STUDY PROJECT

BOMBING BEYOND THE BATTLEFIELD: AN AIR FORCE IMPERATIVE

BY

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USAWC CLASS OF 1991

U.S. ARMY WAR COLLEGE, CARLISLE BARRACKS, PA 17013-5050

Unclassified
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution is unlimited
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION U.S. Army War College 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) Carlisle Barracks, PA 17013-5050	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING / SPONSORING ORGANIZATION 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
Bombing Beyond the Battlefield: An Air Force Imperative

12. PERSONAL AUTHOR(S)
Colonel John H. Buckner, Jr.

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Individual	FROM _____ TO _____	3 April 1991	~~33~~ 34

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

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20. DISTRIBUTION / AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☐ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	
22a. NAME OF RESPONSIBLE INDIVIDUAL RICHARD O. TROY, COL, USAF	22b. TELEPHONE (Include Area Code) (717) 245-4016 / 22c. OFFICE SYMBOL AWCAC

DD Form 1473, JUN 86 Previous editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE
Unclassified

Block 19. Abstract (cont.)

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USAWC MILITARY STUDIES PROGRAM PAPER

BOMBING BEYOND THE BATTLEFIELD: AN AIR FORCE IMPERATIVE

AN INDIVIDUAL STUDY PROJECT

by

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ABSTRACT

AUTHOR: John H. Buckner, Jr., Col, USAF

TITLE: Bombing Beyond the Battlefield: An Air Force Imperative

FORMAT: Individual Study Project

DATE: 3 April 1991 PAGES: 33 CLASSIFICATION: Unclas

The current world political scene is changing at an unprecedented pace, and U.S. policy makers are struggling to define a clear guide for the future. With the Cold War declared over, many see a drastically reduced military threat to the U.S. Concurrently, the U.S. economic situation is tenuous, domestic issues cry out for attention and dollars, and politicians and the public are looking for a peace dividend. In this environment, Air Force leaders are in the process of making decisions about the shape of the future Air Force. They must balance the requirement to reduce spending with the responsibility to provide for the capability to meet national military objectives in support of national security strategy. One key element to past Air Force contribution has been bombing beyond the battlefield. This paper looks at the past to see examples of what has been done and what was learned. It further looks at what Air Force leaders see as the future global mission of the service and how the capability to bomb beyond the battlefield fits as a component of that strategy as well as what is and will be available to perform this mission. The conclusion is drawn that the mission of bombing beyond the battlefield will remain an Air Force imperative and additional F-15Es should be part of future fighter force structure.

INTRODUCTION

As this document is written there are changes in the world, the magnitude of which rival those in the history of mankind. The East-West superpower polarization that has dominated political struggles for the past 40-plus years has essentially ended. National and regional issues based on religious, cultural, historical, economic and social differences are no longer suppressed by the umbrella of the superpower struggles. The response of the world community of nations to these issues will help establish what the President has called the "new world order." The USSR has been in the process of changing from a communist dominated state toward a representational one with the government run economy forsaken for a free market. The progress of this process, however, is clouded in internal Soviet turmoil without a predictable outcome. There are major arms negotiations that cannot keep pace with the realities of unilateral reductions in hardware, manpower and defense budgets. Threat perceptions to the survival of the United States have lessened to a significant degree, despite the recent Persian Gulf War in Saudi Arabia, Kuwait and Iraq. In addition, the U.S. economy is in a downward slide with debate as to the true definition of its nature - recession, correction, slowdown, etc. U.S. politicians, the media and the public are demanding attention to domestic issues of violence, drugs, health care, poverty, education and the environment. In this exciting and confusing atmosphere the Department of Defense, and specifically the U.S. Air Force, must contend with a

near-term problem: how to draw-down a ready and capable military structure while retaining a force that can support national security objectives with an acceptable level of risk.

