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Strategy, Coercion and the Effectiveness of Airstrikes in Counterinsurgency Campaigns

July 2016

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Abstract

Air power has played a major role in unconventional and counterinsurgency campaigns since the advent of the military airplane. How effective is it in these types of campaigns? I use Pape's typology of coercive strategic models in conventional war and apply it to six counterinsurgency campaigns since the Second World War. I then assess each strategy's effectiveness in the conflict. Two trends emerge: strategies have shifted over time from those targeting supporting elements (logistics, mobility) to strategies directly targeting insurgents in combat; at the same time, air power has become less strategically effective. I examine three drivers for these trends: new technology making close air support missions technically feasible, doctrinal changes providing a military logic supporting these missions, and societal factors encouraging the replacement of ground forces with air strikes.

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Introduction

In August 2015, it was reported that the Inspector General of the Pentagon had begun an investigation into intelligence assessments regarding the US-led air campaign against the Islamic State in Syria and Iraq. Senior officials within the US Defence Intelligence Agency (DIA) have alleged that assessments about the air campaign's success against IS militants have been overstated for political gains.[1] This is the latest in a long history of controversy surrounding the use of air strikes in unconventional warfare, including counterinsurgencies. Whether air strikes are effective or not, or to what extent they are effective, has been a concern for as long as there have been bombers.

This study seeks to get to the heart of the issue - are air strikes effective in counterinsurgency campaigns? To answer this question, first I will examine how we define effectiveness in this situation, building a number of theoretical models of campaigns on Robert Pape's influential work examining strategic bombing in conventional wars. I will evaluate six historical campaigns based on the models developed, roughly grouped into three distinct phases: Wars of Decolonization (the Malayan Emergency and the Algerian War), Cold War Conflicts (the Vietnam War and the Soviet invasion of Afghanistan) and the Global War on Terror (the conflicts in Afghanistan and Iraq). I will argue that there is a longstanding historical shift from strategies that target infrastructure supporting insurgents (using strategic and tactical

[1] Mazetti, Mark, and Apuzzo, Matt. (2015) "Inquiry Weighs Whether ISIS Analysis Was Distorted" *New York Times*. 25 August 2015.

interdiction-denial strategies) towards strategies directly targeting insurgents (through close air support-denial and decapitation strategies), and that this trend has made air strikes less effective. Finally, I will consider a number of mechanisms that would appear to drive these trends. I will argue that the development of precision guided munitions (PGMs) or 'smart bombs' in the 1980s, the rise of the 'Revolution in Military Affairs' in response, and shifts in society which have given rise to a sensitivity to casualties in military conflict have played the most significant role in driving this trend.

This study seeks to contribute to the literature in two ways. Firstly, I attempt to bridge the gap between consideration of strategic air power in conventional and counterinsurgency campaigns, by applying Pape's theories to unconventional conflicts. I also attempt to incorporate some of the recommendations made by Pape's critics. Secondly, I am seeking to expand the academic debates on coercion in counterinsurgencies by providing significant historical context, compared to the existing emphasis on single-campaign case studies.

Chapter One: Effectiveness and Strategies for Coercive Air Power

Why Effectiveness Matters

The question of effectiveness is an important one. At the most general level, for military force to accomplish its political goals, it needs to be used effectively. This is true for both practical and ethical reasons. Practically speaking, when elements of the military force used are ineffective, this can complicate operations for other elements or sabotage the mission as a whole. At an ethical level, the principles of jus ad bellum and jus in bello require that military force be used only in situations where it is likely to accomplish the 'just cause'. The use of ineffective forms of military force could serve to violate this principle.

The effectiveness of air strikes in particular has become increasingly important as air strikes themselves have become more common in modern conflict. Since the airpower-heavy campaign against Iraq in 1991, air strikes have come to be seen as one of the first recourses in any geopolitical crisis. In addition, the conflicts in which these aerial interventions are taking place are more complex and more persistent. Both of these factors complicate simple effective/ineffective assessments in ways that are not amenable to media soundbites. This chapter establishes a more nuanced framework for assessing effectiveness of air strikes in counterinsurgency campaigns.

Defining “Effectiveness” in Relation to Counterinsurgencies

The first challenge of determining whether or not air strikes are effective is to decide what we mean by ‘effectiveness’. In most academic literature, military effectiveness is defined as at an organizational level, that is, in terms of individual or environmental factors that contribute to the capacity of a military unit in battle. Risa Brooks provides an overview of this use of effectiveness in the literature, ranging from early sociological studies of soldiers’ motivations to modern political science placing unit effectiveness in the context of other measures of state effectiveness.[2] Effectiveness in this regard could influence the success of an air campaign - if the units conducting the air strikes are ineffective, due to any number of circumstances, then the campaign will be less successful. This definition of effectiveness, however, distracts from the core question in this study. I am seeking to determine whether air strikes as a technique succeed in counterinsurgency campaigns, not whether or not the squadrons used in the campaign are effective. For this, a different but related definition of effectiveness is required.

In Robert Pape’s influential study of strategic bombing effectiveness, *Bombing to Win*, he divides military effectiveness into two complementary categories.[3] The first, combat effectiveness, focuses on efficiency - how well do bombs destroy their targets? As Pape notes, however, measuring combat effectiveness measures how quickly or cheaply a

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[2] Risa Brooks, “Introduction: The Impact of Culture, Society, Institutions, and International Forces on Military Effectiveness”. In Brooks, Risa (ed.). *Creating Military Power: The Sources of Military Effectiveness.* (Stanford: Stanford University Press, 2007).

[3] Robert A. Pape, *Bombing to Win: Air Power and Coercion in War,* (Ithaca: Cornell University Press, 1996), p56

military mission is performed. To paraphrase Stanley Baldwin, the bomber will always get through: it is simply a factor of time or effort expended. This measure says nothing about air power's ability to secure political goals.

This is what strategic effectiveness attempts to quantify. Strategic air power is inherently coercive - it seeks to change an adversary's behaviour through the use or threat of force. Bombing strategies operate by way of a mechanism; enemy actors, whether the civilian population, the political leadership, or the military hierarchy, react to the bombing campaign. The intended mechanism, in turn, dictates target lists and the types of munitions to be used.

Inherent to this conceptualization is that, for a bombing campaign to be strategically ineffective, one of two scenarios need to occur. The first is that the forces engaging in the coercion are combat ineffective. In this scenario, the bombers are unable to hit the targets described in the strategic model, resulting in no coercive effect. The second scenario is that, while the air forces undertaking the campaign are effective, the strategic model used is ineffective. While targets are successfully destroyed, these targets do not have the desired impact on the enemy's decision making or capacity to make war.

Pape is just one contributor to the vibrant academic debate on coercive air power and its effectiveness. *Bombing to Win* inspired a vigorous debate among scholars. Two examples of critiques of Pape are Barry Watts and John Warden. Watts argues that

Pape's conclusions rely on fundamentally misunderstanding the complex, nonlinear nature of war as regular, predictable phenomenon, something that is amenable to the kind of universal predictions Pape makes.[4] John Warden, writing in the same edition, argues that Pape pays insufficient attention to the role that PGMs have played in revolutionizing the use of air power, using his experiences in the planning of Operation Desert Storm as a case study.[5] Others, such as Horowitz and Reiter, expand on Pape using quantitative analysis.[6] This study takes on board a number of the critiques of Pape's original formulation. Like Mueller, I include deterrence as evidence of a coercive strategy.[7] Like Warden, I argue that PGMs represent a substantive change in the capabilities of strategic air power. Unlike Warden, however, I see this as a negative development, at least when applied to counterinsurgency campaigns.

There is a rich academic literature examining counterinsurgencies and unconventional conflicts through the lens of military coercion. Schultz traces an explicitly coercion-based model of counterinsurgency to the RAND Corporation in 1965, as the Vietnam

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[4] Barry Watts, "Ignoring Reality: Problems of theory and evidence in security studies". *Security Studies,* 7:2 (1997) p122

[5] John A. Warden III, "Success in modern war: A response to Robert Pape's bombing to win" *Security Studies,* 7:2 (1997)

[6] Michael Horowitz and Dan Reiter, "When Does Aerial Bombing Work? Quantitative Empirical Tests, 1917-1999". *Journal of Conflict Resolution.* 45:2 (2001).

