The Reliability of Warden's Theory on the Use of Air Power

A Monograph
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ABSTRACT

THE RELIABILITY OF WARDEN'S THEORY ON THE USE OF AIR POWER by MAJ Joseph F. Birchmeier, USA, 47 pages

During World War II and the Vietnam War, the primary focus of effort for air power was on the destruction of enemy factories producing military goods and the transportation networks that brought these goods and personnel to the battlefield. In the 1980's this changed due to the impact of COL (RET) John Warden's theory.

Warden analyzed the enemy as a system and concluded that there were crucial elements of the enemy that would cause its defeat if destroyed. Warden concluded that the enemy's leadership was this crucial element. He explains his theory using a five-ring model in which the most important and most protected elements are in the middle and the other elements, in order of importance to the enemy, emanate in four more rings from this center ring. The four other rings, in order, are: the enemy's organic essentials (electricity, oil, and food); the enemy's infrastructure (roads, airfields and factories); the enemy's population; and the enemy's fielded forces.

The implementation of this theory in both the Gulf War and during air operations in Kosovo created much controversy. This controversy centered on the lack of importance placed on the destruction of the enemy's fielded forces. The controversy that Warden's theory has produced in the past ten years is the reason for this monograph. This monograph determines whether Warden's theory is reliable based on five criterions. These five criterion are: its ability to provide a causal description of how and why air power can defeat an enemy; its ability to provide a verbal picture of what, when and where air power should be applied to defeat an enemy; its ability to provide foresight and foreknowledge of the future; its ability to provide the conceptual means to reduce the complex nature of an enemy into its constituent parts; and its ability to solve the problems that the United States faces. All five of these criterions had to be met for Warden's theory to be considered reliable

This monograph concludes that Warden's theory is not reliable based on its inability to solve the problems that the United States face. This conclusion has been reached for three reasons. First, the destruction of the center ring, the enemy's leadership, has not proven to be the enemy's center of gravity. Second, his theory underestimates the importance of the destroying the enemy's fielded forces in causing his defeat. Finally, in deciding that air power must focus on the enemy's leadership, Warden's theory disregards the political and diplomatic realities that, in most instances, will prevent this attack from occurring.

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INTRODUCTION

The United States' first significant use of military aircraft occurred during World War II. Since that time, there has been on-going debate as to the proper role of airpower as a means to achieve political ends. Most recently, the 1990-91 Gulf war, and the 1999 conflict in Kosovo have demonstrated that the controversy still exists.

COL (RET) John A. Warden began to develop a theory for the proper use of airpower prior to the Gulf War. He used a "five ring model" to develop the preliminary plan for the employment of air assets for Operation DESERT STORM. This plan caused controversy in Washington and within the theater of operations.

Warden was the director of the Air Force's strategy office, named Checkmate, at the time of Iraq's invasion of Kuwait.[1] His plan, named INSTANT THUNDER, which called for the use of air power to drive the Iraqis out of Kuwait, was criticized by then Chairman of the Joint Chiefs of Staff, General Colin Powell because his plan "had a serious omission: it did not call for any strikes on the Iraqi ground troops that had invaded Kuwait and which, he thought, could threaten the region for years to come."[2]

Warden received similar complaints concerning INSTANT THUNDER within the theater of operations, led by the commander of the U.S. and allied air assets during DESERT SHIELD and DESERT STORM, GEN Chuck Horner. When Warden briefed his plan to General Schwarzkopf, the Central Command (CENTCOM) Commander and other key members of the CENTCOM staff to include Horner, he states he had many issues with the plan. His primary concern was that the "attacks, foreseen by INSTANT THUNDER, were to be directed primarily against vital targets throughout Iraq, and

principally on targets in the Baghdad area. That meant, for the most part, that Iraqi forces deployed in Kuwait and on the Saudi border would not be hit."[3]

More recently, LTG Michael C. Short, the air chief during NATO's conflict with Yugoslavia, and GEN Wesley K. Clark, the overall operational commander, had significant differences of opinion as to the use of air power during the conflict. LTG Short was advocating a use of air power in-line with Warden's theory.

GEN Clark, on the other hand, saw a need to use air power in a different manner. In an effort to preserve the NATO alliance's will to continue the air effort and a desire to minimize civilian casualties, GEN Clark ordered that air power mainly focus on the destruction of the Serbian forces within Kosovo.[4]

The continuing controversy concerning the use of air power in accordance with Warden's theory is the reason for this monograph. This monograph leverages numerous books and articles written about the application of air power by both military officers and civilian experts. Additionally, this monograph examines articles and after action reviews written about the application of air power in specific conflicts. This monograph determines whether Warden's theory on the use of air power is reliable.

In order to answer the research question, this monograph will first discuss the nature of military theory. This monograph will then examine Warden's theory in detail, explain his theory and discuss why he has reached the conclusions that he has.

Next, this monograph will examine the historical use of air power to achieve strategic objectives. This examination will include the use of air power in World War II (European Theater up to the Normandy landings), Vietnam, DESERT SHIELD/DESERT STORM and Kosovo. The examination of these conflicts will determine if Warden's

theory is reliable. Dr. James J. Schneider, in his paper "How War Works: The Origins, Nature, and Purpose of Military Theory," states "military theory is a professionally justified, reliable system of beliefs about the nature of war."[5] Because military theory, unlike scientific knowledge, cannot be proven, as Dr. Schneider states, the best that can be hoped for is that the theory is first justified and second reliable.

The study of military history can help to determine if a military theory is justified. Study of military history provides a foundation from which professional considerations can be made, insights gathered, and intuition can be applied to determine if the theory is justified.[6]

Based on the historical evidence, this monograph will determine how closely the application of air power resembles Warden's model. If Warden's model was not followed this monograph will discuss the reasons it was not followed. If his model was followed, this monograph will discuss how successful air power was in achieving strategic objectives.

The analysis in this monograph will determine whether Warden's model is reliable. The criteria this monograph will use are based on Dr. James J. Schneider's definition for a reliable military theory.[7] In order for Warden's theory to be considered reliable, all five criteria must be met. Dr. Schneider's definition for a reliable military theory is:

1. **Explain**: The theory must provide a causal description of the object of inquiry, the how and the why. This monograph will determine if Warden

adequately describes how air power can achieve strategic objectives and why it can be successful.

2. **Describe**. The theory must provide a verbal picture, the what, when and where. This monograph will determine if Warden successfully allows the reader to visualize his theory.
3. **Anticipate**. The theory must provide foresight and foreknowledge of the future. This monograph will determine whether Warden's theory could become unreliable in the future due to technological/social change.
4. **Analyze**. The theory must provide the conceptual means to reduce complexity to its constituent parts. This monograph will determine if Warden successfully reduces the complex system of an enemy into its constituent parts.
5. **Solve real-world problems.** The ultimate test of a military theory. Can Warden's theory be used to solve problems that the United States face?

COL (RET) WARDEN'S AIR POWER THEORY

The first requirement, according to Warden, to defeat an enemy using air power is to achieve air superiority. "Air superiority...will lay the base for planning and executing a successful air campaign."[8] Warden defines air superiority as "having sufficient control of the air to make air attacks – manned or unmanned – on the enemy without serious opposition and, on the other hand, to be free from the danger of serious enemy air incursions."[9] Once air superiority is achieved, Warden believes his theory can be executed and defeat an enemy.