This paper will look at a small piece of the Air Force down-sizing puzzle. It will conclude that, as the Air Force makes decisions on how best to proceed as it grows smaller and leaner, there should remain a capability to use aerospace power to deliver conventional munitions beyond the immediate battlefield. Additionally, more F-15Es are necessary to keep that option available for the National Command Authority and to provide combat leaders with sufficient force structure and combat flexibility to accomplish their mission in concert with U.S. national military strategy. To arrive at this position the paper first looks at the political situation of today and what it means to the Air Force. Next, it will define the basis for the Air Force interdiction mission and cite several historical examples. It will summarize lessons learned from these past efforts and postulate three scenarios which may require a future commander-in-chief (CINC) to use interdiction. Lastly, it will take a brief look at current and possible future technology interdiction assets and finally focus on what is necessary to bridge the period between today and tomorrow.

POLITICAL SITUATION

Today's post cold war environment is not unique. Following World War II the U.S. undertook a massive demobilization despite an unsettled world

political scene. The purpose and role of the military was unclear. However, the emergence of the USSR with its nuclear arsenal crystallized the direction of national military strategy and provided the basis for U.S. force structuring.[1] For today, absent an obvious and clear follow-on political strategy, defense planners must first look carefully at the national objectives that frame the political context in which U.S. military power may be employed. Only in this context can military variables such as force level and force mix be determined and evaluated. Air Vice Marshal Walker, in his book Air to Ground Operations, said "ideally there must be a match between political intentions and military capability if Clausewitz is to rest easily."[2] As a subset, aerospace power can only be as effective or necessary to the extent it supports and furthers national policy.[3] Currently, U.S. political policy makers are distracted from the process of formulating an appropriate and coherent post cold war strategy in U.S. international relations. This distraction places the U.S. defense establishment in the difficult situation of forecasting military requirements without a clear political roadmap to support. That change is necessary is almost universally understood. Budgetary factors alone will force reductions. It is critical that they be "based on a prudent assessment of permanent, rather than transitory factors."[4] The Air Force must accept this premise and approach the problem with strategic vision, as intentions can change much quicker than capabilities. The concept of how best to structure a smaller Air Force is beyond the scope of this brief paper, but

suffice it to say that some balance of current capability, including interdiction, with an eye to future opportunities and requirements, is a most appropriate starting point. Also, the more flexible the force structure becomes without sacrificing capability, the better the chance of meeting future needs.

INTERDICTION

In analyzing why and how best to meet the Air Force interdiction requirements, it is important to look first at what the overall Air Force mission is in support of national military strategy and how the Air Force does that mission. As established earlier, the military must be capable of meeting political objectives. Aerospace power, then, does not exist merely in its own right, but it exists to pose a capability to project national will and power.[5] The nature of this capability is and should remain multi-dimensional. Department of Defense document DOD 5100.1 outlines functional requirements for the Department and its major components. JCS Pub 2, Unified Action Armed Forces (UNAAF), in turn directs the Air Force to be prepared for the prosecution of war and military operations and prescribes Air Force functional responsibilities. Three are listed here:

> 1.) To organize, train, equip and provide forces for the conduct of prompt and sustained combat operations in the air--specifically, forces to defend the United States against air attack in accordance with the doctrines established by the Joint Chiefs of Staff, gain and maintain general air supremacy, defeat enemy air forces...
> 2.) To organize, train, equip and provide forces for close air support and air logistic support to the Army and other forces, as directed, including

> ...air support... and air interdiction of enemy land forces and communications.
> 3.) Surface sea surveillance and antisurface ship warfare through air operations.[6]

Each of these requires bombing, whether against airfields, enemy forces, lines of communication, sea targets, etc., and together provide a basis for a fundamental aerospace role.

