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# Desert Storm--An Evolution in Warfare

by

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A paper submitted to the faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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**Abstract**

Many present-day warfare theorists suggest the combination of precision weapons and sustained air attack have ushered in a "revolution" in warfare. Was the Desert Storm air operation truly a revolution in warfare? Was it a sudden and fundamental change in the way we visualize war? This essay compares the design of the Combined Bomber Offensive versus Nazi Germany with the Desert Storm air operation, demonstrating striking similarities between both operations, and concludes an evolution, not revolution, has brought about our current operational capabilities.

## Introduction

In a speech after the Gulf War, President George Bush declared, "The F-117 proved itself by doing more, doing it better, and doing it for less...It carried a revolution in warfare on its wings."[1] In the Gulf War Air Power Survey Summary Report, Thomas A. Keaney and Eliot A. Cohen suggest "the lopsided quality...of the air campaign in particular has led a number of observers to conclude the war's conduct and outcome augur a revolution in the conduct of war, a transformation in warfare itself."[2]

Lately, there has been an enormous hype over the revolution Desert Storm ignited. Was the Gulf War, specifically the air operation, truly a revolution in warfare? This essay will examine early air doctrine, the air plan that supported the defeat of Nazi Germany, and the Desert Storm air operation, demonstrating Desert Storm was not a revolution in warfare, rather an evolution that brought about current operational capabilities.

## Early Air Doctrine

Strategic air power doctrine developed at the Air Corps Tactics School in the early 1930s rested on the assumption the destruction of vital targets in the industrial, economic, and social structure can lead to a fatal weakening of an industrialized nation. In order of importance, these critical systems were electrical power, transportation, fuel, food, steel manufacturing, and other manufacturing plants. It was theorized the loss of any of these systems would produce a crippling blow, and the loss of several would render a nation paralyzed.[3] Air power would provide

operational maneuver capability around frontline defenses and attack these critical nodes directly.

Two vital enablers--strategic air intelligence and air superiority--would have to precede any application of air power strategy. The Air Corps Tactics School maintained the first enabler, strategic air intelligence, should cover the economic, industrial, and social structure of potential enemies. The second enabler was the establishment of air superiority over the target nation. The Air Corps Tactics School advocated an offensive approach in achieving this objective incorporating attack on enemy air bases, aircraft and engine factories, aviation fuel, and attrition through air combat.[4]

In summary, long before WWII began, U.S. air commanders embraced the concept of employing of air power to achieve operational and strategic objectives. World War II would provide a proving ground for the initial testing of these theories.

**Origins of the Air War Against Nazi Germany**

The Victory Program, an estimate tasked by President Roosevelt, contained Air War Plans Division-1 (AWPD-1). The overriding goal of AWPD-1 was, "To conduct a sustained and unremitting air offensive against Germany and Italy to destroy their will and capability to continue the war, and make an invasion either unnecessary or feasible without excessive cost."[5]

The initial aim of AWPD-1 acknowledged the German Air Force (GAF) would have to be defeated before an invasion, and was labeled an "intermediate objective of overriding importance." A total of 30 targets were identified as paramount in the defeat of the GAF, including 18 airplane assembly, 6 aluminum, and 6 magnesium plants.

Subsequent to establishing air superiority, the primary objectives of AWPD-1 called for the systematic destruction of 124 specific targets including:

1) Electrical power system (50 generating plants and switching stations).

2) Transportation (47 marshaling yards, bridges and locks).

3) Petroleum (27 synthetic oil plants).[6]

**Casablanca Directive**

AWPD-1, a pre-war contingency plan, grew into AWPD-42, a wartime requirements plan implemented in August, 1942. During this period, a major controversy raged over the British strategy of attacking the morale of the German people by night city bombing versus the American strategy based on unescorted daylight industrial-based bombing. The Casablanca Conference in January, 1943, sought a common directive for the prosecution of the Combined Bomber Offensive (CBO), codenamed Operation Pointblank. Incorporating AWPD-1 and AWPD-42, Pointblank's desired end state was, "The progressive destruction and dislocation of the German military, industrial, and economic system, and the undermining of the morale of the German people to a point where the capacity for armed resistance is fatally weakened so as to permit initiation of final combined operations on the Continent."[7]

To accomplish this objective and prepare for an invasion of Europe, the CBO listed the following target sets as priorities:

1) German submarine yards.

2) German aircraft industry.

3) German transportation network.

4) German oil production plants.

5) Other targets of war industry.

