increased bombing if the North Vietnamese were not accommodating. It was a disastrous strategy that produced no useful results, but did cause heavy casualties to airmen attempting to implement it as well as to civilians on the ground (van Staavaren 2002).

Thus, while ideas about air power had become polarised between those who thought only of nuclear holocaust and those who prepared to fight the tactical air battle, world conditions indicated that neither extreme offered decisive results. The vast middle ground between those two poles had to be recaptured. The renaissance of strategic conventional air power thought began with Colonel John Boyd.

As a fighter pilot during the Korean War, Boyd was intrigued by the success of the F-86 in air combat with the MiG-15 (an eight-to-one superiority) (Werrell 2005: 221). Upon reflection, he decided that the F-86's advantage was due largely to its hydraulically operated flight controls that allowed it to transition from one aerial manoeuvre to another more rapidly than the MiG. After further thought, Boyd began to see the implications of this theory in a broader context. The key to victory was to act more quickly, both mentally and physically, than the opponent. He expressed this concept in a cyclical process he termed the OODA loop (observe–orient–decide–act). As soon as one side acted, it observed the consequences and the loop began anew.

Boyd identified the orient phase as the most important portion of the loop. He speculated that the increasing complexities of the modern world necessitated an ability to take seemingly isolated facts and ideas from different disciplines and events, deconstruct them into their essential components, and then reassemble them in new and unusual ways. He termed this process 'destruction and creation' (Osinga 2015: 51–52). This process dominated the orient phase of his OODA Loop. The goal was to think and operate more quickly than the enemy so that the adversary always reacted either too late or inappropriately.

Even more significant, Boyd later hypothesised that this continuously repeating cycle was at play not only in an aerial dogfight, but also at the higher levels of war. In tracing the history of war Boyd saw victory consistently going to the side that could think most creatively – orienting itself – and then act quickly on the resulting insight. Because of the emphasis on the orientation phase of the loop, in practical terms Boyd called for a strategy directed against the mind of the enemy leadership. Although a pilot, his theories encompassed far more than a blueprint for air operations: to Boyd, this process governed all of warfare (Osinga 2015: 91–92).

Another airman who has thought deeply about strategic air power, and who also focused on enemy leadership as the key, was Colonel John Warden. Like Boyd a fighter pilot and combat veteran, Warden began a serious study of air warfare while a student at the National War College in 1986 (Warden 1989). His subsequent assignment in the Pentagon placed him in an ideal location when Saddam Hussein invaded Kuwait in the summer of 1990. Putting his theories into practice, Warden designed an air campaign calling for strategic attacks against Iraq's centres of gravity.

Warden asserted that war is a combination of physical and psychological factors, but because the psychological facet is difficult to measure or even identify the air strategist must focus on

the physical manifestations of the enemy. The device he used to illustrate his concept was a target consisting of five concentric rings, with leadership as the bull's-eye – the most important centre of gravity while also the most fragile – and armed forces as the outermost ring – the least important but also the most hardened (Olsen 2007).

Warden likened his Five Rings model to the human body. The innermost ring, the enemy leadership, equated to the human brain. Just as the brain was the most important organ of the body – it controlled all movement while also receiving all inputs and was thus irreplaceable – so too enemy leadership was the key to enemy resistance. If the leadership could be killed or captured, then the entire country – the enemy body – would be incapacitated.

Warden went on to argue that the other rings – organic essentials (raw materials and power), infrastructure (industry and transportation), the population and fielded forces – were distractions best avoided. These target systems should be attacked only as necessary to expose the leadership ring to offensive action. Warden concluded that this type of 'inside-out' warfare has always been the most effective in theory, but only the invention of air power made it routinely possible. In his view, the strategic nature of air power, combined with new technology, produced the type of rapid and relatively bloodless victories military leaders had sought for centuries. In short, air power could lead to strategic paralysis (Olsen 2007).

Thus, whereas John Boyd sought to disrupt the *process* of the enemy's leadership, John Warden focused instead on hitting the *form* of that leadership (Olsen 2007). For both men the 1991 Gulf War represented the realisation of such an air strategy. Air strikes against the Iraqi communications network, road and rail systems, and electrical power grid made it extremely difficult for Saddam Hussein to control his military forces, and also induced enormous confusion and uncertainty in his decision-making process. His OODA Loop was expanded and slowed, while Saddam himself was effectively cut off from his forces. (The coalition also flew numerous missions to locate and kill Saddam himself, but he remained well hidden.)

In effect, the theories of Boyd and Warden helped to enable a strategy that resulted in near-paralysis of the Iraqi regime. This air strategy came to be termed 'effects-based operations': the realisation that destruction was not always necessary to determine the success of an air strike. Rather, if the goal, for example, were to shut off the electricity in a certain sector of Baghdad for a short period of time, then it was not necessary to destroy an entire power plant, but simply to damage key elements that could be easily repaired, although not for several hours. This created the desired *effect* – shutting off the electricity for a specified period of time – which is what really counted (Deptula 2001).