In consonance with DOD and JCS guidance, the Air Force defines its roles and missions in Air Force Manual (AFM) 1-1, Basic Aerospace Doctrine of the United States Air Force. The January 1990 draft AFM 1-1 asserts itself as a living guide for how best to employ aerospace power. It encompasses the full spectrum of activities in which the Air Force can contribute to national military policy. In its description of aerospace power, it lists three basic combat roles - aerospace control, force application, and force enhancement - and one support role - force support. The missions associated within these roles include the full range of Air Force contributions to the national defense. The focus of this paper is solely on those missions requiring weapons employment beyond the immediate battlefield, and for the purpose of this paper, that mission is called air interdiction. This is done without intent to fuel any emotional definition debates but simply to describe the functional capability to deliver munitions accurately and with acceptable attrition beyond troops in contact. This generalization excludes nuclear weapons, does not distinguish between tactical or strategic

targets and does not differentiate between classical interdiction targets and others, such as counterair targets like runways. The intent is to describe an asset capability only, leaving employment options to another discussion. The purpose of interdiction, then, includes bombing of any suitable target to destroy, delay, divert or disrupt enemy forces, assets, capabilities or intentions.

It is important to note here that the resources necessary or available to conduct interdiction are not the sole province of the U.S. Air Force tactical air forces. Many other assets could be involved in a campaign. These include, among others, National Intelligence Assets, the U.S. Navy, the U.S. Army, the U.S. Marines, Special Operations Forces (SOF), electronic warfare systems, a variety of command and control activities and allies. This paper, however, is limited to the U.S. Air Force weapon delivery systems, and their past, present and future. Additionally, other than peripheral comments regarding lethality, accuracy, and future prospects, munitions are excluded from this discussion. This omission is done with the understanding that to fully explore force structure issues, weapon factors must be considered in concert with weapon systems and their missions. To begin, the following review should help establish the lessons and benefits of past interdiction campaigns.

HISTORICAL PERSPECTIVE

Reviewing these examples is not done to develop a "how to" or "how not to" primer, but to present information on successes of little to great importance

and to validate past and future use of interdiction bombing.[7] By and large most interdiction campaigns did not meet expectations and were thereby judged as disappointing. Unfortunately, this stemmed from early airpower advocates optimistically claiming strategic bombardment would be decisive. Coming from such notable spokesmen as Brigadier Generals Billy Mitchell (U.S. Air Service) and Guilio Douhet (Italian Air Force) and Viscount Hugh Trenchard (RAF), these claims had immense appeal. From the campaigns in Italy and Normandy in 1944, the Korean War and Vietnam, lessons can be drawn that provide a proper perspective for interdiction.

ITALY. Operation Strangle was a two month campaign from mid-March to mid-May 1944 in the stalemated Italian theater of World War II. The initial objective was "to reduce the enemy's flow of supplies to a level which will make it impractical for him to maintain and operate his forces in Central Italy."[8] The air proponents "expected air interdiction, alone, by simultaneously cutting all lines of communication leading south from the Po Valley would cause the Germans to withdraw."[9] Strategic (heavy bombers), tactical (fighters, fighter bombers, and small to medium bombers) and coastal air forces targeted enemy supply and transport systems in northern and central Italy.[10] During the campaign, both sides of the front were relatively static, the allies had air superiority, there were limited enemy air defenses and most bombing was done in the daytime. The initial results were frustrating to the allies. Expectations

had been overly optimistic. The enemy logistical requirements turned out much lower than predicted, and the enemy adapted to or repaired the damage much better than expected. As a result, supply denial failed to be a conclusive factor. However, when the allies modified the objectives to simply deny the enemy ground forces mobility in combat and to delay reinforcements, the campaign was much more successful and, in fact, benefitted from the previously accumulated supply reductions. Had the original objectives been mobility denial from the outset the results would have contributed even more effectively to the overall campaign.[11]

NORMANDY. Airpower bombardment was a major factor in the planning and execution of the D-Day invasion of German occupied France at Normandy in 1944. There were three phases to air operations in support of the invasion. The "preliminary" phase concentrated on a sustained effort to shut down the rail systems of France and Belgium in order to cause the enemy delay and disorganization of rail reinforcements into the assault area.[12] This plan, known as the Transportation or Zuckerman Plan, included targets both inside and outside the region of intended invasion. The targets displaced from the invasion site were part of an elaborate deception plan to mislead and confuse the enemy as to the Allied intentions. Additional sorties were also tasked against V-weapon launch sites in an effort to forestall the use of the missiles against the British homeland. The "preparatory" phase continued the objectives of the