Warden builds the foundation of his theory on the belief that in order to successfully defeat an enemy, the enemy must be thought of as a system. Ludwig von Bertalanffy states, "in one way or another, we are forced to deal with complexities, with 'wholes' or 'systems,' in all fields of knowledge."[10] Bertalanffy goes on to define a system as "a set of elements standing in interrelations."[11] In other words, Warden is asking that instead of looking at the individual elements of an enemy such as an armored formation, or its supply of ammunition, we examine the relationship that each element of the enemy force has on each of the other elements. In examining the enemy in this way, one can determine the critical elements of the enemy that, if destroyed or denied to the enemy, can lead to total defeat because of their crucial links to the other elements.

Warden goes on to state that any potential enemy is made up of both physical and morale elements and that war efforts should be primarily directed at the physical side because "the physical side of the enemy is, in theory, perfectly knowable and predictable."[12] Warden is not discounting the fact that enemy morale can be effected by military forces, he seems to be focusing on the fact that the physical side of the enemy is known, can be targeted, and the effects on the physical elements can be measured.

Warden uses a five-ring model to explain his theory on the use of air power. Inside each of these five concentric rings Warden places elements of the enemy's system. Warden places what he considers to be the most important element of the enemy's system in the innermost ring and other elements in the other four, emanating out from the center based on importance.

In the innermost ring, and the most important enemy element, is the enemy's leadership. Warden considers this to be the strategic center of gravity for an enemy and

includes the government's ability to communicate and provide security. He believes that this is the most critical ring "because it is the enemy command structure...which is the only element of the enemy that can make concessions, that can make the very complex decisions that are necessary to keep a country on a particular course, or that can direct a country at war."[13]

Warden believes that the enemy will also understand that their leadership is a center of gravity and will attempt to protect this vital element of their system and therefore may be difficult to attack directly. When this happens Warden states that the task then becomes "one of applying sufficient indirect pressure so that the command element rationally concludes that concessions are appropriate, realizes that further action is impossible, or is physically deprived of the ability to continue a particular course or to continue combat."[14]

In the next outer ring and next in importance are what Warden calls the "organic essentials" of the enemy, which includes its supply of energy to include electricity, oil and food. Warden believes that "depending on the size of the state and the importance it attaches to its objectives, even minor damage to essential industries may lead the command element to make concessions."[15] He declares that most states have relatively few "organic essential" targets so that a successful attack on a small number of these type targets can lead to large benefits.

Inside the next ring Warden places the enemy's infrastructure that includes its roads, airfields and factories not included as part of the enemy's "organic essentials". These potential targets are necessary for the enemy to produce and transport material and personnel. Any degradation of the enemy's infrastructure obviously lessens its ability to

resist. Warden warns however that "compared to 'organic essential' systems, there are more infrastructure facilities and more redundancy; thus, a greater effort may be required to do enough damage to have an effect."[16]

The fourth most critical ring is the enemy's population. This, Warden states, may be the most difficult to attack directly. Additionally, Warden states that the effort to target the enemy's population may not produce the desired results because "the population may be willing to suffer grievously before it will turn on its own government."[17]

In the outer ring, and least important, is the enemy's fielded forces. Warden believes that this is the least important element of the enemy because it is only a means to an end and "their only function is to protect their own inner rings or to threaten those of an enemy." Warden notes that the inclusion of fielded forces on the outer ring and thus least important is contrary to traditional military thought but believes that "modern technology...makes new and politically powerful options that in fact can put fielded forces into a category of means and not ends."[18]

Warden, in presenting his theory, makes several points that must be understood to fully comprehend his theory. First is the notion that when attacking an enemy it may not be possible to attack more than one or two of the outer rings. It must be kept in mind that as one moves from the center ring towards the outside ring, the targets within the rings not only become less more important, but they also become more vulnerable. Thus, a state may not be able to directly attack the enemy's leadership and "organic essentials" but only the less protected population and fielded forces.[19]

Second, all attacks are ultimately directed at the leadership of the enemy. Even if the leadership cannot be directly attacked, any attack on the other elements is made to attack the leadership indirectly. For instance, if the leadership is protected and cannot be attacked directly, a state may choose instead to critically damage the infrastructure of the enemy to prevent the leadership from moving supplies and personnel from its factories to the battlefield, causing the leadership to change its behavior according to the attackers wishes.

Finally, that the rings are "in the order presented for several reasons: the most important is in the middle; there is an increase in numbers of people or facilities moving from the center to the fourth ring; and the theoretical vulnerabilities decrease from the inside to the outside largely due to the numbers involved."[20] Warden notes that the fifth ring, or the enemy's fielded forces, breaks the pattern somewhat. The number of targets provided by the enemy's fielded forces may in fact be less than the enemy's population, and at the same time is, in all probability, less vulnerable to attack because of the inherit ability of military forces.[21]

HISTORICAL ANALYSIS

Four conflicts will be studied to allow analysis of the reliability of Warden's theory. The first will be the use of the U. S. air power in the European Theater during World War II up to the Normandy landings on June 6, 1944. The second will be the use of air power during the Vietnam War. The third will be the role of air power during Operations DESERT SHIELD and DESERT STORM. The final conflict that will be studied is air power's role in the conflict in Kosovo. Within each conflict, this

monograph will discuss the strategic aim of the United States, the strategies used in the employment of air power, and the success of these strategies.

WORLD WAR II

In the study of air power's use in World War II, this monograph will focus on the European Theater up to the allied landing at Normandy. The European Theater was chosen over the Pacific Theater due to the significantly different nature of the role of air power in the Pacific Theater, specifically the use of aircraft carriers and the need for island-based aircraft. The time period up to the Normandy landings is used because up to that point, air power was the only military means available. Specifically, up to the Normandy landing, there can be no disagreement as to the effect that air power had on targets such as oil production and transportation networks.[22]

The strategic goal of the allies during World War II was the unconditional surrender of Germany, Japan and Italy. As the war progressed it became clear that unconditional surrender "meant not only complete military victory but also the destruction of German sovereignty, the democratization and denazification of political institutions, and the reeducation of the population."[23]

To completely understand the air power strategies used during World War II, a brief discussion of the development of air power theory leading up to war must be included. The first important air theorist is the Italian Giulio Douhet. He advocated that future warfare on land would continue to be static in nature and that air power was the only way to change this static warfare. He advocated all out air offensives against enemy aircraft and airfields to destroy the enemy's air power and gain command of the air. He

believed that once command of the air was achieved, that air power could freely destroy any target, military or civilian, to achieve the desired end of the conflict. To achieve command of the air, Douhet advocated the use of armed long-range bombardment aircraft.[24]

The first American air theorist, Billy Mitchell, agreed with the offensive nature of Douhet's air theory and the need for an air force independent of the army and navy. However he differed in one key respect. "Whereas Douhet had looked on aircraft other than bombers as ancillary – nice to have, perhaps, but not absolutely necessary – Mitchell could argue the case for all types."[25]

Studying the theories of both Douhet and Mitchell, the U.S. Army Air Forces developed "the theory of 'daylight, high altitude, precision bombardment of selected targets' that the U.S. Army Air Forces carried with them into the Second World War."[26] In other words, going into World War II, the United States believed that "through careful, scientific study of a nation's industry, to single out particular targets whose destruction would of itself bring to a halt an entire industry or series of industries."[27] The Army Air Force also decided that heavily armed heavy bombers could protect themselves to the target, thus eliminating the need for escort fighters.