[7] Karl Mueller, "Strategies of Coercion: Denial, punishment, and the future of air power". *Security Studies*, 7:3 (1998).

War was worsening.[8] Recent scholars have taken up this model for examining counterinsurgencies, providing a historical[9] or economic[10] perspective. Many authors have conducted case studies of single campaigns, including Kosovo[11], Afghanistan (Both the Soviet and Western interventions)[12] and Vietnam[13]. Determining the effectiveness of air power in individual campaigns is a useful endeavour, and can help to determine best practices for application elsewhere. However, this approach misses the potential to engage in long-term trends affecting the interplay between strategy and effectiveness. This study attempts to bridge the gap between Pape's broad conceptual approach focused on coercion and the narrower case-study approach favoured in the current literature on effectiveness of air power in counterinsurgency campaigns.

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[8] Richard Schultz, "Coercive Force and Military Strategy: Deterrence Logic and the Cost-Benefit Model of Counterinsurgency Warfare". *The Western Political Quarterly.* 32:4 (1979).

[9] Andrew J. Birtle, "Persuasion and Coercion in Counterinsurgency Warfare" *Military Review*, 88:4 (2008).

[10] Eli Berman et. al., "Can Hearts and Minds be Bought? The Economics of Counterinsurgency in Iraq". *Journal of Political Economy*. 119:4 (2011).

[11] Daniel L. Byman and Matthew C. Waxman, "Kosovo and the Great Air Power Debate". *International Security*. 24:4 (2000).

[12] Edward B. Westermann, "The Limits of Soviet Airpower: The Failure of Military Coercion, 1979-1989". *Journal of Conflict Studies*. 19:2, (1999). and Alex S. Wilner, "Targeted Killings in Afghanistan: Measuring Coercion and Deterrence in Counterterrorism and Counterinsurgency". *Studies in Conflict and Terrorism,* 33:4 (2010).

[13] Matthew Adam Kocher et. al. "Aerial Bombing and Counterinsurgency in the Vietnam War". *American Journal of Political Science*, 55:2 (2011).

Models of Coercive Air Power in Counterinsurgencies

Pape outlines four general categories of bombing strategies used by various air forces throughout the 20th century. While Pape and the theorists who wrote on these strategies focus on interstate conflict, the basic principles of these strategies are applicable in intrastate or unconventional conflicts, as well. I outline each below, discussing both their original framing in relation to strategic bombing and their application to counterinsurgencies. Table 1 shows how each strategy can be applied in counterinsurgencies, with suggested target sets and similar mechanisms.

Table 1: Strategic Models in Counterinsurgency

Strategy	**Theorist**	**Target Set**	**Mechanism**
Punishment	Douhet	cities	popular revolt
Risk	Schelling	gradual civilian damage	avoid future costs
Strategic Interdiction-Denial	None (Second World War)	Logistics, Reinforcements (From Out of Theatre)	Equipment shortages
Tactical Interdiction-Denial		Forces in Transit, Communications	Operational Paralysis
Close Air Support - Denial		Forces in Combat	Operational Paralysis
Decapitation	Warden	Leadership	Leadership Change or Operational Paralysis

The Punishment model of strategic air power was pioneered in the interwar period. Several theorists and air forces, for example, Hugh Trenchard and the British Royal Air Force, came to similar strategic doctrines; however, the theorist most associated with this model is an Italian general, Gulio Douhet.[14] In his book, *The Command of the Air*,

[14] Pape, p 60

Douhet argued that air power represented the only response to the trench warfare of the First World War. He recommended long-range bombing directly targeting large population centres. As he wrote, “[t]ake the centre of a large city, and imagine what would happen among the civilian population during a single attack by a single bombing unit… I have no doubt that its impact on the people would be terrible”.[15] He also advocated for a particularly brutal mix of munitions, using a combination of explosives, incendiaries, and poison gas to demolish and set fire to targets while preventing firefighters from extinguishing them.[16] This impact was designed to drive the affected civilians to revolt, forcing their leaders to end the war in the name of self-preservation. While heavily influenced by its roots in the interwar years, Douhet remains popular among air forces. As Forrest writes, “Douhet has survived because he continues to give authority to the deepest wishes and instincts of aviators”, including air power’s early independence, imperviousness to surface forces, and its ability to defeat the enemy swiftly and decisively.[17] This strategic model represents the least discriminate of the models examined here.

Douhet’s theory would obviously be difficult to institute in a modern counterinsurgency environment. With few ways to identify friend from foe, indiscriminate bombing of population centres is unable to isolate the insurgents and their supporters from the

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[15] Giulio Douhet, *The Command of the Air*. trans. Dino Ferrari. (Washington: Air Force History and Museums Program, 1998). p 58

[16] A. J. Forrest, “Giulio Douhet’s ‘The Command of the Air’: an enduring strategy?” *Australian Defence Force Journal*. 112 (1995). p 4

[17] ibid. p 8

section of the population supporting the counterinsurgents. The bombing thus effects both segments of the population: driving elements formerly supportive of the government to support insurgents at the same time as coercing insurgents to change their behaviour. The literature on the effects of civilian harm on local support for insurgents is mixed: while much of the literature finds that civilian casualties promote support for insurgencies, there are some notable exceptions.[18]

However, in situations where the wellbeing of the population was not of particular importance, similar strategies could be used. The Royal Air Force made use of a similar model, called "air control," in Britain's African colonies and Iraq after the First World War.[19] As I will discuss in more detail later, similar punishment raids were used by the Soviet Union during the Afghanistan intervention, including air strikes against Kandahar City and Herat, killing hundreds or thousands of civilians.[20] Beyond the Soviet case, since the Second World War punishment strategies have not been used by Western counterinsurgents.

The Risk strategy is very closely related to the punishment strategy. This is most readily identified with the American scholar Thomas Schelling, in his book *Arms and*

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[18] For example, authors in favour include Condra and Shapiro (2012) and Dell and Querubin (2016). Arguments against include Lyall (2009).

[19] For a full account of the RAF and other air forces use of bombing in colonial situations in this time, see David Omissi, *Air Power and Colonial Control*. (Manchester: Manchester University Press, 1990).

[20] For example, in April 1983, Amstutz describes "waves of Soviet bombers" attacking Herat, with an estimated 3,000 Afghan casualties. See J. Bruce Amstutz, *Afghanistan: The First Five Years of Soviet Occupation*. (Washington: National Defence University, 1986).

Influence.[21] Similar to the punishment model, the risk model also focuses on population and economic centres. While punishment strategies advocated for massive and immediate attacks, the risk strategy regards the threat of violence to be more important. As Schelling writes:

> "the ideal compellent action would be one that, once initiated, causes minimal harm if compliance is forthcoming, and great harm if compliance is not forthcoming, is consistent with the time schedule of feasible compliance, is beyond recall once initiated, and cannot be stopped by the party that started it but automatically stops upon compliance, with all of this fully understood by the adversary".[22]

Pape's formulation of risk as a separate strategy has proven to be somewhat controversial. Mueller, for example, points out that the difference between risk and punishment lies mostly in the timing of the strikes, rather than fundamental differences in the mechanism, targets or munitions used.[23] This is another strategy that is difficult to enact in counterinsurgency campaigns. Risk requires the enemy to be aware of the consequences of noncompliance - in counterinsurgency situations, however, it can often be difficult to identify or locate insurgents in order to communicate this. Pape uses the US bombing campaign against North Vietnam as his primary example of this strategy. While I will be discussing the Vietnam War as well, my focus is on operations against the Vietcong in the south, which entailed a variant of the denial strategy detailed below. None of the cases presented in this study included a risk strategy element.