Transportation Plan and extended them to include bridges over the Seine River to further isolate the invasion battle area. In addition, all airfields within 130 miles of the assault beaches were to be brought under attack to help secure control of the sky.[13] In the third or "assault" phase, the interdiction missions were tasked to neutralize coastal defenses, assist the land forces in the initial occupation of the beach and delay the arrival of reserves.[14] Strategic bombers, medium bombers, fighter bombers and fighters were used in the plan execution. The Allies enjoyed air superiority, as in Italy, and carried out an around-the-clock campaign, but weather and night severely reduced accuracy. It is generally accepted, however, that the interdiction campaign contributed significantly to the success of the invasion. The cumulative effect of bombing rail lines, bridges, and German petroleum, oil and lubricants (POL) facilities kept the reserves from timely reinforcement. Additionally, by destroying some vehicles and posing a continuing threat to others, the allies caused traffic jams and forced the Germans to move at night, further delaying reinforcement movements.[15]

KOREA. Objectives of interdiction missions in the Korean War varied as the ground situation changed. In the initial phases of hostilities, when the North Korean Army (NKA) invaded south with armor at high speed and then, as the United Nations forces executed the breakout from Pusan and drove the NKA north, aircraft interdicted choke points and enemy forces to help curtail enemy movement and assist friendly movement.[16] After Seoul was retaken for the

second time by the UN forces and the ground movement essentially ceased, the air effort focused on supply interdiction. Named Operation Strangle after the successful campaign in Northern Italy, the airpower objective was to isolate the enemy from its supplies. It initially targeted roadways and trucks in North Korea and later included a major campaign against the railway system. Planners thought that by degrading the enemy's supply efforts, the NKA would be forced to shorten its lines of communication and withdraw, perhaps without a ground campaign.[17] Later, recognizing a need to alter the air war objectives, the CINC ordered the Air Component to: "... deny the enemy the capacity to maintain and sustain further decisive ground attack and maintain maximum pressure on the enemy in North Korea, thus creating a situation conducive to a favorable armistice."[18]

As in World War II, the U.S. air forces enjoyed virtual air superiority, but had little night or bad weather capabilities. Enemy air defenses were reasonably unsophisticated initially, especially before the Chinese entered the war. Bombers carried a significant portion of the tonnage, as distances from Japanese bases were great and fighter bombers had limited range.[19] In the aggregate, airpower failed to meet supply interdiction expectations and, in fact, the enemy even improved its logistical position to wage war by the time of the cease-fire. Despite this apparent failure, there were successes and, without airpower and interdiction, the UN would not have prevailed to the extent it did. As General

Ridgway, the Commander of the Eighth Army asserted:

> Despite our constant and consistently successful effort to knock out the railroads and bridges, to demolish marshaling yards and deny the highways to enemy traffic, supplies continued to flow down from Manchuria. Chinese artillery activity greatly increased, helping to slow all our ground operations. . . . Whatever may be said for the value of airpower - and there is no question that without it many of our advances would not have been possible - it simply could not keep the enemy from bringing in the armament he needed. It could slow him down and keep him working nights; but it could not isolate the battleground.[20]

VIETNAM. The last example is the 1972 interdiction effort in the Vietnam war, specifically the two Linebacker campaigns. The goal of the two Linebackers was to force North Vietnam to halt its conventional offensive into the South and accept a cease-fire agreement. The stated military objectives of the strikes were to:

> (1) Reduce the resupply of North Vietnam from external sources,
> (2) Destroy North Vietnam's internal stockpiles of war materials and
> (3) Curtail the flow of troops and material from the North into combat areas in the South.[21]