Strategy for the direct air support of an invasion was postponed because the Allies could not agree on a plan. Of significant note is the omission of the German electrical power system from the CBO target list. This target set, the first priority on the AWPD-1 list, had been viewed as the "heart" of Germany by U.S. air planners.[8]

Operation Pointblank began in June, 1943. During the next six months, German fighters inflicted a heavy toll on Allied bombers. Allied fighters did not have the range to escort the bombers all the way to the targets, resulting in tremendous losses for the USAAF. At the time, USAAF leaders did not believe fighter escort was even required. In an effort to generate quick results, air planners had disregarded a primary enabler--air superiority.

**Air Operations in Direct Support of Operation Overlord**

As the invasion of Normandy approached, ground commanders grew impatient with the results of the air war. The GAF was still a very capable threat. In February, 1944, the Pointblank directive was changed. The destruction of the GAF, the only target anyone could really agree on, became a priority target, and the original CBO target list was dropped.[9]

During the last week of February, 1944, the Allies unleashed a dedicated effort versus the GAF codenamed "Big Week." Four days of armada-size missions attacked 12 German aircraft factories. Escort fighters, now fitted with range-extending external fuel tanks, were released to seek out and destroy the enemy wherever they were found. The GAF broke down and never recovered. The intermediate objective of establishing air superiority, step one in any air

plan, had finally been achieved--two years and two months after the United States entered the war.[10]

Gen Eisenhower, as Supreme Commander Allied Expeditionary Forces, was given control of the entire Allied Strategic Air Forces in March, 1944. Despite protests from Allied air commanders, he immediately shifted the direction of the CBO. Eisenhower's air plan called for the progressive wearing down of the Luftwaffe and the destruction of critical points in the rail and highway systems to isolate the coastal areas selected for invasion.[11] Eisenhower deemed Overlord was too crucial an operation, and every ounce of air power would have to be available without negotiation.[12]

The Overlord air plan continued attacks on the GAF. The only other operational fire concentrated on rail communications in France, incorporating 110 rail bridges and marshaling yards. The goal was to permit the Allies to transfer divisions across open beaches faster than the Germans could shift divisions by land to counter them.[13] Eisenhower did release a token amount of AAF bomber assets to attack German oil targets. Otherwise, the entire Allied fighter and bomber force was transformed into an air interdiction force.

On June 6, 1944, the Allies employed 12,837 aircraft versus 300 German fighters, which were shot from the sky in less than 10 hours.[14] Air superiority had clearly been established. The success of the Normandy invasion is well documented in history. In September, 1944, three months after the Normandy invasion,the Strategic Air Forces were given permission to begin the systematic targeting of the German industrial and economic base using the

original CBO target list. This combination of air power and the land offensive culminated in the crushing defeat of Germany.

**Planning the Desert Storm Air Campaign**

Forty-five years later, shortly after the Iraqi invasion of Kuwait, a working group in the Pentagon briefed an initial plan and target list to USCINCCENTCOM. One of the chief architects of the plan was Col. John A. Warden, III, who put up a sign outside the Checkmate spaces in the basement of the Pentagon that read, "Air War Plans Division 1941-1991."[15]

This group worked the following objectives and produced the operations order that became the initial phases of Desert Storm:

1) Destroy/neutralize air defense command and control.

2) Destroy nuclear, biological, and chemical storage and production capability.

3) Render ineffective national and military command, control and communications infrastructure.

4) Destroy key electrical grids and oil storage facilities.

5) Deny military resupply capability.

6) Eliminate long-term offensive capability.

7) Disrupt and weaken Republican Guard Forces.[16]

Col. Warden professed the art of employing air power to accomplish operational and strategic goals long before Desert Storm. His book, The Air Campaign, published in 1988, prefaced, "The Air Campaign is an attempt to come to grips with the very complex theory associated with the air war at the operational level. It is devoted to how and why air power can be used to attain the military objectives needed to win a war."[17]

A great deal of this book is rooted in history, with large portions based on the CBO. An entire chapter is devoted to the attainment of air superiority. Another section is devoted to an offensive approach to the air war, a condition similar to both Pointblank and Desert Storm. He wrote, "During American planning and execution of the bombing campaign against Germany...planners maintained that destroying enough single-target systems would win the war. Critics of this approach disparagingly referred to these target systems as panaceas. In retrospect, the petroleum, transportation, and electrical generating systems might have come close to qualifying as real panaceas."[18]

At the heart of Desert Storm's strategy was air power's ability to strike the enemy command structure directly, both civil and military. Every state and military organization has a unique set of vulnerabilities--centers of gravity-- which Warden portrays as five concentric circles. These circles, listed from the inside out, are described below:

1) Enemy command structure - critical because this is where concessions will be made.