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[21] Thomas Schelling, *Arms and Influence.* (New Haven: Yale University Press, 1966)

[22] Schelling, *Arms and Influence*, p 2-3

[23] Mueller, p 189

Denial strategies are, in Pape's formulation, the most successful form of strategic coercion. Where punishment and risk strategies target civilian populations with the goal of inflicting unsupportable levels of pain, denial strategies are designed to coerce an opponent by preventing them from achieving victory on the battlefield. Pape does not identify a scholar associated with this school of thought, and he divides it into three categories, based on three different target sets: attacks directly against enemy forces, or close air support; strategic interdiction, designed to affect the ability for weapons and materiel to reach the front lines; and tactical interdiction, designed to paralyze movement in the theatre by attacking logistics capabilities and command and control facilities. The origins of all three of these tactics lie in or immediately before the Second World War, often in response to limitations that prevented the use of the full punishment model popular at the time.[24]

Pape cautions against the effectiveness of denial strategies against guerrilla forces. He notes that guerrillas are less dependent on large logistical tails or on centralized command and control structures, which in his definition restricts the targets available for bombing. On this point, I strongly diverge from Pape: by reimagining the target sets slightly, and by including a deterrent role in addition to a direct coercion role, it is possible to see an important role for denial-based strategic air power in counterinsurgencies.

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[24] Pape, p 70-74

At the level of strategic interdiction, even insurgencies require some military supplies, particularly weapons and ammunition. While more difficult than identifying and attacking large-scale industrial facilities that make up a modern state's military manufacturing base, it is still possible to, for example, target smuggling routes bringing in supplies to insurgents. This is likely to be even less effective, in the short run, than Pape's conclusions regarding conventional strategic interdiction, as identification of targets can be an issue.

As for tactical interdiction, including deterrence in the effects of strategic air power opens up a number of mechanisms for air power to influence insurgent groups. The mere presence of an effective capacity for air strikes can prevent insurgent groups from operating efficiently, by preventing smaller units from grouping into larger, more effective forces. Insurgencies that are effective at levels beyond local theatres also do require some command and control and logistical facilities. Attacking messengers or weapons caches in the field can serve to paralyze insurgent operations in much the same way as conventional attacks on unit headquarters and transportation infrastructure.

The use of close air support, attacks aimed directly against frontline forces, are the most similar between conventional and counterinsurgency campaigns. One significant difference is that the difficulties in distinguishing insurgents from the general population mean that close air support strikes in counterinsurgencies are generally undertaken when troops are under fire already. This could potentially decrease effectiveness,

putting friendly soldiers' lives in some danger. This is a particularly acute risk prior to the introduction of PGMs.

The final strategic model is also the most recent one: Decapitation. Pape attributes this model to John Warden, an American Air Force officer and one of the principal architects of the Desert Storm bombing campaign. Taking a systems approach to examining society, Warden identifies five rings, with the Leadership ring occupying the central place.[25] The goal of the decapitation strategy is to destroy or otherwise cut off the leadership ring from the rest of society. Pape identifies three mechanisms to accomplish this. Firstly, it could be possible to directly target leadership figures with airstrikes, on the basis that their replacements will seek peace either because they support the war less or because of their fear of being targeted themselves.[26] The second mechanism is political decapitation, where air strikes target regime communications and other elements of their internal control structure, such as their security forces or loyal military forces, in order to facilitate a popular revolt or coup. The final option is military decapitation, where air strikes seek to cut off the leadership from frontline military forces, denying them strategic direction or instructions. These frontline military units will then collapse under even light military pressure.

Pape makes a number of critiques of the decapitation model in the context of conventional conflicts. Some of his critiques have withstood the test of time better than

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[25] Warden, p 175

[26] Pape, p 80

others.[27] The least applicable at present is practical: Pape argues that it is difficult to find and track the enemy's political leadership during a conflict, where security measures around leaders are likely to be particularly tight. In the age of the Predator drone and targeted killing campaigns, the idea that air power is particularly unsuited to tracking and targeting specific individual commanders is less valid. Others critiques continue to be persuasive: he argues that idiosyncratic wars, driven by the force of a leader's personality over the wider wishes of society, is a rare occurrence. Succession is difficult to predict, and in the authoritarian societies that have been targeted in recent conflicts, even knowing who will succeed is no guarantee of being able to predict the direction they will move society in. Finally, as with punishment campaigns, decapitation is unlikely to result in the overthrow of the government, either through popular uprising or coup. Both coups and successful uprisings are rare in war, and when they do occur, generally happen late in the conflict, once defeat is certain. In counterinsurgency campaigns, decapitation is a very modern strategy. That said, it has played a major role in US military operations in Iraq, Afghanistan, and outside of declared combat zones around the world.

[27] Pape, p 79-86

Chapter Two: Counterinsurgencies and the Strategic Shift

This chapter will evaluate the effectiveness of the use of air power in a number of counterinsurgency campaigns, applying the typology of strategic models developed above. Each campaign often uses multiple strategies at different stages or in different contexts. In several cases, hybrid strategies can be seen. The types of strategies identified in each campaign can be found in Table 2. Overall, I find that there is a change across time in the strategies used, from strategic interdiction-denial (often featuring the use of air strikes independent from ground forces) towards decapitation and close air support strategies (where air power is used much more closely in conjunction with ground forces). For each conflict, I will present a brief background on the use and intensity of air power in the campaign. I then evaluate the strategic models used, presenting examples of operations complying to the relevant models.

Table 2: Strategies and Effectiveness

Cases	**Punishment**	**Strategic Interdiction - Denial**	**Tactical Interdiction-Denial**	**Close Air Support - Denial**	**Decapitation**
Malaya		Moderately Effective	Moderately Effective		
Algeria		Moderately Effective	Moderately Effective	Moderately Effective	
Vietnam		Ineffective	Ineffective	Ineffective	
Soviet Afghanistan	Ineffective	Ineffective			
Iraq				Ineffective Counterproductive	Ineffective
Afghanistan				Ineffective Counterproductive	Ineffective

Assessing the strategic effectiveness of each of these strategic models is a more difficult undertaking. Air strikes are emphasized to differing degrees in each conflict, and operate alongside other military forces and civilian policies, all of which effect outcomes, making an objective assessment difficult. Instead of attempting to create a quantitative ranking or ratio, I make use of contemporary reports and, where available, academic analysis to estimate effectiveness instead. The key metric defining success is to what extent air power was able to change insurgent behaviour through coercion. In analyzing each of the conflicts here, I determine that the close air support and denial strategies used in recent conflicts are less effective than the strategic and tactical interdiction-denial strategies used in earlier eras.

The Decolonization Counterinsurgencies

During what was termed the Malayan Emergency, the British faced off with a Maoist insurgency in the jungles of modern-day Malaysia. The Royal Air Force would come to play a large role in offensive combat operations against the insurgency. Air Vice Marshall Sir Francis Mellersh, Air Officer Commanding in Malaya in 1949 and 1950, reported that, starting from an initial air strike in July 1948, operational tempo increased to the point where in the last three months of 1950 alone, the number of sorties had increased to 1,142.[28] By 1951, the RAF had deployed 10 squadrons of aircraft, 4 of which were ground attack or light bomber squadrons, with an additional medium

[28] Sir Francis Mellersh, "The Campaign Against the Terrorists in Malaya". *Royal United Services Institution Journal*. 96:583 (1951). 401-415.

bomber squadron provided by the Royal Australian Air Force.[29] The British command placed great stock in the value of direct air strikes, particularly for their effect on the insurgency's morale. In a report entitled "Review of the Emergency Situation in Malaya at the End of 1954" by the Director of Operations in Malaya, General Geoffrey Bourne wrote that "Air attacks represent one more form of pressure on the terrorists and as such constitute an integral and important part of the security force operations in the Emergency".[30]

There were problems with using air power in the conflict. As the reports themselves mention, the density of the jungle canopy in the area of operations virtually prevented reconnaissance from the air or direction from ground troops. In eight years of war in Malaya, the RAF's Number 1 (Bomber) Squadron dropped 17,500 short tons of bombs (or 15 Million kilograms), with only 16 confirmed kills credited to their operations.[31] Even with efficient procedures for calling in and launching close air support strikes, the enemy often melted away into the jungle as air support arrived.[32] This necessarily precluded a close air support-denial strategy.

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[29] The National Archives. (1951). "The Situation in Malaya" Memorandum by the Secretary of State for the Colonies. CAB/129/48. Annex III

[30] The National Archives (1955). "Malaya: A Review of the Situation" Memorandum by the Secretary of State for the Colonies. CAB/129/74.