In Linebacker I the U.S. attacked targets in North and South Vietnam including rail lines from China, POL storage and pumping stations, choke points, transportation vehicles and lines, etc., with fighter bombers, over 170 B-52s and a new generation of smart munitions. Essentially, it amounted to a classical interdiction campaign.[22] Linebacker II expanded the targets to include those in Hanoi and Haiphong using B-52s, F-111As and Navy A-6s. The attacks were relentless and continued around-the-clock, regardless of weather. Enemy air

defenses were the most formidable any interdiction campaign had ever faced and losses were a little more than two per cent but slightly less than expected.[23] Linebacker I is generally credited with coercing North Vietnam into accepting a cease-fire in October and agreeing to terms for peace. However, the talks stalled and Linebacker II ensued in December 1972, succeeding to the point that British war expert, Sir Robert Thompson, stated:

> In my view, on December 30, 1972, after eleven days of those B-52 attacks on the Hanoi area, you had won the war. It was over!...They and their whole rear base at that point were at your mercy. They would have taken any terms. And that is why, of course, you actually got a peace agreement in January, which you had not been able to get in October.[24]

LESSONS LEARNED

In a lecture to the U.S. Army War College, a noted military historian reminded students of the importance of projecting a future vision and destiny for their individual services. He said they should fortify that vision using lessons of the past without remaining bound to them. In that pursuit, military strategists and historians have studied these and other interdiction campaigns extensively. They generally agree that using interdiction in the proper circumstance with appropriate goals can result in decisive contributions to military and more importantly, political, objectives. At the same time, the benefits of an air interdiction campaign are difficult to measure objectively. Most efforts tend to focus solely on individual engagements and battles and discount the value of the

overall campaign.[25] Each of the past interdiction campaigns has been perceived as a failure by many. In almost every case, excessive expectations lead to disappointment in results. Understanding the contributions of interdiction and some of the factors affecting success can result in more realistic expectations and successful operations. To further this purpose the paper will next summarize previous contributions and the fundamental success factors learned from history. The success factors are divided into two categories. Those somewhat independent of bombing platform are called general factors, and those more a function of the platform are called weapon system factors. General factors include *air superiority, intelligence, rules of engagement, operational situation with respect to ground forces and air-to-ground coordination.* Weapon system factors include *enemy ground based air defenses, sortie availability, basing and opportunity for continuous application of pressure.*[26]

INTERDICTION CONTRIBUTIONS. Successful interdiction is best measured by its contribution to winning the war and not by merely counting targets hit or destroyed. By striking enemy airfields, the air component can contribute significantly to gaining and maintaining the air superiority enjoyed in previous campaigns and necessary for any modern war. An important impact of sustained interdiction that is difficult to quantify, but certainly a contributor to the war effort, is the diversion of resources it causes the enemy to make to overcome bombing effectiveness. For instance, during Linebacker I, the North

Vietnamese were forced to divert significant POL, air defense assets and manpower to offset and counter losses when the rail system from China was targeted.[27] In World War II the Germans diverted immense expenditures to rebuild, replace and defend war production and supply facilities as a result of the massive allied strategic bombing campaign. While not directly measurable, this "opportunity" cost to the enemy is a synergistic contributor to the overall objective of defeating the enemy. Another immeasurable but historically validated impact of air operations is the shock factor and its resulting impacts on enemy and friendly morale.[28] Also, reducing enemy supply throughput capacity by bombing lines of communication and choke points can create shortages at the point of battle, when the enemy consumption rates and supply demand are high. Additionally, timely interdiction can reduce mobility of enemy reserves, allowing friendly forces to capitalize on localized superior forces. Direct attacks against land forces can supplement artillery and act as a force multiplier by not only slowing force movement but destroying it as well.