2) Key production - War related industry, electricity, and petroleum products.

3) Transportation system.

4) Population and food sources.

5) Fielded military forces.[19]

**Desert Storm Execution**

The Desert Storm air plan consisted of three phases:

1) Strategic attack - Included establishing air superiority.

2) Kuwait Theater of Operations (KTO) suppression of enemy air defenses (SEAD).

3) Direct attack on the Republican Guard and the Iraqi Army in the KTO.[20]

The first phase, strategic attack, followed Warden's concept of the five concentric rings. Estimated at taking one week to complete, this phase concentrated on disconnecting the command structure from the military by destroying communications, electrical power, the transportation network, and the oil refining capacity.[21] Simultaneously, air supremacy was achieved by air combat, SEAD through direct and electronic attack, and by destroying the Iraqi Air Force (IAF) on the ground.

The second phase, SEAD in Kuwait, was estimated at taking only one day since these defenses were not as redundant as those in Iraq. The third phase, direct attacks on the Republican Guard and the destruction of the Iraqi Army in Kuwait would take about three weeks. This phase would prepare the KTO for an invasion and included the destruction of 54 bridges, 42 of which were located between Baghdad and Basra.[22]

Throughout the Desert Storm air operation, the concept of "parallel warfare" was applied. Parallel warfare is the simultaneous application of force, at each level of war, against key systems to effect paralysis on the subject organization's ability to function. The objective of parallel warfare is effective control of an opponent's strategic activity.[23] It combines mature air power technology with a strategy based on achieving systematic effects rather than complete target destruction.[24]

Parallel warfare elevates the principle of economy of force to a new level. An example is dramatized in the following: To aid achieving air superiority, two Iraqi Sector Operations Centers (SOCs) were initially fragged to be destroyed by 16 F-117s on the opening night of the war--an 8:1 aircraft to target ratio. Further analysis of the Iraqi air defense network unveiled four SOCs, not two, plus five additional Interceptor Operations Centers (IOCs). The problem stems from having only 16 F-117s available. The solution is in the objective--the effect desired was to shut down the air defense command and control systems. The SOCs and IOCs did not require complete destruction, they only had to be rendered ineffective. It did not require all 16 F-117s originally fragged. Some of these assets could be allocated elsewhere. Applying this philosophy to the remaining F-117 assets, the opening 24 hours of the war found 42 F-117s flying 76 target attacks, almost a 1:2 aircraft to target ratio.[25] These targets included command leadership bunkers, communication exchanges, SOCs, IOCs, satellite downlink facilities, and vital communication nodes.[26]

When you apply this conviction throughout the Air Tasking Order (ATO), 1300 offensive sorties were flown against 152 discrete targets in the first 24 hours. The 152 targets attacked on the first day represent a significant leap compared to the 154 targets on the entire AWPD-1 list in WWII.[27]

**Revolution or Evolution**

Was Desert Storm a revolution in warfare? Was it a sudden and fundamental change in the way war is visualized? Did war's paradigm change? If you focus on the doctrine of applying air power to achieve operational objectives, you must conclude there

was not a revolution. This doctrine can be traced to the decades following WWI, when the Air Corps Tactics School predicted an air force would bypass the front lines, attack the vital centers, and inflict a "fatal weakening" on an enemy nation.

Was there a significant difference in target sets? Again, the answer is "no." Warden's five concentric rings were based on the CBO. Of significant note is the addition of the inner ring, the command structure, not found in WWII target sets--the only major difference. Operational thought behind this strategy directs all actions be aimed at the mind of the enemy command. Strategically, the desire is to put pressure on an enemy political structure to force some kind of concession--truce, armistice, unconditional surrender. Operationally, pressure is applied to the command structure to force operational concession--delay, withdrawal, surrender.[28] Desert Storm applied pressure against Saddam Hussein, who essentially held both strategic and operational control.

Were there significant execution differences between the CBO and Desert Storm? Both operations contained basically the same phases, but were executed in entirely different order. During WWII, operations pursued the following sequence: air superiority, interdiction, invasion, and finally strategic attack. Desert Storm's chronology was: air superiority/strategic attack, interdiction, followed by invasion. At first glance, it would appear the Allies had gotten the sequence out of order during WWII. However, other concerns forced the delay of the CBO until after the Normandy invasion. The CBO required six months, after establishing air superiority during "Big Week," to complete. Eisenhower could not afford to wait six months. Utilizing maximum summertime

campaign weather was critical. An additional factor in favor of an early invasion was the continuing efforts of the Germans to strengthen coastal defenses.[29]