[31] Jay Gordon Simpson, "Not By Bombs Alone: Lessons from Malaya". J*oint Forces Quarterly,* Summer 1999. p 95

[32] Bruce Hoffman, *British Air Power in Peripheral Conflict, 1919-1976*. (Santa Monica: RAND Corporation, 1989) p 43-44

Generally speaking, RAF air strikes in the Malayan Emergency tended towards a strategic interdiction-denial strategy. Food cultivation sites and jungle camp sites were targeted, damaging the ability of insurgents to resupply themselves and denying them a safe "homeland" in the jungle to regroup. Tactical interdiction was also undertaken, with bombing used to shepherd the insurgents towards waiting ground forces.[33] In a particularly interesting hybrid strategy, combining tactical interdiction and punishment strategies, bombing was targeted against empty tracts of jungle. Harassing attacks like these were intended to both limit the insurgents' freedom of movement and to negatively impact morale. This morale effect has more in common with the mechanisms at work in punishment strategies than in denial strategies. A 1955 report indicates that, while exact numbers were not available, these attacks have led to surrenders by insurgents.[34]

In contrast to the dense jungles of Malaya, the French operations in Algeria between 1954 and 1962 faced significantly more favourable terrain for the use of air strikes. The Algerian desert provided significantly less cover for the National Liberation Front (FLN) insurgents. Typical operations described by the French counterinsurgency theorist David Galula and other French commanders involved a combined force of airpower and ground troops, with bombers suppressing insurgents as helicopter borne commandos and ground-based forces moved into position to surround the enemy forces.[35]

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[33] Hoffman, p 44

[34] "Malaya: A Review of the Situation" p 13

[35] Galula, David. *Pacification in Algeria: 1956*-1958. (Santa Monica: RAND Corporation, 1963). p 196, and Peterson, A.H. et al. (eds). *Symposium on the Role of Airpower in Counterinsurgency and Unconventional Warfare: The Algerian* War. (Santa Monica: RAND Corporation, 1963) p36

Coordination between close air support planes and ground troops was close. The French Air Force in this period also pioneered the use of armed helicopters in a close air support role, arming helicopters with 20mm cannons and wire-guided anti-tank missiles.[36] These combined arms campaigns were conducted largely in the mountainous regions of the country, outside of the population centres.

French operations then, aided by the more favourable terrain, tended towards tactical interdiction, with elements of strategic interdiction. The use of extensive border fortifications, partially patrolled from the air, served to restrict arms and reinforcements from entering Algeria.[37] Limiting the enemy's ability to rearm, reinforce and resupply is the primary driver of a strategic interdiction strategy. Independent air strikes were conducted against forces in transit in the countryside, far from friendly land forces.[38] These strikes limited mobility and served to 'fly the flag', providing presence and discouraging civilians from aiding insurgents- a combined tactical and strategic interdiction mode.

Presaging more modern conflicts, the French Air Force was also used to provide significant amounts of close air support, operating closely with ground forces. The use of armed helicopters in a close air support role represents a major advance: the low

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[36] Beau G. Rollie, "Helicopters in Irregular Warfare: Algeria, Vietnam and Afghanistan" MA Thesis, US Army Command and General Staff College (2013). p 26

[37] RAND Counterinsurgency Symposium, p 44-46

[38] Martin Alexander and JFV Keiger. "France and the Algerian War: strategy, operations and diplomacy". *Journal of Strategic Studies*. 25:2 (2002). p 13

speed and high loiter time of helicopters enable a significantly higher level of accuracy than is possible with fixed-wing aircraft. The Algerian War also represents the beginning of organized threats to aircraft in counterinsurgency situations. The proliferation of heavy machine guns, and later surface to air missiles, began to increase risks for air power, particularly in close air support settings. It was in reaction to this threat that France developed the armed helicopter capability.[39]

The Cold War Counterinsurgencies

Air strike capabilities in the US war in Vietnam were likely the best-resourced of all of the pre-PGM era conflicts. By 1967, the US Air Force had deployed 19% of its total aircraft inventory to South Vietnam, approximately 1,000 aircraft.[40] Aircraft used in strike missions ranged from the propeller-driven A-1 Skyraider to the B-52 strategic bomber. Much of the air effort in Vietnam was focused on independent interdiction operations, whether against North Vietnam or its neighbours, such as along the Ho Chi Minh Trail. However, the number of combat sorties dedicated to supporting US ground troops in South Vietnam between 1965 and 1967 still reached just shy of 50,000.[41] Throughout the war, there were a number of technological innovations designed to maximize the effectiveness of air support for ground troops, including the attack helicopter (as

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[39] David Jordan, "Countering Insurgency From the Air: The Postwar Lessons" *Contemporary Security Policy*. 28:1, (2007). p115

[40] John Schlight, *The War in South Vietnam: The Years of the Offensive, 1965-1968*. (Washington: Office of Air Force History, 1999). p289

[41] Ibid. p292

opposed to the armed utility helicopters used by the French in Algeria), the fixed wing gunship (such as the AC-47 or AC-130), and early laser-guided bombs.

The US air strike operations fall under three models: strategic interdiction against supplies along the Ho Chi Minh Trail, tactical interdiction, largely centred around defoliants and attacking tunnel complexes, and close air support, directly supporting troops in combat. The Vietnam war marks the start of the shift in targeting in counterinsurgency campaigns, with air strikes targeted both physically and operationally closer to friendly combatants. According to one estimate, 72% of all bombs dropped in the war were dropped on South Vietnam.[42] Despite the image in popular culture, fostered by iconic battles including the Battle of Khe Sanh or the Battle of Ia Drang (popularized in the book and film *We Were Soldiers*), Close Air Support was narrowly focused. Large numbers of munitions were used in comparatively few situations, with air power only supporting around 10% of ground battles according to some estimates.[43] This number, however, likely understates the use of air power, as armed helicopters under the direct control of the US Army are not counted. Close Air Support was less effective in periods of bad weather and at night, which quickly became the times when the Vietcong and the North Vietnamese forces would launch offensives.[44] While vast

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[42] Raphael Littauer and Norman Uphoff, *The Air War in Indochina*. (Boston, Beacon Press, 1972).

[43] Donald J. Mrozek, *Air Power and the Ground War in Vietnam: Ideas and Actions*. (Maxwell AFB: Air University Press, 1988). p 118

[44] Flareships, working in close concert with fighters, countered some of the insurgents' advantages at night. See Ralph A. Rowley, *The Air Force in Southeast Asia: Tactics and Techniques of Close Air Support Operations, 1961-1973*. (Washington: Office of Air Force History, 1976).

improvements had been made in terms of generating sorties for close air support compared with earlier conflicts, over 50% of firefights in Vietnam were too short (under 20 minutes in duration) to call in air strikes.[45] The liberal use of airstrikes forced retreats or allowed distant outposts to be evacuated. However, they were unable to destroy sufficient enemy forces to sap the enemy's combat capabilities.

A smaller number of strikes in South Vietnam then were tactical interdiction, targeted against enemy forces without specific intelligence. Approximately 20,000 square kilometres of forested area was sprayed with defoliants, including the notorious Agent Orange.[46] These attacks were designed to impede the free movement of enemy forces through the dense jungle. Enormous areas of forest were sprayed, totalling approximately 15% of South Vietnam's forested areas.[47] These operations had little effect on the insurgents' freedom of movement.

Strategic interdiction attacks took two forms: direct attacks against supply lines from North Vietnam along the Ho Chi Minh Trail, and food denial attacks against crops in South Vietnam. In the later half of the war, from 1968 to 1972, Commando Hunt raids targeted hundreds of sorties per day against the trail, attacking trucks, transshipment points, and the roads themselves. These raids destroyed significant quantities of

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[45] Mrozek, p 118

[46] Milton Leitenberg, "America in Vietnam: Statistics of a war". *Survival*. 14:6 (1972), p 270

[47] Arthur H. Westing, "Herbicides in War: Current status and future doubt". *Biological Conservation*. 4:5, (1972). p325

supplies and thousands of trucks.[48] Food denial attacks destroyed substantial amounts of farmland, targeted mainly at the interior Central Highlands region. One estimate put the total destruction at crops equivalent to enough food to feed 849,000 Vietnamese for a year.[49] The food denial program had little effect on supplies for insurgents: between 90% and 99% of the food destroyed was destined for civilians.