GENERAL FACTORS. All U.S. interdiction campaigns have had *air superiority* to some degree. It remains a preeminent concern of the CINCs and determines to what extent both the air and ground campaigns can be executed. *Intelligence*, both pre and post hostility, is of paramount importance. Knowing which targets should be attacked and when to strike them are critical to "fine tuning" or redirecting, if necessary, the focus of the bombing campaign. The bomb damage

assessment (BDA) debate that dominated the media with respect to massive bombing raids early in the Persian Gulf War highlighted the complexity and criticality of this intelligence issue. *Rules of engagement* have played and always will play a critical role in the planning and execution of bombing campaigns. All combat must be carried out under the umbrella of political objectives, and consequently, political restrictions are a necessity and reality. For instance, in both Korea and Vietnam the U.S. adversary had sanctuaries that were protected from the bombing and severely limited the impact of the supply interdiction campaigns. Preventing sanctuaries and other militarily restrictive limitations, if possible, or altering objectives to accommodate them are major considerations in successful campaigns. The *operational situation for ground forces* has proven to be a major determinant in how best to prosecute an air war. For example, when the enemy army is moving, such as the North Korean Army pushing south toward Pusan in 1950 or the North Vietnamese driving south in the Spring of 1972, it becomes very vulnerable to interdiction of lines of communication, choke points and forces. If movement ceases, the enemy's supply consumption decreases and the forces are less susceptible to interdiction. In essence, any interdiction plan cannot be developed or executed without taking into account the enemy strategy and consequent vulnerabilities. Good *air to ground coordination* is likewise a requirement for optimum employment of bombing assets. This is well established and understood for close air support, but it is nearly as critical

to interdiction operations in synchronizing the CINC's theater campaign.

WEAPON SYSTEM FACTORS. *Enemy ground based air defenses* obviously affect all platforms, but it is listed as a weapon system factor because of the differences they have on varying types of aircraft. For survivable interdiction against forces with significant air defense systems, aircraft will need combinations of self defense, alternative delivery options, force packaging and high maneuverability. *Sortie availability and basing* are vital considerations to the commander. In past campaigns almost half of all theater sorties were apportioned to the interdiction mission.[29] Many of them were flown by bombers from distant bases, and while fighters did participate, lack of range was frequently a major problem when nearby bases were not available. Turnaround times, maintenance reliability, supplies and airborne tanker availability are likewise important variables in the equation of sortie generation. *Continuous application of pressure* has proven to be a conclusive factor. This means day and night operations in all weather conditions with accuracy and sufficiency of payload. During the early campaigns, the enemy adapted to daytime bombing by limiting movement, albeit slower, to night or under the weather. Not until the Persian Gulf War was technology fielded to reduce system limitations to these variables and enable U.S. interdiction truly around-the-clock. Also, it was not until the late stages of the Vietnam War that the U.S. used technology to significantly improve bombing accuracy and thus interdiction efficiency. For

example, during the Rolling Thunder air campaign in North Vietnam, hundreds of sorties were flown against the Thanh Hoa bridge using unguided munitions. All attempts were unsuccessful and many aircraft were lost. During Linebacker, however, aircrews used laser guided weapons and rendered the bridge unusable on the first mission.[30]

FUTURE SCENARIOS

If interdiction has proven to be worthwhile in the past despite its drawbacks, under what circumstances may the U.S. find itself where interdiction would be a force employment option of choice again? If the scenarios of the future yield situations not vulnerable to interdiction coercion or support, there would be no need to bolster force structure to maintain or improve our capabilities. The Persian Gulf War, to the point of ground hostilities, was a textbook case of a scenario calling for interdiction. But was it an anomaly or is it representative of the future? Given the world conditions cited early in this paper, it is one of at least several in which the U.S. may find itself militarily involved requiring bombing in mass.