Just as experience during the Gulf War of 1991 tended to support the theories of Boyd and Warden, it also revived an old theory of air power employment. Robert Pape was a civilian academic who taught at the School of Advanced Airpower Studies. In his seminal work, *Bombing to Win*, Pape reviewed strategic air campaigns in the Second World War, Korea and Vietnam, studied the works of Douhet, Mitchell and other classic air thinkers, and then examined the results of the Gulf War. He argued that it was not the relatively small number of air sorties directed against strategic targets in and around Baghdad that determined the outcome of the war; rather, the massive use of air power directly against the Iraqi forces and their supply lines proved decisive. Approximately 80,000 Iraqis deserted their posts and another 80,000 or so surrendered virtually without a fight as a result of six weeks of pounding from the air. To Pape, the Iraqi army was rendered 'combat ineffective' before the Coalition ground assault even began at the end of February.

Pape was revisiting the early ideas of both Billy Mitchell and Hugh Trenchard: the primary role of air power was to complement the ground forces in the defeat of the enemy's forces. In short, the route to victory was the same as it had been for centuries: the defeat of the enemy



army. Only now, air power had advanced to the stage where it could destroy an army faster, more easily and at less risk than could another army (Pape 1996: 240–253).

### **The aftermath of Desert Storm and the revolution in war**

The decades following the first Gulf War have strengthened the dominance of air power in modern war – at least the way it is practised by the United States and its major allies. Military successes, large and small, have included removal of drug king Manuel Noriega from power in Panama, Desert Storm (albeit temporary), Bosnia, Kosovo, Libya, and the early victories in Afghanistan and Iraq post-9/11.

Military planners must focus on successes as well as failures to determine a way ahead that maximises the chances of achieving political success while minimising the cost in blood and gold. If a terrorist or unconventional enemy pursues war with asymmetric strategies and weapons, then nations must counter them with their own asymmetric advantages.

The increasing use of precision-guided munitions has allowed air power to mitigate the problems of collateral damage and the large intrusive footprint (large numbers of conventional ground troops) that have plagued American interventions in the post-Second World War era. Because of its range, precision, lethality, flexibility and security – air forces have suffered remarkably few casualties since the Vietnam War – air power limits risk.

As an example, at the beginning of the Iraq operation in 2003, thirteen Iraqi divisions were positioned in the north to defend against a possible invasion from Turkey. Besides the Kurds, there were US special operations forces (SOF) teams in the north – fewer than 600 men – plus the 173rd Airborne Brigade that was air-dropped into Bashur. Of note, this brigade arrived with almost none of its equipment, which had been pre-positioned in Turkey before it became apparent that operations from that front would be denied. Nonetheless, on 30 March 2003 these forces destroyed the Iraqi 4th infantry division, followed by the 21st division on 31 March, and the 81st and 38th divisions on 2 April. The entire northern front collapsed on 10 April with the 5th Iraqi Corps surrendering and Kirkuk falling (Andres 2006: 412). In the words of one observer:

In short, against all prewar expectations, SOF operations in northern Iraq were fantastically successful. Despite numerous logistical and political obstacles, a small SOF group working with unskilled indigenous allies and highly constrained airpower defeated a significant portion of Iraq's army. Moreover, it did so without suffering a single American death.

*(Andres 2006: 412)*

This is remarkable, and comparable with the Afghanistan situation where SOF troops, teamed with the indigenous Northern Alliance and backed by ubiquitous intelligence, surveillance and reconnaissance (ISR) assets and Coalition air power, produced a rapid and stunning victory – before conventional US ground troops even arrived in theatre. Also of importance, the Northern Alliance, even with the smattering of SOF troops present, was always outnumbered by the Taliban; at Mazar-e-Sharif, for example, 5,000 Taliban in defensive positions confronted 2,000 Northern Alliance troops (Andres, Wills and Griffith 2006: 149). But of course the Northern Alliance had air power behind it, with targets called in and directed by SOF. Air power was the great equaliser.

Indigenous troops were essential to both of these operations, as they had been in the Balkans when Croats and Kosovars benefitted from North Atlantic Treaty Organization (NATO) air power. Of importance, these indigenous forces were not considered of high quality prior to

hostilities. The Kosovars and the Northern Alliance, for example, were deficient in quantity, quality, training and weapons; they had proven largely unsuccessful in fighting the Serbs or the Taliban previously. Yet, when stiffened with SOF and air power, they achieved enormous success (Lambeth 2001: 221–227, 242–243). In Libya, it was air power teamed with local opposition ground forces which brought down Muammar Gaddafi – with no casualties to NATO forces (Mueller 2015).