The Soviet occupation of Afghanistan marks the final conflict in the Cold War era examined in this study. The Soviet doctrine towards the use of airstrikes in counterinsurgency was rather less restrained than that practiced by the UK, France, or the US. At the beginning of the conflict, operations were marked by occasional large-scale assaults, starting with extensive bombardment of the target area.[50] The Soviets also conducted punitive carpet-bombing raids, notably levelling up to half of the city of Herat, with a population of 150,000.[51] One Soviet advantage in air power was in the Mi-24 Hind attack helicopter, a large, heavily armed and armoured helicopter, capable of transporting 8-12 ground troops along with up to 192 unguided rockets, machine guns, and cannons. Helicopters were used extensively in both airlift and attack roles. However, the Afghan insurgents' access to heavy anti-aircraft weaponry, beginning with heavy machine-guns and SA-7 handheld surface-to-air missiles and expanding to

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[48] Herman L. Gilster. *The Air War in Southeast Asia: Case Studies of Selected Campaigns*. (Maxwell AFB: Air University Press, 1993). p 31

[49] Westing, p 325

[50] McMichael, Scott R. "The Soviet Army, Counterinsurgency, and the Afghan War". *Parameters*. December 1989. p24

[51] Nelson, Denny R. "Soviet Air Power: Tactics and Weapons Used in Afghanistan" *Air University Review,* January-February 1985.

include the much more capable Stinger missile, significantly increased losses of aircraft, particularly helicopters. A declassified CIA intelligence report estimated that between 1979 and 1985, over 600 aircraft were lost.[52]

Strategically, the Soviet Union utilized strategic interdiction-denial and punishment models. Punishment raids directly against urban centres, for example the Herat raid noted above, are a classic hallmark of Douhet's strategic doctrine. Even when using strategic interdiction strategies, there was usually an element of punishment. Helicopters and fixed wing aircraft dropped millions of mines in the mountain passes, a clear strategic interdiction attempt to limit the flow of reinforcements and supplies streaming over the border from Pakistan. However, many of these mines were 'butterfly' mines, disguised as radios, toys, or pens and designed to injure, but not kill. Many of the victims of these mines were children.[53] Early in the conflict, Hinds were frequently used in a close air support role.[54] As insurgents became better armed, however, these missions became increasingly dangerous and less used.

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[52] Central Intelligence Agency, Directorate of Intelligence. (1985). "The Soviet Invasion of Afghanistan: Five Years Later" Declassified Intelligence Assessment. Accessed at: http://www.foia.cia.gov/sites/default/files/document_conversions/89801/DOC_0000496704.pdf

[53] Westermann, Edward B. "The Limits of Soviet Airpower: The Bear Versus the Mujahideen in Afghanistan, 1979-1989". *Journal of Conflict Resolution*. 19:2 (1999). p 28-30

[54] For greater detail on the close collaboration between ground forces and helicopters in close air support, see Lester W Grau (ed). *The Bear Went Over the Mountain: Soviet Combat Tactics in Afghanistan.* (Washington: National Defence University Press, 1996)

Counterinsurgency in the Global War on Terror

The period between the end of the Soviet invasion of Afghanistan and the start of the 21st Century counterinsurgencies in Iraq and Afghanistan featured major advances in air power. The development of PGMs, the diffusion of advanced communications equipment, and the use of aerial bombing campaigns had all been proven in the Gulf War and the campaigns in Bosnia and Kosovo. During the initial invasions of both Afghanistan and Iraq, air power was used to great success. The 'Afghan Model', using small numbers of Special Operations forces to order air strikes to support friendly local forces, was widely hailed as the future of warfare.[55] As the counterinsurgency campaigns developed, air power remained a major component of the military response. In many ways, these initial campaigns set the tone for later missions: large air contingents supporting small ground forces, providing largely close air support.

The number of air strikes increased steadily through the conflict. In 2004, 285 sorties dropped munitions in Iraq, while 86 dropped munitions in Afghanistan. By 2007, there were 1,119 strikes occurred in Iraq and 2,926 occurred in Afghanistan.[56] These numbers include only 'major' munitions dropped, excluding guns and unguided rockets. The increase in the number of strikes closely follows the number of troops deployed, with Iraq airstrikes peaking in 2007 and Afghanistan in 2010, both during US-led 'surges'. As in previous counterinsurgencies described

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[55] Stephen D. Biddle. "Allies, Airpower, and Modern Warfare: The Afghan Model in Afghanistan and Iraq". *International Security*. 30:3 (2005).

[56] Cordesman, Anthony H. "US Airpower in Iraq and Afghanistan: 2004-2007". Center for Strategic and International Studies. 13 December 2007. Accessed at: http://csis.org/files/media/csis/pubs/071213_oif-oef_airpower.pdf

here, insurgents integrated with civilian populations. In these conflicts, however, air power was used extensively in support of operations in urban centres.

While there has been a great deal of attention paid to the overall number of air strikes and to the number of civilian casualties caused by air strikes, there has been relatively little scholarship examining the actual use of air strikes in Iraq and Afghanistan. This makes defining the strategic models an imprecise business, at best. In Afghanistan, air strikes have been frequently divided into two types: planned and un-planned.[57] A similar division, if not identical language, can be seen in Iraq as well. In planned strikes, targets are selected prior to the strike, and operations are often undertaken by air power independently. Drone strikes, particularly those targeted against specific individual commanders or 'signature' strikes against possible insurgents would fall into this category.[58] Unplanned air strikes, on the other hand, are quick-reaction strikes, used to defend US and Coalition forces under serious attack. As such, they tend to be used closer to or even in urban centres. Particularly interesting examples from the Iraq War include the 2008 Battle for Sadr City and in Fallujah.[59] In both cases, ground commanders were provided with substantial dedicated air support, ranging from attack helicopters to fixed wing gunships, from drones to manned fighters. Targets generally focused on enemy troop concentrations, often

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[57] Robert Perkins. "Air Power in Afghanistan: How NATO Changed the Rules 2008-2014". Action Against Organized Violence, December 2014.

[58] Zenko, Micah. "Targeted Killings and Signature Strikes" Council on Foreign Relations. Blog. 16 July 2012. Accessed at: http://blogs.cfr.org/zenko/2012/07/16/targeted-killings-and-signature-strikes/

[59] See David E Johnson et al. *The 2008 Battle of Sadr City*. (Santa Monica: RAND Corporation, 2013) and William Head. "The Battles of Al-Fallujah: Urban Warfare and the Growth of Air Power". *Air Power History*. 60:4 (2013).

knocking down entire buildings.[60] Even with the substantial planning for these operations, many, if not most of the strikes were deployed on an ad-hoc basis.

To transform the terminology of 'planned' versus 'unplanned' into strategic models, I argue that air strikes in the Iraq and Afghanistan campaigns represent primarily close air support and decapitation models. The lack of more detailed target information on planned strikes makes this particularly inexact: planned strikes could include strikes more commonly associated with tactical or strategic interdiction-denial. It appears that Close Air Support represents the largest use of air strikes in the Iraq and Afghanistan campaigns. The large air components dedicated to supporting ground operations, such as the attacks on Fallujah and Sadr City identified above, indicate that ground support was a major priority for air forces in the conflict. Many of these strikes were defensive, with the primary intent to protect allied soldiers. However, they can also be said to be operating offensively - by destroying enemy forces in a particular area, these strikes are designed to force the enemy to surrender or retreat from a given territory.

Decapitation strikes have also become increasingly used as the conflicts have advanced. In 2010, over 200 targeted killing strikes in Afghanistan had been recorded.[61] These two strategic models can also occur simultaneously: during the Fallujah battles, particular attention was paid by supporting aircraft to targets where intelligence suggested leaders including Abu Musab al-Zarqawi, leader of Al-Qaeda in Iraq could be located. Al-Zarqawi himself was later killed in a

[60] Ibid.

[61] Wilner 2010

targeted killing strike in Iraq.[62] These decapitation strikes seek to paralyze insurgent groups, destroying their capacity to plan attacks and even to fracture the unity of these organizations.