Based on the decisions made during the interwar years, the first air strategy employed in World War II is what Robert A. Pape calls the "industrial web" strategy.[28] Pape states "American airmen entered World War II believing that Germany could be forced to surrender by air bombardment of industry, without invading the Continent or resorting to terror bombing of civilians."[29] This strategy, formalized in the first *Air War Planning Document* (AWPD-1) of 1941, targeted industrial sites that would affect the

German military as well as its civilian population. Specifically, this plan targeted German electrical power and national transportation.[30]

This strategy was never really implemented because of the relatively few bombers that the United States possessed in the early stages of the war. By 1943, when the United States had developed a significant bomber force, its strategy had shifted to a new strategy that Pape calls strategic interdiction. This new strategy "focused more narrowly on sectors of industry directly linked to the combat power of the Wehrmact."[31] Specifically, this strategy targeted the enemy's ability to produce weapon systems such as aircraft and tanks.

The strategy, which began in early 1943, was not as effective as the planners probably hoped for. Pape states, "the offensive caused only a temporary setback in production because machines and machine tools were damaged far less severely than factory structures."[32] Larry Addington adds to this conclusion by stating "despite the Allied strategic bombing, 1944 as a whole was the best year of the war for German armament production."[33] Pape points out that one reason for the failure of this strategy was the ability of the Germans to substitute for destroyed materials and that World War II "illustrate the difficulties of applying strategic interdiction to a continental power such as Germany which controls vast resources."[34]

As the war progressed, it became clear to American leaders that Germany could not be defeated without a ground invasion of Europe. This, coupled with the increasing pressure being applied by the USSR to open a second front, led to the decision for a cross-channel invasion. This decision led to a change in strategy for the use of air power. This third strategy, which Pape calls operational interdiction would target "finished

military goods and the means of bringing them to the battlefield...target sets included road, rail, and canal transportation in Germany and especially in France."[35]

This change in strategy coincided with what Eighth Air Force Commander James H. Doolittle described as "his most important decision of the war."[36] Doolittle decided that the first priority for U.S. fighters was no longer the escort of bombers to target areas, although a certain amount of escort would still be provided. Instead, the fighters would now concentrate on the destruction of the German fighters. In other words, "fighters would fight for air superiority with bombers used mainly as bait to lure German fighters into combat."[37]

The effect of both the new strategy and the decision to gain air superiority through the destruction of German fighters can be unquestioned. The new air strategy was successful in interdicting the flow of supplies to the battlefield. "All German efforts to maintain the flow of traffic failed to prevent a backlog of 160 trains, loaded with vitally important military supplies and personnel."[38]

The effect of the focus of allied fighters on the destruction of German fighters was crucial. By June 6, 1944, the German air forces in western France were reduced to 125 operational aircraft.[39] Their destruction, coupled with the German's inability to replace the lost crews due to an inadequate training program, forced the Germans to husband their remaining fighter force. "Every German aircraft seen on the ground was located east of Hamburg, some 500 miles from Normandy beaches – too far to interfere with Normandy landings."[40]

The combined effect of focusing on the transportation networks within France and Germany and gaining air superiority through the destruction of German fighters cannot

be understated. The Supreme Allied Commander, General Dwight D. Eisenhower stated that "possession of an overpowering air force made feasible an invasion that would otherwise be completely impossible."[41]

An additional aspect of the use of air power in the European theater must be explored, that is the effect that air power had on the civilian population. "During the war, the Allies dropped 1.3 million tons of bombs on Germany, destroying over 40 percent of the urban area of the seventy largest cities and killing 305,000 civilians."[42] Despite this heavy bombing, it did not "provoke any serious backlash against the regime from those who suffered."[43]

THE VIETNAM WAR

Although there have been much debate as to the exact strategic goal the United States was attempting to achieve during the Vietnam War, this monograph will use the strategic goal defined by Douglas Pike. He states the purpose of the war was "to preserve the right of self-determination and to establish the freedom of the South Vietnamese people."[44]

The air operations conducted during the war were given various names and had different objectives. The first air operation was named ROLLING THUNDER and ran from 2 March 1965 through 31 October 1968. The objective of this bombing campaign was to "coerce the North Vietnamese into halting the infiltration of men and supplies into South Vietnam and entering into peace negotiations."[45]

The second operation, FREEDOM TRAIN, conducted in April of 1972 sought to "compel North Vietnam to cease its ground offensive in the South and to accept a cease

fire.[46] FREEDOM TRAIN was President Nixon's reaction to North Vietnam's Easter Offensive in which they launched an attack across the demilitarized zone using armored formations on March 30, 1972. At this time, U. S. troop strength was shrinking as the United States continued to withdraw forces from South Vietnam. At the end of 1971, troop strength was 280,000 compared to a strength of 540,000 three years earlier.[47]

LINEBACKER I, lasted from May 10 until October 23, 1972. The goal of this operation was to force North Vietnam to "halt its ground offensive and to accept U. S. terms for the peace accords."[48]

The final operation, LINEBACKER II was waged from December 18 until December 27, 1972. The goal of this operation was to force North Vietnam to sign the peace agreement.[49]

The Vietnam War presented significant challenges for the use of air power to achieve the strategic goal. First, severe restrictions were placed on the Air Force in terms of the types of targets that could be attacked. The United States sought to limit civilian casualties, especially during the early stages of the war. Chairman of the Joint Chiefs of Staff, General Earle G. Wheeler, stated after the war, "We advocated, militarily, that we should undertake the most sizable effort that we could against remunerative targets, excluding populations for targets. None of us believed in that at all."[50]

An additional constraint placed on air power during the war was that air power was not allowed to attack targets within North Vietnam during numerous pauses in the bombing campaign due to political considerations. These bombing pauses were normally used in an attempt to bring the North Vietnamese government to agree to a negotiated settlement with the inherent threat that failure to negotiate would result in resumed

bombing, possibly with increased intensity.[51] The effects of these, and other restrictions on the effectiveness of air power will be discussed later in this monograph.

With the above restrictions placed on air power, the political and military leaders of the country struggled to develop an air strategy that would achieve the United States' strategic objectives. Robert A. Pape describes the three different air strategies employed during the war.[52]

The first strategy was favored by President Johnson's civilian advisors and used during the first month of ROLLING THUNDER and again during FREEDOM TRAIN. The concept of this strategy was to gradually destroy North Vietnam's industrial economy and transportation network. The thought was that by gradually attacking it's economy; North Vietnam would bend to the will of the United States for fear of its industrial base being completely destroyed.

There were a few principles to this strategy. The first was that the destruction of the industrial base was to be gradual so that North Vietnam would realize that if they did not comply with the United States' wishes, further damage could be inflicted. Second, the intensity of the attacks and the amount of damage inflicted on the industrial base was to increase as the operation progressed so that North Vietnam would understand the United States' willingness to increase it attacks if necessary. Finally, secret diplomatic actions were to occur during the operation in an attempt to forge an agreement with North Vietnam.[53]

This first strategy failed both during ROLLING THUNDER and FREEDOM TRAIN for many reasons. First, during both operations, "North Vietnam's economy was not a highly valued asset."[54] During ROLLING THUNDER, the war in South Vietnam

was a guerilla war being waged mostly by South Vietnamese insurgents who were not very dependent upon supplies from North Vietnam, but instead drew much of their supplies from support bases within South Vietnam.