The first is a NATO type conflict involving the U.S. and allies against the Soviet Union and some semblance of a Warsaw Pact alliance. The Soviet military still maintains the largest and most threatening force to the U.S. and its interest anywhere in the world. To assume it away while the capability exists to

bring mass destruction on the U.S. would be irresponsible, despite the apparent lack of Soviet resolve or political inclination to maintain the cold war bipolar confrontation. The military consequences of this scenario have been the focus of over 40 years of analysis and massive bombing is an integral feature. The second is exemplified by the Persian Gulf War where a single party, or small number of allied parties, isolates itself from the world and commits an act of aggression contrary to the interests of the U.S. and the majority of the world body of nations. Rapid military force in large measure, including combined forces from the air, land and sea, may be the response of choice, and the U.S., as the world leader, would be a major contributor. The third is a case where an ally of the U.S. becomes involved in a regional conflict with a second state and the vital interests of the U.S. are threatened enough to galvanize political support for some U.S. military action. Aerospace power enables considerable and possibly decisive presence with minimum risk for large scale U.S. casualties. In all cases, the region involved will be quite distant from the continental U.S., will not have sufficient in-place forces and probably have to use some bases relatively far from appropriate targets.

AIR FORCE VISION

Against this backdrop of political possibilities, budget trends and DOD and JCS guidance, the Air Force published a White Paper, The Air Force and U.S. National Security: Global Reach - Global Power, in June 1990. It describes the

Air Force's perspective on how it can uniquely contribute to U.S. national security in the evolving world order because of aerospace power's speed, range, flexibility, precision and lethality. It emphasizes these characteristics because the

"combination of continuing and emerging threats to national security interests, proliferation of sophisticated weapons and reduced numbers of overseas U.S. forces...likelihood that U.S. forces will be called upon to defend U.S. interests in a lethal environment is high, but the time and place are difficult to predict"[31]

Providing versatile combat forces for theater operations and power projection is a major objective in the Air Force vision of future contribution to national defense strategy. The stated goal will be to "provide a rapid tailored response with a capability to intervene against a well-equipped foe, hit hard and terminate quickly."[32] The implication is a requirement for fast, agile and modernized conventional capabilities. The force must be able to deploy rapidly with minimal support and provide massive, persistent firepower across a wide area. Air Force Secretary Donald B. Rice summed up the concept in recent testimony to Congress when he said the Air Force is "intent on designing and fielding forces that are highly mobile and quite flexible, forces that can hit hard and be used in alternative scenarios...across the spectrum of conflict."[33]

CURRENT CAPABILITY

If Global Reach - Global Power represents the Air Force vision of its future, where is the Air Force now in achieving that objective in the role of interdiction? Operations Desert Shield and Desert Storm provide a proven

testimony of the Air Force's current capabilities to project force and are a departure point for analyzing the force structure requirements of the future. It is too early to assess the full campaign, but it is possible to review briefly the interdiction resources involved in that campaign and speculate on their future. At the onset of hostilities F-16, F-111, F-15E, F-117, and B-52 aircraft bombed precise military targets around-the-clock. They represent the bulk of the Air Force conventional interdiction inventory and performed spectacularly throughout the coalition air campaign.

F-16. This capable, multirole aircraft will be the predominant fighter in the U.S. tactical forces inventory for the future. It is highly maneuverable and able to accurately deliver a variety of munitions using visual and radar systems. The block 40/42 models are modified to carry low altitude navigation and targeting infrared for night (LANTIRN) pods enabling the system to navigate and bomb at night under the weather. Pilots trained in LANTIRN equipped F-16s can supplement the dedicated interdiction assets and bring firepower to bear on targets beyond the battlefield around-the-clock. There are, however, limitations to F-16 performance in the interdiction role. When configured with the pods and other required external stores, the F-16 has somewhat limited range and payload. Additionally, the high demand for alternative employment such as counterair or close air support, as well as the difficulty in maintaining trained crews, will likewise detract from its contribution in a sustained interdiction campaign.

F-111. The F-111 series aircraft have played a critical role in interdiction operations and planning since the A - model became operational in the late 1960s. The aircraft can travel great distances and carry a significant tonnage of a variety of ordinance. The various models have undergone continuing improvements to increase their all-weather navigation and night delivery capabilities. The most notable modification is the addition of the Pave Tack system to the F-111F, which is now capable of acquiring, tracking and designating ground targets for laser, infrared and electro-optically guided weapons. The highly televised video tapes from the Libyan raid and Desert Storm have documented this in detail.