Effectiveness

It is clear from the discussion above that there has been a shift in the strategic models used for air strikes in counterinsurgency campaigns. How has effectiveness changed through this period? This section examines each of the eras described above, estimating effectiveness using both contemporary assessments and the wider literature on each conflict. I find that strategic effectiveness has declined in each of the three eras described.

Decolonization Campaigns

In the early modern counterinsurgency campaigns in Malaya and Algeria, air power was moderately effective. While air strikes played a minor role in counterinsurgency operations compared to ground forces, they were widely considered effective in the roles they were assigned. In Malaya, British officers are complementary of the use of air strikes both in the strategic and tactical interdiction roles. The 1955 report to the British Cabinet on the situation specifically highlighted the morale effect of bombing on the decision of insurgents to surrender.[63] Using bombers to force insurgents to move towards ground forces, a classic form of tactical interdiction, was seen as less valuable as ground forces in that situation, but necessary due to the rugged terrain and thick

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[62] Dexter Filkins and John F. Burns. “At Site of Attack on Zarqawi, All That's Left Are Questions” *The New York Times*. 11 June 2006.

[63] “Malaya: A Review of the Situation” p 13

jungle. Modern academic analyses are more inclined to view the Malaya campaign as a failure for air power.[64] These critiques, however, tend to focus overly on the lack of combat effectiveness, particularly in the large expenditures of munitions compared to low official death tolls. Contemporary reports, on the other hand, generally include consideration for the strategic value of air strikes, and find them adequate for the role assigned.

In Algeria, air strikes were marginally less effective compared with Malaya. The system of border fences, in part made possible by aerial strike capabilities to patrol distant sections, reduced the flow of reinforcements and supplies by as much as 90%, and ensured that units that did cross did so only in small formations.[65] Tactical interdiction and close air support strikes against insurgent groups in the Algerian interior, in conjunction with ground forces, were responsible for paralyzing the rural counterinsurgency, forcing the insurgents into a campaign of urban terrorism.[66] These missions for air power were only partially successful, coercing the insurgents into changing tactics, rather than to accept defeat. Compared with later campaigns, inducing the enemy to select a suboptimal strategy can still be considered evidence of moderate effectiveness.

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[64] One example is Jay Gordon Simpson, (1999)

[65] John Talbott, *The War Without a Name: France in Algeria, 1954–1962* (New York: Alfred Knopf, 1980), p. 184.

[66] Alexander and Kieger, p 13

The Cold War Counterinsurgencies

Air strikes in the two Cold War counterinsurgencies were largely ineffective. Insurgents were able to continue operations throughout the conflict and throughout the battlespace. In the Vietnam War, close air support was effective only in that its use could stop attacks or allow for the evacuation of exposed troops - it had no impact on the ability of the Vietcong to continue attacks. Tactical interdiction similarly failed to decrease the mobility of enemy forces, despite the huge fraction of destroyed forest. Despite the success in destroying trucks and materiel along the Ho Chi Minh Trail, this bombing never had its desired effect. Because the insurgents being supplied had few requirements, even the limited supplies that made it through the bombing were sufficient to continue combat operations.[67] A similar effect can be seen in the food denial strategy. The largest success of that campaign was to drive civilian populations out of insurgent controlled territory and into government-run refugee camps, without negatively impacting insurgent combat effectiveness.[68]

These findings are echoed by participants: a survey conducted after the war reported that while most general officers in the war thought that airstrikes were valuable, a substantial minority thought they were ‘not vital’. There is some evidence that views changed depending on when in the war the respondent served; soldiers serving later, as the North Vietnamese Army began more conventional operations, were more likely to

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[67] Gilster, p 22-27

[68] Leitenberg 1972

view airstrikes as decisive.[69] All in all, air strikes in Vietnam may have been instrumental in protecting US and South Vietnamese positions and soldiers, it did not have material effect on the enemy.

Similar outcomes can be seen in the Soviet invasion of Afghanistan. Both the punishment and strategic interdiction strategies used were ineffective. Repeated carpet and terror bombing of villages and cities did little to effect the morale of the civilians and did not lower their support for the insurgents. Despite over 1 million civilians killed or wounded in terror bombing, land mines, and artillery shelling, the mujahideen continued to fight.[70] Strategic interdiction failed just as thoroughly. As with the Vietnam War, the logistical support needed to supply the mujahideen in Afghanistan was low enough that those supplies that could arrive from safe havens in Pakistan were sufficient. The Soviets were never able to completely close the mountain supply routes, nor convince Pakistan to end the safe havens.[71] With neither the punishment nor the strategic interdiction strategies impacting insurgent operations, no coercion occurred, rendering air power in this campaign ineffective.

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[69] Mrozek p119

[70] Westermann, p 102

[71] For examples of the limited supplies necessary to sustain the insurgents, and their techniques for evading the Soviet blockade, see Arthur Bonner, *Among the Afghans* (Durham, NC: Duke University Press, 1987)

Finally, how effective were the close air support and decapitation strategies in the wars in Iraq and Afghanistan? I argue that these strategies go beyond merely being ineffective. Instead, they actively damaged the wider counterinsurgency efforts. As with the Vietnam War, close air support was highly effective in a defensive capacity, protecting the lives of soldiers when attacked by the enemy. The volume of fire, and particularly the frequent use of air strikes in populated settings, has resulted in significant civilian casualties, which in turn increased public support for the insurgents.

It is generally accepted among decision makers and counterinsurgents that civilian casualties has negatively impacted the counterinsurgency efforts in Iraq and Afghanistan.[72] Civilian casualties weaken the legitimacy of the counterinsurgents, promoting otherwise peaceful civilians to find common cause with the insurgents in the name of revenge or perceived self-preservation. This effect is well-known among insurgents, as well. Close Air Support as a strategic model is designed to damage an enemy's capacity to make war by depleting its equipment and personnel. The increase in local support through civilian casualties negates this effect by making losses easier to replace. There is evidence that this relationship has been recognized by commanders: in the final years of the Afghan conflict, commanders instituted strict rules of

[72] See Christopher Kolenda et. al. "The Strategic Costs of Civilian Harm". Open Society Foundations. June 2016. and David Kilcullen and Andrew McDonald Exum, "Death From Above, Outrage from Below." *The New York Times*, 17 May 2009.

engagement, dramatically decreasing the number of air strikes undertaken in urban settings and lowering civilian casualties, as well.[73]

The decapitation strategy appears to have been no more successful than the close air support strategy. Evidence at best is mixed: some studies indicate that targeted killing in Afghanistan and Pakistan has no effect, others that violence decreases, and still others that it negatively impacts counterinsurgency efforts.[74] In all three cases, however, the decapitation strikes do not accomplish their goal in the strategic models used here; that is, they do not coerce the insurgents into giving up the fight. While some behaviours are modified in the interest of self-preservation, the insurgent groups in Iraq and Afghanistan continued the war, and continued to be effective. Thus, the decapitation strategy model failed to be effective.

Conclusions

Two trends have been established in this chapter. The first is that there has been a clear shift in the strategies used by air power in counterinsurgency campaigns. Instead of using strategies which attack elements supporting insurgents, such as logistics or the insurgent's mobility, counterinsurgency campaigns have shifted gradually towards strategies that focus on directly attacking insurgents, through close air support for ground troops in conflict or attempts to decapitate the insurgent organizations. In a parallel trend, I find that effectiveness of air power in each of these conflicts, when

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[73] Perkins 2014

[74] Stephanie Carvin, "The Trouble with Targeted Killing" *Security Studies*. 21:3 (2012).

compared against the strategic models used, has decreased across time, with older counterinsurgencies rating as more effective, and the most recent efforts rating as less effective, perhaps even counterproductive. The question raised here, then, is what has driven the strategic shift? This will be discussed in the next chapter.

Chapter Three: Causes of the Strategic Shift

The historical record examined in the previous chapter indicates two distinct trends in the use and effectiveness of air strikes in counterinsurgency campaigns. Firstly, there has been a 'strategic shift', with counterinsurgents increasingly moving away from strategic interdiction-denial strategies favoured in earlier campaigns towards close air support and decapitation strategies. The second trend indicates that air strikes have ranged from modestly effective to benignly ineffective to actively counterproductive over the course of the conflicts studied.