Another difference in execution involved operational fire directed against electrical power. Desert Storm attacked this system very effectively. During WWII, this target set was dropped from the CBO list on the grounds its paralysis was beyond the capability of the air force. A post-war analysis shows clearly crippling this target was well within air force capability. Knocking out electricity is crucial because it can not be stockpiled like other essentials. According to Albert Speer, "The destruction of the power plants would be the most radical measure, as it would lead at once to a breakdown of all industry and public life. Destruction of 56 targets would produce this effect."[30]

Much credit has been given to stealth technology and precision guided munitions (PGM) as being "revolutionary." In actuality, this technology was merely the point on the end of the spear, making the application of doctrine extremely surgical, and giving new definition to the principles of mass and economy of force. In WWII, the Norden bomb sight was state of the art technology. Still, maximum and repetitive tonnage on target was the only option available to ensure target destruction. A total of 154 specific targets were identified in AWPD-1 as the critical components of Germany. Factoring in projected number of bombers available, target dimensions, bombing probability tables, force requirements providing a 91% probability of destruction, and a mission rate of five sorties per month, it was determined it would take six months to fulfill the objectives of AWPD-1.[31]

It is important to note this formula was based on the destruction, not merely neutralization, of the 154 targets--two vastly different goals. This led to long periods of focusing on one target, allowing Germany to rebuild others, making it almost impossible to paralyze more than one target at a time. To knock out a single industry with the weapons available in 1944 was a formidable enterprise demanding continuous attacks to effect complete results.[32] Two 300-plane raids flown against two targets in WWII have been replaced by the economically effective use of one PGM-equipped platform.

A crucial step in applying this concept is detailed, pre-attack strategic air intelligence, a idea developed almost sixty years ago. The target folders collected in 1940 on the German electrical power and distribution system are a prime example. Detailed specifications were obtained through information supplied by U.S.banks, who had lent Germany the capital to build these systems. The result was a comprehensive target study on the German electrical power and distribution system including target folders, aim points, and bomb sizes. Through the same methods, target folders were prepared on German petroleum and synthetic oil plants, aircraft and engine production facilities, the German Air Force, and the transportation network.[33]

During Desert Storm, pinpointing critical DMPIs (Desired Mean Points of Impact) was required so a precision guided bomb could shut down a specific target, without necessarily having to bomb it into the stone age. For example, shutting down the power grid that provides electricity to the air defense system requires less force than destroying each element of that same air defense system.[34]

Yet, technology alone does not make a revolution. It must be combined with focused, original operational thought. In May, 1940, the British and French had technology and military systems comparable to those of the Germans. But without the necessary organizational adaption, the British and French were unable to withstand the German Blitzkrieg.[35]

If there was a revolution during Desert Storm, it is found in the concept of parallel warfare. Enhanced by technology, parallel warfare incorporates simultaneous attack at all levels of war, degrading command, control and the ability to defense rapidly. Total destruction of a target is not always required, having been replaced by the effects-based objective of neutralizing targets quickly and simultaneously. Entire cities and factories were literally reduced to rubble during WWII. Attacks on the Iraqi power system led to shutting down their entire national grid, producing a crippling synergistic effect on the Iraqi war machine. But after the war, Baghdad's electrical power structures were still intact, with electricity being supplied soon after the cessation of hostilities.

The Gulf War demonstrated paralysis through the application of parallel war. The strategies of annihilation and attrition rely on individual target destruction as the ultimate measure of success. Some targets, such as enemy armor, may require destruction to ensure its ineffectiveness. In parallel warfare, the measure of success is effective control over systems the enemy relies upon to exert influence.[36] Within a few days of the start of Desert Storm, a condition of "air supremacy" was declared by coalition commanders. This was not due to the Iraqi Air Force (IAF) being

destroyed--it most certainly was not--rather the IAF was rendered completely ineffective.

**Conclusion**

In a future conventional conflict, as in Desert Storm, the total application of air power will be applied in a comprehensive nature. It will not be an exclusive Air Force operation. The Navy will launch Tomahawk cruise missiles and carrier-based assets. Army special forces units will operate behind enemy lines setting charges or spotting targets for PGM-equipped air assets. The ATO will include ATACMS (Army Tactical Missile System). The USMC will release a percentage of its air assets to the Joint Force Air Component Commander. Space systems will be used as will information warfare capabilities. All of these systems will combine to produce a blanketing, paralyzing effect over an enemy nation. But even then there will be nothing truly revolutionary about how we conduct war. The effects we desire will have evolved from our world's long history of war. Carl von Clausewitz wrote, "War is thus an act of force to compel the enemy to do our will."[37] We've just gotten a whole lot better at it.

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