By the time that the United States waged FREEDOM TRAIN the war being waged by North Vietnam had changed. Following the TET Offensive, the war had changed to a war primarily being fought by the North Vietnamese Army using more conventional operations. These forces were much more dependent upon supplies being supplied from the north, however not necessarily produced within North Vietnam for "North Vietnam was primarily a funnel for military-related equipment produced in the USSR and the People's Republic of China."[55] Because of the fear of spreading the war beyond the borders of North Vietnam interdiction of these supplies could not occur until they arrived in North Vietnam and were not affected by the attacks on the North Vietnamese industry.

Similarly, the effect of the attacks on the transportation network of North Vietnam was not effective because the north did not fully utilize its transportation network. "For instance, truck traffic on Route 15 was estimated by the CIA to have used only 10 percent of the road's capacity in summer 1967."[56]

The second air strategy, proposed by the air chiefs, was used during ROLLING THUNDER from the summer of 1965 through the winter of 1966-1967.[57] This strategy was similar to the strategy proposed by President Johnson's civilian advisors, except that instead of gradually destroying the economy and transportation networks of the north to force negotiations, they proposed to "obliterate all industrial and major transportation targets as well as air defense assets"[58] at one time. The thought was that this type of

attack would "make it so expensive for the North Vietnamese that they will stop their aggression against South Vietnam and Laos."[59]

This strategy failed essentially for the same reasons as the first strategy; that being the heavy reliance of the North Vietnamese war effort on outside assistance. For example, "Prior to ROLLING THUNDER, North Vietnam received about $95 million a year in economic aid and almost no military aid. From 1965 to 1968 however, North Vietnam received approximately $600 million in economic aid and $1 billion in military assistance."[60]

JCS Chairman, General Wheeler, initially advocated the final strategy that was employed during the war. The concept behind this strategy was to "limit the infiltration of men and equipment into the South"[61] so they would be "unable to achieve military victory in South Vietnam, Hanoi would be compelled to seek negotiations."[62] This strategy was employed at the end of ROLLING THUNDER (spring-fall 1967) and during LINEBACKER I and II.

The effect of this strategy differed depending on the type of war being waged by North Vietnam. During ROLLING THUNDER, this strategy had little impact on the war due to the guerilla warfare being waged in South Vietnam and the limited number of personnel and amount of material being sent south.

However, during LINEBACKER I and II this strategy worked very well, mainly due to the change in the type of warfare being waged in South Vietnam from guerilla to conventional warfare. Using this strategy, the Air Force targeted "logistical centers and transportation arteries...bridges along the northwest and northeast rail lines from China, fuel dumps, warehouses, marshalling yards, rolling stock, vehicles, power plants, a POL

pipeline running from China, and a large number of surface-to-air missile and antiaircraft artillery sites."[63]

Having switched from guerilla warfare to conventional warfare which included the use of armored formations, the North Vietnamese forces were much more reliant on supplies from the north and in much larger quantities than during the early years of the war. In the end, "LINEBACKER I largely achieved the goal of thwarting the Easter Offensive"[64] although "efforts of ARVN ground forces were also necessary."[65] LINEBACKER II was also successful in bringing the North Vietnamese back to the peace talks and ultimately signing the peace accords.

A final note about the use of air power in the Vietnam War is the impact that air power had on the civilian population. As stated earlier, the United States did not initially target the population of North Vietnam. However, "as fighting continued without signs that the enemy would yield, air leaders reluctantly ordered direct strikes on war making capability and civilian morale."[66] Although relatively few civilian casualties resulted during the war due to bombing, the capabilities of the Air Force was not lost on the leaders of North Vietnam. "Only when Hanoi promised to negotiate did the raids stop, and 'the threat of renewed and effective bombing,' an American negotiator recalled, 'was implied in all that we signed with Hanoi.' The Politburo could not afford to ignore that threat."[67]

THE GULF WAR

On August 2, 1990 Iraqi forces invaded Kuwait in an attempt to become a regional power. "With its invasion, Iraq attempted to incorporate Kuwait and its oil

resources quickly and cheaply. Success would permit Saddam Hussein to dominate the Organization of Petroleum Exporting Countries and the Persian Gulf region, if not set the world price of oil."[68] This attack obviously threatened interests that were vital to the United States. "From the beginning, the Coalition had two main demands: that Iraq withdraw from Kuwait and that conditions for 'future regional stability' be established, which over time came to mean the destruction of Iraq's offensive military capability and the replacement of Saddam's regime."[69]

On August 6, 1990 Saudi Arabian King Fahd requested the assistance of the United States to defend Saudi Arabia. The next day President Bush ordered the deployment of military forces to the region, beginning Operation DESERT SHIELD. Thus, as U. S. forces were preparing to deploy into theater, military planners were faced with the situation of Iraqi forces positioned along the Kuwaiti-Saudi Arabian border, capable of resuming offensive operations at any moment. It was in this environment that the plans for the use of air power began to be developed.

During Operations DESERT SHIELD/DESERT STORM, two air strategies were employed: a strategy of decapitation and a strategy of denial. The decapitation strategy "sought to kill, overthrow, or isolate Saddam Hussein and his regime or to use the threat of these events to compel Saddam to withdraw from Kuwait."[70] This plan, named INSTANT THUNDER was organized around Iraqi centers of gravity and "the most important center of gravity was the ability of Saddam Hussein to lead and control his nation, so attacks on communication sites and command centers would isolate him from the Iraqi people and his armed forces."[71] Additional targets included "Iraq's nuclear, chemical, and biological facilities and its national air defense system and airfields. Still

other targets included electrical power, oil production, railroads, and military production."[72]

The advantages of this strategy were the small size of the force necessary to implement the strategy and the limited time needed to complete its implementation. As briefed, the "strategic air campaign of INSTANT THUNDER envisioned approximately 150 attack aircraft,"[73] and was expected to take only six days.[74] This provided the National Command Authority an ability to rapidly respond to the Iraqi invasion.

The decapitation strategy planned in August 1990 was largely the plan executed beginning in January 1991. Execution of this plan went very well and "in terms of targets destroyed, Instant Thunder achieved what it had hoped to accomplish within the time frame it had established."[75] In fact "on 30 January Coalition commanders could confidently claim that twenty-six leadership targets had been struck and 60 percent severely damaged or destroyed, and 75 percent of Iraq's command-and-control and communications had been struck and destroyed."[76]

The problem was that although the decapitation strategy had been executed according to plan, Iraqi forces still occupied Kuwait. That this may be a problem with the decapitation strategy was noted in the early stages of the war. "When first briefed on Instant Thunder on 11 August [1990], Chairman Powell dropped his bombshell question: 'OK, It's day six…now what?'"[77]

An additional problem with the decapitation strategy was that it did not address the second portion of the U. S. objective for the war, specifically the destruction of Iraq's offensive capability. The purpose for this objective was to prevent Iraq from threatening their neighbors in the future. General Powell made this objective clear when he stated "I

won't be happy until I see his tanks destroyed...I want to leave their tanks as smoking kilometer fence posts all the way back to Baghdad."[78]

Due to the concerns of leaders such as General Powell, a second air strategy was developed, a denial strategy. "The denial campaign assumed that a American ground campaign would be necessary to force the Iraqis out of Kuwait...the purpose of air power was to shift the military balance on the ground, crippling Iraq's military strategy to defeat the ground attack."[79]

The concept of the denial strategy had three phases. First, air power would fix the Iraqi ground forces in position, not allowing them to attack or withdraw from Kuwait. Second, air power would attack the Iraqi ground forces where they stood. Finally, the Coalition would conduct a ground offensive to complete the destruction of the Iraqi forces.[80] Specific targets for the denial strategy included supplies (ammunition, POL, food and water) moving to the battlefield; bridges, roads and rail lines south of Basra; and combat units (tanks and artillery).