In Chapter One, I outlined the two ways in which strategic bombing could be ineffective: either because of a lack of combat effectiveness, or because the mechanism used in the strategic model did not result in coercion. The advance of technology, however, has resulted in increasing combat effectiveness across the entire period studied. One particularly stark example of this technological improvement, the development of precision-guided munitions (PGMs) is described below. The lack of effectiveness, then, can be attributed to the changes in strategy, from strategic and tactical interdiction towards close air support and decapitation strategies.

In that case, then what is driving the change in strategies? Strategies are not generated in isolation, but are influenced by a wide range of factors. The 'Strategic Shift' can be ascribed to three major changes: Technological, Doctrinal, and Societal. Each change provides a particular impetus for the shift in strategies. The first is technological: earlier

commanders used strategic interdiction-denial strategies because the weapons available at the time were unsuitable for other strategies. The development and widespread deployment of Precision Guided Munitions make strategies like close air support and decapitation feasible. The second change is doctrinal. The development of PGMs was accompanied by a fundamental shift in military doctrine, called the Revolution in Military Affairs. This doctrine changed the relationship between air power and ground forces, making the case that air power was capable of independent operations in ways unthinkable to earlier military leaders. These doctrinal developments provide the intellectual force for policymakers to change strategies. The third trend is societal: changes in the relationship between the media, decision makers, and public opinion has resulted in a drive to limit casualties that has then driven changes in the total resources available and in the composition of forces available to commanders, compared to previous conflicts. This represents the external impetus for the strategic shift: as society changes, so do the preferred policies of decision makers. Each of these trends has roots early in the period studied here, but with a clear inflection point between the end of the Cold War era and the rise of the Precision-Guided era noted in the previous chapter.

I Can, Therefore I Do: The Development of PGMs

Precision Guided Munitions had been first used experimentally throughout the Second World War, both by Germany and the Allies. These bombs had significantly improved accuracy over free-fall weapons, however, they were limited by the need for good

weather, small warhead size, and mechanical faults.[75] As mentioned above, it was not until the Vietnam War that what could be considered as 'modern' PGMs were used in combat. Bombs were guided by laser designators or television systems. These weapons too faced targeting challenges; for both the television and laser guided models, smoke, fog, and haze over the battlefield could prevent weapons from acquiring the target, while the planes designating the targets were forced to loiter at relatively low altitudes over targets heavily guarded by surface-to-air missiles and anti-aircraft artillery.[76] However, the technologies developed during the Vietnam period by the United States would become the basis for the most successful developments in PGMs, including by American allies such as the United Kingdom, and by competitors, such as the Russian KAB-500Kr and KAB-1500Kr series guided bombs.

The 1980s saw extensive further development of guidance systems for PGMs. The Paveway II and Paveway III series of laser-guided bombs increased the accuracy of these weapons to the point where CEP was virtually zero. This was, however, accompanied by a substantial increase in the cost per unit, from $20,000 per weapon for Paveway II to $65,000 for Paveway III (in 1988 USD).[77] The addition of laser designator pods (LANTIRN pods) to aircraft enabled them to self-designate laser-guided bombs, eliminating the requirement for a designator aircraft to loiter around the target

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[75] Donald I. Blackwelder, "The Long Road to Desert Storm and Beyond: The Development of Precision Guided Munitions" Thesis, School of Advanced Airpower Studies, Air University. (1992).

[76] Carlo Kopp. "Milestones: Smart Bombs in Vietnam" *DefenceToday*, September 2009. p43

[77] Blackwelder, 37

area. After the Gulf War, guidance using the Global Positioning System (GPS) finally permitted precision strikes no matter what conditions were on the ground, through the Joint Direct Attack Munition program.[78] Technological development had created weapons that, by the late 1980s, could in theory score direct hits against all target types in all weather conditions, day or night.

These weapons, with incremental upgrades, remain the mainstays of air power in the modern counterinsurgencies in Iraq and Afghanistan. They represent an extraordinary development in the accuracy of bombing. To use an example from the Vietnam War, during Operation Rolling Thunder, US Air Force F-105 fighter-bombers achieved a circular error probable (CEP)[79] of 447 feet.[80] Modern PGMs have CEPs measured in single digits.[81] They are also widely available, making up over 68% of munitions dropped in the early weeks of Operation Iraqi Freedom.[82] These two fundamental characteristics of PGMs open up a wide range of new missions that were simply unavailable to commanders in earlier eras. Air strikes can be used both at night and in bad weather. Smaller and more mobile targets can be

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[78] Federation of American Scientists. “Joint Direct Attack Munition (JDAM)” Military Analysis Network. Accessed At: http://fas.org/man/dod-101/sys/smart/jdam.htm

[79] Circular Error Probable is a measure of accuracy for air-dropped munitions. It represents the radius of a circle from the aim point in which 50% of bombs dropped will fall in

[80] Kenneth P Werrell, “Did USAF Technology Fail in Vietnam? Three Case Studies”. *Airpower Journal*. Spring 1998.

[81] Phillip R. Pratzner,“The Current Targeting Process” in Ducheine, Paul et. al. (eds). *Targeting: The Challenges of Modern Warfare*. (New York: Springer Publishing, 2016) p 91

[82] T. Michael Moseley, “Operation Iraqi Freedom - By the Numbers” US CENTAF, Assessment and Analysis Division. 30 April 2003. Accessed at: http://www.afhso.af.mil/shared/media/document/AFD-130613-025.pdf

attacked, right down to individual insurgents, opening up new possibilities for Close Air Support and Decapitation missions.

'Tactical Clarity, Strategic Obscurity': The Implementation of RMA

The technological developments dovetailed with the development of a new doctrinal concept focusing on the implications of the increasing precision of conventional weapons. Originally called the Military-Technical Revolution and later termed the Revolution in Military Affairs (RMA), this concept argues that technological developments in stealth, battlespace awareness, command and control, and PGMs represent a fundamental shift in the way that wars will be fought.[83] One of the dominant themes is that PGMs have altered the balance of power between land and air forces in such a way that air power will act as the decisive force in combat, relegating land forces to securing the gains made by air forces.[84] With air power taking the lead in providing firepower, land forces could reduce dependence on large, cumbersome divisions and the associated potential for high casualties.[85] The ability for air forces to strike the enemy at will, without consideration for time or space, would break the enemy commander's observation-orientation-decision-action cycle, leading the enemy to

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[83] Theodor W. Galdi, "Revolution in Military Affairs? Competing Concepts, Organization Responses, Outstanding Issues" Congressional Research Service. CRS 95-1170 F. (1995) Accessed at: http://fas.org/man/crs/95-1170.htm

[84] Elinor C. Sloan, *The Revolution in Military Affairs*. (Montreal: McGill-Queen's University Press, 2002) p13

[85] Lawrence Freedman, *Strategy: A History*, (Oxford: Oxford University Press, 2013). p 216

conclude that resistance would be futile.[86] Taken to its logical conclusion, RMA is a form of coercive strategy all in itself, a form almost of decapitation. The primary focus of RMA was studying future near-peer conflicts, where each combatant muster conventional military forces. This focus, and the power of the form of warfare that RMA describes, was validated both in the Gulf War and in the initial invasions of Afghanistan and Iraq.

Some attention was paid to facing unconventional opponents, including in Krepinevich's original paper on the subject for the Pentagon's Office of Net Assessments in 1992.[87] Krepinevich considers counterinsurgency techniques exclusively as countermeasures to the missions proposed in RMA, with no indications of how the principles of RMA could aid in fighting insurgencies. Indeed, as the insurgencies in Iraq and Afghanistan gained strength, so too did the critics of RMA. Thomas Hammes, a former Marine Corps officer, describes RMA as "third generation warfare", where combined arms forces sought to break the enemy's will by attacking logistics, command and control facilities. On the other hand, he argues that the United States' most dangerous enemies were perfecting what he described as "fourth generation warfare". This type of warfare uses all available networks, including political, economic, social and military, to convince an enemy that their strategic goals are unachievable.[88] On a more technical point, Kieth Shimko

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[86] The observation-orientation-decision-action loop, or OODA Loop, was first theorized by Col. John Boyd based on observations of dogfighting in the Korean War. It has gone on to be highly influential in doctrinal circles independently. See W. Lind (1985). *Maneuver Warfare Handbook*. Boulder: Westview Press, p 5-6.