In sum, the world in this second decade of the twenty-first century involves peer competitors that must remain deterred. A major conventional war – or worse, one using nuclear weapons – must always remain a concern for political and military leaders. It is probable that a key reason nuclear weapons have not been employed since 1945 is that so many nations have them and state their intention of using them if directly attacked. Nonetheless, it is also true that the majority of conflicts that will see US or Western involvement are the types of punitive or United Nations-sanctioned protection missions witnessed over the past four decades. Recent events point towards a new paradigm involving air power (including robust ISR assets), special forces, and indigenous ground troops in the types of wars now endemic.

### **Key observations**

When reviewing air theory over the past century, both as imagined and as conducted, four themes become most prominent. First, air power has been recognised as an inherently strategic weapon in ways that surface forces are not. At the same time, it can also operate effectively at all three levels of war simultaneously from the outset of war.

Second, air power has always been viewed as a powerful offensive weapon. Although defence may be the strongest form of war on land, such is not the case with air power because of its ability to strike quickly, virtually anywhere, and often with little or no warning.

Third, air theorists have continually stressed the importance of achieving air superiority as rapidly as possible. Some argue this is essential only in the operational area, while others insist on gaining command of the air at the theatre level. Gaining air superiority allows both the freedom *to* attack and the freedom *from* attack. Joint force operations as conducted by the United States and its allies have come to depend on this air superiority – and usually air supremacy.

Finally, targeting still remains crucial, but ingenuity and trenchant analysis to determine the correct targets when fighting a terrorist organisation such as so-called Islamic State in Iraq and Syria (ISIS). Old templates traditionally used against conventional opponents must now be modified.

The task of the air strategist is to make sense of the various conflicting theories and concepts noted above and translate them into a workable plan. This begins with asking three fundamental questions: what is the goal; how much is it worth to achieve that goal; and what is it worth to the enemy to prevent you from achieving it. After addressing these basic questions, air strategists must devise a campaign plan to achieve the political goals set by the nation's civilian leaders. This involves transforming broad goals into specific military objectives, identifying the target sets that must be affected (not necessarily destroyed) to attain those objectives, and then combining the results into a coordinated operations order that can be implemented by the military forces involved.

What cannot be overemphasised is that there must be a clear linkage between the targets chosen and the objectives sought. For example, what specifically do planners expect to gain by bombing the power grid? If their overall objective is to force the enemy to halt an invasion of a neighbouring country, then how, exactly, will striking the power grid – or a munitions factory,

or armoured divisions, or intelligence headquarters – contribute towards achieving that objective? In other words, just because a target is destroyed or neutralised does not mean it was important or that the campaign has come any closer to attaining its goals. The intellectual process of linking ends and means is a crucial, yet too often overlooked, requirement for the air strategist.

Determining the key target or group of targets within a country requires careful and accurate measurement of the effects of air attacks. This analysis is essential to ensure the results are what were expected, so that adjustments can be made for future operations. This is not a minor consideration. Air warfare ordinarily requires a detailed understanding of an adversary's entire economic and political systems. Prior to the Second World War this was a fundamentally different type of military intelligence than that required during previous eras. As a result, new bureaucracies arose, composed of economists, industrialists and engineers, whose main function was to study the makeup and vulnerabilities of an enemy state. Today, these intelligence agencies have become key elements of the military, and their products are vital to the formulation of a viable air campaign plan (Ehlers 2009).

Perhaps the greatest caveat for the air strategist to bear in mind is that few wars are simple. Just as nations go to war for a complex array of varied, often conflicting, reasons, so too they choose to make peace based on a calculus that is seldom easily identifiable. And that is perhaps the most valuable lesson for any military strategist: beware the theorist who offers a model of war that purports to give a simple and universally applicable answer to the numbing complexities of war. There is seldom one answer; moreover, answers usually vary from one country to the next and from one situation to the next.

## Conclusion

In summary, it has become apparent over the course of the past six decades that air power is playing an increasingly important role in warfare. Surface force commanders realise that their operations are extremely difficult, if not impossible, without the extensive employment of air power. Airmen have often claimed that the basic methods and strategies of war-making have changed because of their new weapon. Without denying the dominance of air power on the battlefield, they also argued for its pre-eminence at the strategic level, basing this contention upon various targeting philosophies. The question as to which strategic targets should have priority in an air campaign has proven surprisingly thorny, and the answer is not self-evident. As a result, a variety of air theories have sprung up, each encompassing much internal logic, as well as an increasing volume of operational experience and evidence to support it.

Nonetheless, it is time to move beyond overly prescriptive interpretations of air power's use in war. It has become an aphorism that flexibility is the key to air power. That is just as true in the theoretical sense as in the operational. Needed are airmen well grounded in all aspects of air warfare, including the theoretical. Only then will we be able to select the concept for employing air power best suited to the situation at hand. Flexibility is also the key to air strategy.

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