During the Gulf War both the decapitation and the denial strategies were conducted nearly simultaneously. At the beginning of air operations, the decapitation strategy took primacy. As operations progressed, and the need for a ground offensive was confirmed, more and more effort was focused on the denial strategy. The decapitation strategy, as with the denial strategy, went largely according to plan and achieved outstanding results. "The denial campaign wreaked havoc on Iraq's strategy of waging a protracted war of attrition against a Coalition ground offensive by sharply interdicting supply lines, preventing military units from moving on the battlefield, and destroying heavy forces."[81] The *Gulf War Air Power Survey* may have stated the effect

of the denial strategy best when it said that "the most important contribution of air power in the Kuwait theater during the ground war, and a prime reason why the ground campaign was so short and so overwhelming, was the success of air interdiction in preventing the heavy divisions from moving or fighting effectively."[82]

Two additional points must be made that impacted the use of air power during the Gulf War. First was the issue of time. Pressure was put on General Schwarzkopf to begin ground operations for two reasons. First, further delay, beyond the actual attack date of February 24, 1991 would risk exposing the military forces to the extremely hot season fast approaching. Second, the Soviet Union was actively trying to negotiate a peace settlement between the Iraqis and the Coalition. The fear was that this diplomatic effort could result in denying the Coalition the attainment of their goal of destroying Iraq's offensive capability.[83]

The second point is the effect that the destruction of the Al-Firdos bunker had on the use of air power. This bunker, which intelligence had identified as a command and control bunker, was destroyed on the night of February 13-14, 1991. Civilians were using the bunker, which may well have been a command and control bunker, as a shelter to protect them from the Coalition bombing of Baghdad. The Iraqis claimed that hundreds of civilians were killed in this attack.

The intelligence analysis that went into determining that this bunker was an appropriate target for attack or the number of civilians killed in the attack is not as important, for the purpose of this monograph, as the effect that the publicity this attack received had on the use of air power. "The attack was a major blow to the strategic air

campaign...the word was passed to the Black Hole: the bombing of Baghdad would be the exception, not the rule."[84]

This incident in reality had very little impact on the overall air effort because most of the targets in Baghdad had already been successfully attacked. However, this attack points to an inherent risk that attacks on targets located within population centers have. This risk probably has increased in recent years due to the ability of the enemy to quickly use modern communications to leverage public opinion when such accidents occur.

KOSOVO

American and NATO need to become involved in Kosovo sprang from intensified fighting between the Kosovar Albanian and Serb forces in 1998, with the strategy being used by the Serb forces resembling the kind of ethnic cleansing seen previously in Bosnia.[85] As the fighting intensified, the refugees fleeing the fighting into neighboring Albania and the Former Yugoslav Republic of Macedonia threatened to cause instability. "In fall 1998, 300,000 Kosovar civilians fled their homes."[86]

Additionally, the "implications of the crisis for the Bosnian peace process: to allow Belgrade's campaign of ethnic cleansing to continue unabated would have put the entire project of a multiethnic Bosnia at risk."[87] The international community initially responded with "U.N. Security Council Resolution 1199 of September 23, 1998 – which demanded an immediate end to hostilities – spoke of an 'impending humanitarian catastrophe' and characterized the developments as 'a threat to peace and security in the region.'"[88]

Fighting continued into the spring of 1999, and because the Serb forces appeared to be intensifying the ethnic cleansing in Kosovo, NATO forces began air operations on March 24, 1999. Operation ALLIED FORCE had the stated goals of "the removal of Serb forces [from Kosovo], the placement of a NATO-led peacekeeping force in Kosovo and the return of refugees."[89] NATO suspended air operations on June 10, 1999 after Yugoslavia leaders agreed to comply with NATO's call for a cease fire. "NATO officially ended its air war against Yugoslavia on June 20."[90]

During the seventy-eight day operation, "more that 900 aircraft – two-thirds American – flew more than 14,000 strike and 24,000 support sorties. The United States suffered the only NATO air losses, an F-117A Nighthawk and an F-16 Fighting Falcon."[91] Air operations focused, much like the air operations during DESERT SHIELD/DESERT STORM, on both strategic targets in Yugoslavia, particularly in and around Belgrade and on the fielded forces in Kosovo. Detailed information on the damage to targets in Yugoslavia is not available, but the air operation is believed to have destroyed "153 armored personnel carriers…339 military vehicles… and 389 artillery pieces or mortars."[92] The effect of the destruction of these military forces was analyzed to be "crippling losses for Serbia's regular armed forces."[93]

This dual strategy of striking both strategic targets in Yugoslavia and fielded forces in Kosovo was not without its controversy. Strategic targets included "supply routes, bridges, fuel refineries, command centers, [and] radio relays."[94] General Short argued that strategic targets should be the focus of the air effort. "'I'd have turned the lights out,' Short said, 'I'd have dropped the bridges across the Danube. I'd have hit five

or six political-military headquarters in downtown Belgrade. Milosevic and his cronies would have woken up the first morning asking what the hell was going on.'"[95]

This strategy was not without its detractors. Eliot Cohen, a professor of strategic studies at Johns Hopkins University School for Advanced International Studies and the director of the US Air Force's official history of the Gulf air war argued "bombing supply lines and petroleum refineries...'works only when you make the other guy consume fuel and ammunition.' And the only way to get him to do that is to force him to move his tanks and fire his bullets – in other words to engage him with troops on the ground."[96]

The air operation had to also focus on the fielded forces however for political reasons. In the case of operations in Kosovo, General Clarke explained, "the consensus of 19 nations was required to approve action, and many countries had preconceptions about how to apply force. Every single nation had a domestic political constituency, and every single nation had a different set of political problems."[97] LTG Short stated that General Clark "pushed for approval to bomb Belgrade from the second day of the campaign, but NATO political leaders, particularly the French, were reluctant."[98]

The air operations over Kosovo pointed to a major weakness that is of serious concern to American leaders if significant allied operations need to be undertaken once again. This concern is the ability of allied forces to operate at the same level as American forces due to significant technological differences between the allied forces. Secretary of Defense William Cohen stated, "if NATO is to remain an effective military force, the allies must build or buy the equipment to fire satellite-guided weapons and similar advanced, expensive hardware."[99]

ANALYSIS

The criterion discussed earlier will now be applied against the four case studies. Warden's theory will be judged valid if each of the five criteria is met.

EXPLAIN

As stated earlier, for Warden's theory to be reliable it must provide a causal description of the object of inquiry, the how and the why. Warden is very clear in presenting how and why air power can defeat an enemy.

In presenting how air power can defeat an enemy he first states that air power must be focused on the physical aspects of the enemy, because the physical aspects of the enemy can be targeted and the effects measured. He then goes on to state that the physical aspects of the enemy must be viewed as a system. Each part of the system impacts in some way and in varying importance with the other elements of that system. Defeat of the enemy, Warden states, can be achieved by directly attacking the most important element of the enemy, which is its leadership.