[87] Andrew F. Krepinevich, "The Military-Technical Revolution: A Preliminary Assessment" Center for Strategic and Budgetary Assessments. (2002). p31

[88] T. X. Hammes, "Fourth Generation Warfare Evolves, Fifth Emerges," *Military Review*, 87 (May-June 2007), 14.

argues that the reconnaissance-strike complex at the heart of RMA is simply unsuitable for the nature of counterinsurgency operations. As he describes:

> On the streets of Mogadishu and Baghdad the US intelligence assets that could detect and track tank columns moving in the desert could not differentiate a militiaman insurgent from a regular citizen, a safe house from a family dwelling or a garage where cars were repaired from one where explosives were produced.[89]

What we see here is that RMA had only limited direct application to counterinsurgency campaigns. Why then, has it remained so influential? Largely because of a lack of alternatives. The US Army/Marine Corps field manual *FM 3-24 - Counterinsurgency*, the flagship population-centric counterinsurgency doctrine publication, dedicates just five pages to air power, buried in a 282-page document.[90] The limited role for air power in explicitly counterinsurgency doctrine, despite the continued reliance on its effects in the field, requires Air Force operators to look elsewhere for strategic guidance.

The support for RMA has dramatically shaped the forces dispatched to both Iraq and Afghanistan, resulting in fewer ground forces and larger air components. Once deployed, the limited ground forces necessitated the focus on Close Air Support strategy, using airborne firepower to make up for the smaller ground presence. As Eliot Cohen writes, “the revolution in military affairs may bring a kind of tactical clarity to the

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[89] Keith M Shimko, “The United States and RMA: Revolutions Do Not Revolutionize Everything”, in Jeffrey Collins and Andrew Futter (eds) *Reassessing the Revolution in Military Affairs: Transformation, Evolution and Lessons Learnt*. (New York: Springer Publishing, 2015). p 25

[90] Charles C. Dunlap, “Air Minded Considerations for Joint Counterinsurgency Doctrine.” *Air and Space Power Journal*. 21:4, (2007).

battlefield, but at the price of strategic obscurity".[91] The attempt to use RMA to guide counterinsurgency strategy has placed the focus on winning battles, using air power, while leaving the wider strategic implications of this unconsidered.

'Gratification Without Commitment': The Rise of Casualty Aversion

The third fundamental change leading to the strategic shift is societal: the confluence of politics, media and public opinion which has led to a growing aversion to military casualties. Public opinion concerning foreign and military policy has been a major factor in foreign policy decisions for more than a century.[92] However, the Vietnam War marks a notable turning point, making military casualties a major impetus for public disapproval with a conflict.[93] While much of the literature focuses on the United States, this effect has been observed elsewhere, for example the United Kingdom.[94] The mechanism for how casualty levels influences public opinion is debated in the literature. One perspective is that the public reacts negatively in most circumstances, while the other school of thought holds that the negative reaction is spawned when casualties come in conjunction with information that that the delegation of foreign policy responsibility to

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[91] Eliot A. Cohen. "A Revolution in Warfare". *Foreign Affairs*. 75:2, (1996).

[92] Take, for example, American isolationism in the early years of the First World War.

[93] Scott Sigmund Gartner and Gary M. Segura, "War, Casualties, and Public Opinion" *Journal of Conflict Resolution*. 42:3 (1998).

[94] Paul Dixon, "Britain's 'Vietnam Syndrome'? Public Opinion and British Military Intervention from Palestine to Yugoslavia", *Review of International Studies*. 26:1 (2000).

elites is not going well.[95] In either case, it is clear that in most cases of war, the public has a clear preference for fewer casualties.

This disapproval has consequences for elected officials: studies of the Vietnam war show that higher casualty levels at the state level negatively impact the voting shares of pro-war senators.[96] More recently, if not for the approximately 10,000 casualties of the wars in Afghanistan and Iraq by 2004, President Bush could have won nearly 2% more of the popular vote.[97] With practical political consequences comes the need for action - casualty avoidance becomes not just sound military strategy, but a political necessity.

The public's casualty aversion, and the political consequences of that aversion, find a convenient solution in air power. In the words of one academic, " Air power is an unusually seductive form of military strength, in part because, like modern courtship, it appears to offer gratification without commitment".[98] Replacing ground personnel with aerial bombardment when fighting against enemies armed with small arms and no antiaircraft weapons is a sure way to lower casualties. One of the results of this policy is that RMA thinking is provided with domestic political pressure in favour, giving elected

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[95] Matthew A. Baum and Philip B.K. Potter, "The Relationships Between Mass Media, Public Opinion, and Foreign Policy: Towards a Theoretical Synthesis". *American Review of Political Science*. 11 (2007).

[96] Scott Sigmund Gartner et. al. "War Casualties, Policy Positions, and the Fate of Legislators" *Political Research Quarterly*. 53:3 (2004).

[97] David Karol and Edward Miguel. "The Electoral Cost of War: Iraq Casualties and the 2004 U.S. Presidential Election". *Journal of Politics*. 69:3 (2007).

[98] Eliot A. Cohen, "The Mystique of US Air Power". *Foreign Affairs*. 73:1 (1994).

decision makers a personal stake in the acceptance of this doctrine. As discussed above, one of the major implications of RMA was to lower casualties by replacing ground forces. The second result, independently of the RMA connection, is to increase the use of close air support missions in situations where troops are in contact with the enemy. Using overwhelming force in these situations acts as a way to "transfer risk" away from friendly soldiers, and onto enemy combatants and local civilians.[99] While domestic concerns about civilian collateral damage have had negative effects on public opinion of a conflict, it appears that these effects take a secondary consideration to friendly military casualties.

Overall, the strategic shift from strategic and tactical interdiction towards direct conflict with insurgents through close air support and decapitation has been driven by three overlapping trends: technological, doctrinal, and societal. Each of these trends effected strategy generation in slightly different ways: if any one of these trends had occurred differently, it is conceivable that the shifts in strategy would have had very different endpoints.

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[99] Martin Shaw, *The New Western Way of War: Risk-Transfer War and Its Crisis in Iraq*. (Cambridge: Polity Press, 2005)

Conclusions

This study has outlined three interrelated trends defining the strategic effectiveness of air power in counterinsurgency campaigns. Firstly, I established the strategic models used in six campaigns since the end of the Second World War. Studying these models shows a marked shift, away from strategies targeting elements that support insurgent operations, including logistics and mobility, towards strategies that directly target insurgent forces through providing close air support for troops in combat and by directly attacking the leadership of insurgent organizations.

Secondly, evaluating the operation of these strategic models in each conflict, I evaluated their effectiveness in coercing insurgents to cease fighting. Here, as well, there was a clear trend: counterinsurgencies have become less effective over time, with the close air support and decapitation strategies emphasized in the recent campaigns in Iraq and Afghanistan being particularly ineffective, possibly even counterproductive.

Finally, I outlined three explanatory trends for the shift in air power strategies. At the first level, the development of precision-guided munitions provided the technological development necessary to allow close air support and decapitation campaigns to be feasible. Secondly, the development of the Revolution in Military Affairs and its associated doctrines prioritized precision strike, delivered by aircraft, over ground troops, making ‘light footprint’ counterinsurgency logical to military commanders. Finally, the wider public’s growing aversion to casualties in military interventions, and the impact

of this aversion on electoral politics, provided civilian decision makers with the impetus to prioritize strategies that would limit the number of ground forces necessary and to use air power in a way that would provide maximum protection to ground forces.

This study is necessarily incomplete. The focus on counterinsurgencies by Western major powers obscures that a large number of these types of operations are undertaken by states with more limited military capabilities. Drone strikes in modern counterinsurgencies are mentioned only in passing, and focused on areas where there are active hostilities. Evidence from strikes in areas outside of these active conflicts could impact the conflicts presented here. Finally, the time period of this study ends between and 2014, as counterinsurgency operations in Iraq and Afghanistan are completed. The use of air power alone in Libya, and the hybrid conventional and counterinsurgency campaign against the Islamic State in Iraq and Afghanistan present interesting case studies for the use of air power in other types of unconventional conflict.

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