Warden shows that this theory of how to defeat an enemy is different from past theories. Prior theories did not view the enemy as a system and defeat of the enemy was accomplished when its fielded forces were destroyed. In these theories, the destruction of the enemy's fielded forces was the ends to be achieved. Warden believes that the enemy's fielded forces should not be considered the ends to be achieved, but the means to an end. "That is, their only function is to protect their own inner rings or to threaten

those of an enemy."[100] He also states, "it is pointless to deal with enemy military forces if they can be bypassed by strategy or technology either in the defense or the offense."[101]

Having described how to defeat an enemy, Warden also clearly shows why this method can be successful. "The most critical ring is the command ring because it is the enemy command structure...which is the only element of the enemy that can make concessions, that can make the very complex decisions that are necessary to keep a country on a particular course, or that can direct a country at war."[102]

Warden goes on to state that even if the enemy command structure cannot be attacked directly, the focus of all effort should be on applying indirect pressure on the enemy's leadership to coerce them to change their behavior. He believes that "the command element will normally reach these conclusions as a result of the degree of damage imposed on the surrounding rings."[103]

In summary, Warden successfully explains his theory. He clearly provides a causal description of the how and why air power can be successful in defeating an enemy.

DESCRIBE

The second thing that Warden must do to present a reliable theory is to provide a verbal picture. Dr. Schneider describes it as the what, when and where. Warden is extremely successful in presenting a verbal picture with his theory.

As previously stated, Warden demonstrates that what must be attacked is the enemy leadership, both its civilian and military leaders. He realizes that it is normally difficult, if not impossible to capture or kill an enemy's leaders (disregarding the policy

aspects of this course of action). However, he shows that direct attacks on the leaders themselves are not necessary.

By viewing the enemy as a system, he shows that in order to be successful, an enemy leader must be able to direct his nation. To take this ability away from the leader is just as effective as a direct attack on the leader himself. Therefore, the destruction of the communications means necessary to direct his forces or maintain control of his population can successfully defeat the enemy.

When to attack the enemy's leadership, although not directly stated, is easily inferred from Warden's theory. He believes that the enemy's leadership should be attacked immediately, if possible. This is demonstrated in the plan that he developed during the initial stages of the Gulf War. This plan called for immediate attacks against the command, control and communications of the Iraqi leader.

Where to attack is basically a targeting problem based on the command, control and communications capabilities of the enemy being attacked. By identifying what must be destroyed to defeat the enemy, he has also described where to attack the enemy.

In summary, Warden successfully describes his theory. He clearly provides a verbal picture to the reader of what, when and where to attack an enemy with air power in order to cause its defeat.

ANTICIPATE

The third thing that Warden must do to present a reliable theory is to provide foresight and foreknowledge of the future. Warden is successful in providing foresight and foreknowledge of the future.

Admittedly, this is the most difficult criterion to apply because it requires some "reading between the lines." However, Warden clearly was intending that this theory should be just as reliable in the future as it is today. The first indication of this is that he uses a system approach in describing the enemy.

Ludwig von Bertanalanffy in his work, *General System Theory: Foundations, Development and Applications*, states that using a systems approach as a means of analysis began in the early twentieth century. He goes on to state that system theories are now used more and more frequently due to the continual complexity of the world we face due to such factors as increased reliance on computers and globalization.[104] It is not unreasonable to conclude that an increase in complexity will continue into the future calling for greater use of system analysis to solve problems. It also is not unreasonable to conclude that this increase in complexity will include problems faced by the military just as much as it does to the problems faced in the civilian sector. Therefore, Warden's use of a systems approach to analyze a potential enemy is just as valid of approach now as it will be in the future.

Besides using a system approach in analyzing the enemy, Warden also discusses ways of attacking the enemy that are not necessarily available today but may be in the future. For example, he discusses the possibility of using weapons other than airplanes to defeat the enemy using his theory. Specifically, he describes the possible use of non-lethal computer viruses to destroy the communications assets needed by an enemy leader to direct his forces. Thus, by developing a theory that is not focused on a specific technology or weapon system to use in the defeat of an enemy and instead focusing on how to defeat the enemy, and by viewing it as a system, regardless of the technology

available, he has developed a theory that can withstand the inevitable improvement in weapons technology.

Finally, he gives examples of how to analyze all types of potential "enemies" to show how his theory, although admittedly designed for nations with armed forces, could be applied to future enemies. These future enemies include an analysis of how terrorist organizations and drug cartels can also be viewed as a system and how applying his theory can defeat them.

An additional comment is that Warden's theory has withstood a small measure of a test of time simply because it is still being used and debated over ten years after he first published *The Air Campaign: Planning for Combat.* This obviously is in no way comparable to Clausewitz and Jomini who developed their theories almost two hundred years ago, but at the same time it does show continued validity.

In summary, Warden successfully anticipates the future in his theory. He demonstrates foresight and foreknowledge of the future, and his theory will not become unreliable in the future due to technological change.

ANALYZE

The fourth thing that Warden must do to present a reliable theory is to provide the conceptual means to reduce complexity to its constituent parts. Warden is successful in reducing the complex nature of an enemy into its constituent parts.

As stated earlier in the discussion of system theory, a system theory attempts break the complex nature of a system into its component parts and describe the interrelations between these component parts. Because Warden has applied a systems

approach to the enemy, by definition he has broken the complex nature of the enemy down into its constituent parts. The only issue to be resolved in order to successfully meet the criterion of "analyze" is to discuss whether the enemy truly is a system.

That an enemy is a system and can be broken down into elements that have interrelations is relatively easy to demonstrate, as Warden does, and is intuitively obvious. As Warden discusses each ring in his five-ring model, he describes the importance of each ring in terms of the effect that the destruction of the elements would have on the rest of the enemy system. For example, he places leadership on the innermost ring because of it being most critical to the continued functioning of the enemy, especially in the direction of its armed forces and the civilian population.

Further, other military writers such as Shimon Naveh support Warden. Naveh, in his book *In Pursuit of Military Excellence: The Evolution of Operational Theory* demonstrates how successful operations can occur only if the enemy is viewed as a system. The introduction to his book states that he attempts to "dissolve the mental fog which has for so long surrounded the sphere of military systems, this work seeks to offer a scientific interpretation of the intermediate field of military knowledge situated between strategy and tactics, better known as operational art."[105]

In summary, Warden successfully analyzes the problem of how to defeat the enemy. He clearly breaks the enemy into its constituent parts and further, shows the importance of each part to the other parts of the enemy system.

SOLVE REAL-WORLD PROBLEMS

Dr Schneider states that the ultimate test of a theory is whether it solves real-world problems. Warden's theory fails this criterion.

The first reason that Warden's theory fails to solve real-world problems is that the innermost ring has proven not to be the enemy's "center of gravity." In two recent conflicts, both in the Gulf War and in Kosovo, the leadership of the country was targeted and although these targets were analyzed to have been destroyed, failed to bring an end to the conflict.

As stated earlier, during the Gulf War, the leadership targets were essentially destroyed during the first six days of air operations. However, this failed to bring about a defeat of the enemy as predicted in Warden's theory. Additionally, air operations continued for more than a month before the initiation of ground operations, many of those targets again being the enemy's leadership and still the enemy was not defeated. Iraq's defeat was secured only after ground operations were initiated and the enemy's armed forces destroyed, largely by air power. However, it clearly was not the destruction of the innermost ring, leadership, which resulted in its defeat, but the outermost ring, the enemy's fielded forces.

Similarly, the events in Kosovo roughly parallel the events during the Gulf War. Air operations initially focused on targets in Belgrade, largely seeking to destroy the leadership's ability to direct efforts in Kosovo. Although the intensity of air operations in Yugoslavia obviously was not satisfactory to LTG Short, it can be assumed that in the seventy-eight day air operation, a large majority of the leadership targets were attacked.

Yet again, it was not until the fielded forces were forced to withdraw that the enemy was defeated. Yugoslav leadership, as Iraqi leadership demonstrated in the Gulf War, was very resourceful in maintaining control and directing efforts despite air attacks of its command and control apparatus. It was only when its fielded forces were at risk of being destroyed that United States' objectives were achieved.

A second problem with Warden's theory in solving real-world problems is that it underestimates the importance of the enemy's fielded forces. Warden states that due to technology, the destruction of the enemy's fielded forces no longer should be considered ends in themselves, but only a means to an end. He goes on to say that these fielded forces are only important because they protect the other four inner rings.

What Warden fails to give due recognition is that although in his mind the enemy's fielded forces are only a means to an end, to the enemy they are normally his most critical means, and until this means is taken away from him, he will continue to attempt to achieve his ends. In the case studies involving World War II, the Gulf War and in Kosovo, it was the destruction/interdiction of the enemy's fielded forces by air power that was most important in the United States achieving its objectives. Because destruction of the leadership ring has proven to be too difficult, or less important than Warden believes to the defeat of the enemy, the destruction of the enemy's fielded forces are critical to defeating the enemy.

Additionally, Warden states that the destruction of the defeat of an enemy has nothing to do with the destruction of its fielded forces. In truth it may have everything to do with the destruction of its fielded forces. This was especially true during the Gulf

War. In this occasion the destruction of Iraq's fielded forces was a stated strategic objective.

Finally, even if destruction of the leadership ring was effective in defeating an enemy, Warden fails to take into account the political and diplomatic realties that make effective attack against leadership targets problematic. Three of the case studies presented in this monograph highlight this point.

In Vietnam, numerous targets were not attacked either due to restrictions on geographic location or due to halts in air operations in North Vietnam. Many of the geographic restrictions were related to the United States' desire to prevent the spread of the conflict to regions outside of Vietnam. Specifically, the United States did not want to risk the direct entry of China into the war. The bombing halts, on the other hand, were ordered to support diplomatic attempts to bring North Vietnam to the negotiating table. Both the geographic restrictions and the bombing halts would make the targeting and destruction of the leadership of an enemy difficult if not impossible.

During the Gulf War, targets in Baghdad were restricted due to the destruction of the Al-Firdos bunker. The civilian casualties and the negative world opinion that resulted from that accident threatened to tear the fragile Coalition apart. From that point on targets in Baghdad were restricted as measures were taken to hold the Coalition together. Although, in reality, the Al-Firdos bunker incident had little real impact on air operations in the Gulf War because it occurred during the latter stages of air operations.

The impact of this incident dramatically points out the danger inherent in targeting the enemy's leadership. Future restrictions on attacking targets inside of the enemy's capital can be assumed which makes the ability to destroy the leadership ring

problematic. A similar incident occurred during Operation ALLIED FORCE. The destruction of the Chinese embassy led to increased restrictions of striking targets in Belgrade.[106]

Operation ALLIED FORCE pointed out another diplomatic reality that prevents the destruction of the leadership ring. That reality is alliance/coalition warfare. In an attempt to maintain international support for the air operations in Kosovo, each of the nineteen NATO allies had to approve the targets for each day's attack. Because of the diplomatic and domestic agendas of each of these nations, in many instances targets that were agreed to were so uncontroversial as to be unimportant. The realities of alliance/coalition warfare make Warden's theory unreliable.

CONCLUSIONS

World War II was the first war in which the United States heavily relied upon aircraft. During World War II, three different air strategies were tried and targets mainly centered on Germany's oil production capabilities, their factories used to produce military goods, and transportation networks. The key effect that air power provided in the European Theater up to the Normandy landings was the interdiction of supplies and units heading to the Normandy landing sites and the gaining of air superiority to prevent the enemy from attacking the landing sites with their own aircraft.

During the Vietnam War, air power was again used primarily against production facilities and transportation networks. This war demonstrated the constraints that could be placed on air power due to diplomatic and political considerations. Although the initial strategic objective of freedom and self-determination for the South Vietnamese

people was never met, air power was instrumental in bringing the North Vietnamese to the negotiating table that eventually allowed the United States to disengage from the conflict in Vietnam.

In the 1980's, COL (RET) John Warden III developed a new theory for the use of air power. He believed that by thinking of the enemy as a system, the most important elements of that system could be determined. Once determined, the mobility and lethality available through the use of air power could destroy these "centers of gravity".

The five rings model that Warden developed portrayed the most important and least vulnerable elements of the enemy system in the inner ring and the less protected and less important elements emanating out from that center ring. The second most important ring is organic essentials (electricity, oil and food), followed by infrastructure (roads, airfields and factories), the enemy population and fielded forces.

His position as an Air Force planner at the Pentagon at the outbreak of the Gulf War put him in a perfect position to test his theory. Acting upon a request from the CENTCOM Commander, General Schwarzkopf, Warden was tasked to develop a plan for the use of air power in Kuwait/Iraq. Warden's plan focused on the decapitation of the Iraqi leadership. His plan focused on targets that, if destroyed, would deprive the Iraqi leadership of its ability to direct the war effort and control the civilian population. This strategy was significantly different from the strategies developed for air power during World War II and Vietnam. For the first time, an attempt was being made to defeat an enemy, not by focusing on the enemy's military equipment and organizations, but by preventing the leadership of the country from directing the war effort.

Air operations during DESERT STORM basically followed the plan developed by Warden almost six months earlier. Within six days, most of the leadership targets designated in the plan had been attacked through the use of air power. This effort failed to bring about the withdrawal of Iraqi forces from Kuwait. As the necessity for ground operations became apparent, the focus of air operations shifted more and more to the military organizations in the Kuwaiti/Iraqi area of operations. The destruction that air power achieved largely prevented Iraq from presenting any type of defense and resulted in the defeat of Iraq within one-hundred hours after the commencement of ground operations.

Although Warden's plan was basically implemented during the execution of air operations, it was not without controversy. The controversy centered on the difference of opinion as to how much focus should be placed on the destruction of the tanks, artillery and other forces. Warden, based on his theory, obviously felt that little effort should be expended on their destruction.

A similar controversy arose during air operations in Kosovo. LTG Short believed that the air effort should focus on the destruction of targets in Yugoslavia, specifically Belgrade to force the Yugoslav leaders to withdraw its forces from Kosovo. Gen Clark, considering the wishes of the other NATO countries, and focusing on the destruction of the forces conducting the ethnic cleansing within Kosovo wanted to focus effort on the military forces within Kosovo.

The controversies that have occurred in the past ten years, because of this new strategy for the use of air power, are the purpose of this monograph. This monograph determined whether Warden's theory is reliable based on the criteria of: its ability to

provide a causal description of how and why air power can defeat an enemy; its ability to provide a verbal picture of what, when and where air power should be applied to defeat an enemy; its ability to provide foresight and foreknowledge of the future; its ability to provide the conceptual means to reduce the complex nature of an enemy into its constituent parts; and its ability to solve the problems that the United States faces.

This monograph demonstrates that Warden's theory is not reliable based on these criteria. Although Warden's theory meets the first four criterions, the last, and most important is not. Warden's theory has not demonstrated an ability to solve the problem that the United States faces for three reasons. First, the destruction of the center ring, the enemy's leadership, has not proven to be the enemy's center of gravity. Second, his theory underestimates the importance of the destroying the enemy's fielded forces in causing his defeat. Finally, in deciding that air power must focus on the enemy's leadership, Warden's theory disregards the political and diplomatic realities that, in most instances, will prevent effective attacks on the enemy's leadership from occurring.

[1] Atkinson, Rick. *Crusade: The Untold Story of the Persian Gulf War.* Boston: Houghton Mifflin Company, 1993, 56.

[2] Gordon, Michael R. and Trainor Bernard E. *The General's War: The Inside Story of the Conflict in the Gulf.* Boston: Little, Brow and Company, 1995, 84, 88.

[3] Clancy, Tom and Horner, Chuck. *Every Man a Tiger.* New York: G.P. Putnam's Sons, 1999, 262.

[4] "NATO Lowers Its Tally of Tanks Hit in Kosovo," (http://www.fas.org/man/dod-101/ops/docs99/990917-nato2.htm), 17 September 1999. Accessed 8 February 2000.

[5] Schneider, James J. "How War Works: The Origins, Nature, and Purpose of Military Theory." A monograph written for the School of Advanced Military Science, 16 June 1995, 7.

[6] Ibid., 8.

[7] Ibid., 7-8.

[8] Warden, John A. *The Air Campaign: Planning for Combat.* Washington: Brassey's, 1989, 9.

[9] Ibid., 10.

[10] Bertalanffy, Ludwig von. *General System Theory.* New York: George Braziller, 1968, 5.

[11] Ibid., 55.

[12] "The Enemy as a System," (http://www.airpower.maxwell.af.mil/airchronicles/apj/warden.html). Accessed 8 February 2000.

[13] Ibid., 6.

[14] Ibid., 6.

[15] Ibid., 6.

[16] Ibid., 7.

[17] Ibid., 7.

[18] Ibid., 7.

[19] Ibid., 7.

[20] Ibid., 8.

[21] Ibid., 8.

[22] In his book, *Bombing to Win: Air Power and Coercion in War*, Robert A. Pape makes the argument that the German "decline in the war economy was due mainly to territorial losses, not strategic bombing." To avoid arguments such as these only the period of time that air power alone was used in the European Theater will be discussed. These arguments would add little to this monograph.

[23] Pape, Robert A. *Bombing to Win: Air Power and Coercion in War.* London: Cornell University Press, 1996, 257.

[24] Douhet, Giulio. *The Command of the Air.* Washington: Office of Air Force History, 1983.

[25] MacIsaac, David. "Voices from the Central Blue: The Air Power Theorists." In *Makers of Modern Strategy from Machiavelli to the Nuclear Age*" ed. Peter Paret. Princeton: Princeton University Press, 1986, 631.

[26] Ibid., 634-5.

[27] Ibid., 634.

[28] Pape, 258.

[29] Ibid., 258.

[30] Ibid., 259.

[31] Ibid., 263.

[32] Ibid., 274.

[33] Addington, Larry H. *The Patterns of War Since the Eighteenth Century.* Indianapolis: Indiana University Press, 226.

[34] Pape, 275.

[35] Ibid., 266.

[36] McFarland Stephen L. and Newton, Wesley Phillips. *To Command the Sky: The Battle for Air Superiority Over Germany, 1942-1944.* Washington: Smithsonian Institution Press, 160.

[37] Ibid., 161.

[38] Ibid., 233.

[39] Addington, 226.

[40] McFarland, 237.

[41] Ibid., 245.

[42] Pape, 254-5.

[43] Overy, Richard. *Why the Allies Won.* New York: W. W. Norton & Company, 132.

[44] Pike, Douglas. "Conduct of the Vietnam War: Strategic Factors, 1965-1968" from *The Second Indochina War: Proceedings of a Symposium Held at Arlie, Virginia, 7-9 November 1984.* Washington: Center of Military History, United States Army, 1986, 101.

[45] Pape, 175.

[46] Ibid., 175.

[47] Karnow, Stanley. *Vietnam: A History.* New York: Penguin Books, 685.

[48] Pape, 175.

[49] Ibid., 175.

[50] Clodfelter, Mark. *The Limits of Air Power: The American Bombing of North Vietnam.* New York: The Free Press, 127.

[51] Ibid., 90.

[52] Robert A. Pape, in his book *Bombing to Win: Air Power and Coercion in War* describes what he believes are the three different air strategies employed during the Vietnam War on pages 174-210. A summary of those strategies is included in this monograph.

[53] Pape, 178-80.

[54] Ibid., 189.

[55] Ibid., 192.

[56] Ibid., 192.

[57] Ibid., 183.

[58] Ibid., 180.

[59] Ibid., 180.

[60] Ibid., 193-4.

[61] Ibid., 181.

[62] Ibid., 181.

[63] Ibid., 199.

[64] Ibid., 199.

[65] Ibid., 199.

[66] Clodfelter, 127.

[67] Ibid., 196.

[68] Pape, 241.

[69] Ibid., 215.

[70] Ibid., 221.

[71] Keaney, Thomas A. and Cohen, Eliot A. *Gulf War Air Power Survey Summary Report.* Washington, 36.

[72] Ibid., 36.

[73] Kearney and Cohen, 39.

[74] Ibid., 36.

[75] Pape, 229.

[76] Ibid., 229.

[77] Ibid., 224.

[78] Gordon and Trainor, 89.

[79] Pape, 220.

[80] Ibid., 224.

[81] Ibid., 213.

[82] Kearney and Cohen, 116.

[83] Gordon and Trainor, 367.

[84] Ibid., 342.

[85] "NATO's Success in Kosovo," (http://www.fas.org/man/dod-101/ops/pqdweb?TS=950022862&Did=000000046040595&Mtd=1&Fmt=4&Sid=9&Idx=20&Deli=1&]), Accessed 8 February 2000.

[86] Ibid.

[87] Ibid.

[88] Ibid.

[89] "Air Chief's Kosovo Lesson: Go for Snake's Head First," (http://www.af.mil/news/Oct1999/n19991027_991992.html), 28 October 1999, Accessed 8 February 1999.

[90] "NATO Ends Air War," (http://www.fas.org/man/dod-101/ops/docs99/n06211999_9906212.htm), Accessed 8 February 2000.

[91] "Air Chief's Kosovo Lesson: Go for Snake's Head First."

[92] "NATO Lowers Its Tally of Tanks Hit in Kosovo," (http://www.fas.org/man/dod-101/ops/docs99/990917-nato2.htm), 17 September 1999, Accessed 8 February 2000.

[93] Ibid.

[94] "Completion of the Air War a Long Process," (http://www.fas.org/man/dod-101/ops/docs99/990414-air_war.htm), Accessed 8 February 2000.

[95] "Air Chief's Kosovo Lesson: Go for Snake's Head First."

[96] "Completion of the Air War a Long Process."

[97] "Air Chief's Kosovo Lesson: Go for Snake's Head First."

[98] "SHAPE News Summary & Analysis 22 October 1999," (http://www.fas.org/man/dod-101/ops/docs99/sa221099.htm), Accessed 8 February 2000.

[99] "Cohen – NATO," (http://www.fas.org/man/dod-101/ops/docs99/990921-kosovo2.htm), Accessed 8 February 2000.

[100] "The Enemy as a System."

[101] Ibid.

[102] Ibid.

[103] Ibid.

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