F-15E. The F-15E dual-role fighter (DRF) is the newest addition to the interdiction inventory. It is a redesigned F-15D and is built to accommodate the LANTIRN system for day and night all weather penetration and weapon delivery. The "Strike Eagle" retains the F-15 air superiority characteristics of its predecessors but is enhanced to perform attacks on targets throughout the battlefield with both guided and unguided munitions. Like the F-111F it proved to be indispensable to the CENTCOM commander in the air campaign in Desert Storm.

F-117. The F-117 stealth fighter adds a penetration capability to the USAF inventory not before available, even with force packaging, which requires significant support assets. This specialized aircraft features design and material

innovations rendering it nearly impossible to distinguish on conventional radar receivers. Combining stealth, internal weapons carriage and specialized systems, it is an ideal complement to existing interdiction platforms. While its technical specifications remain classified, its performance in Desert Storm has documented its ability to deliver a lethal payload a long distance at night against specific high priority targets.

B-52. The B-52 adds significant weapons carriage and delivery capability to a CINC's interdiction options. Despite their extreme age in aircraft years, these bombers now have substantially improved avionics, infrared and electro-optical sensors, communications and electronic warfare equipment over those of the days of Linebacker. They remain a viable and coveted weapon system against a variety of targets, especially when operating in an environment of air superiority, such as the Desert Storm campaign.

THE FUTURE

In analyzing force structure decisions of today for the near-term, it is appropriate to think about the longer-term future and what might be available to the CINCs of tomorrow. With the early successes of the sea-launched Tomahawk missiles in the Persian Gulf War, there will be increased Air Force research and development effort on conventional cruise missiles and other standoff weapons. There will continue to be research on unmanned aerospace vehicles with intent of increasing their flexibility and lethality for future

employment. Stealth enhancements will certainly continue to be a high priority for both manned and unmanned vehicles. At the rate of technology advancements today, it is not beyond realistic expectations that eventually the U.S. will develop space-based weapons with an energy transfer capability or some other form of advanced technology weapon not now imaginable. While any or all of these options may possibly evolve into operational assets, they nevertheless represent an undetermined amount of time and money in development, testing and fielding. They will also need political support to receive sufficient funding for development. Given today's climate vis-a-vis the budget and perceived threats, gaining that support will be a difficult task. In the interim there is a requirement to improve today's capabilities and meet the evolving threats that will exist in the postulated scenarios. What is the future of our current force?

F-16. As mentioned earlier the F-16s will be the most prevalent weapon system in the Air Force tactical inventory beyond the turn of the century. As an interdictor, it will retain its limitations, especially in the areas of range and payload. The LANTIRN capable aircraft with trained pilots will combine to provide a valuable, although somewhat restricted, contribution to the around-the-clock interdiction campaign.

F-111. The F-111s are old and with the exception of the F-model are being phased out of the combat inventory. There is only one wing's worth of F-models, with a fleet average age of well over 15 years. This total is subject, of

course, to combat and peacetime attrition without replacement. With modifications and operational limitations, they can sustain a lethal and viable place in the inventory for the near-term, but they will become a major concern and expense after the turn of the century. In fact, the Air Force plan for the past decade has been to retain the F-111s only until the Air Force version of the Navy's stealthy A-12, or Advanced Tactical Aircraft (ATA), was introduced into the inventory as a replacement interdiction platform. The Commander of the U.S. Air Forces in Europe, in preparation for testimony to become Chief of Staff, said in a letter response to inquiry that the ATA would be used for the deep attack mission currently done by the F-111s, which would approach the end of their service life after the turn of the century. He emphasized at that time the importance of continuing the development of the ATA should the threat of F-111 airframe life require acceleration of the ATA program.[34] Less than a year later the Secretary of Defense announced the cancellation of the ATA for program performance reasons, but did not concurrently announce any changes in the threat or requirement for what the ATA was supposed to do.

F-117. The F-117 will continue to provide its unique contribution to the CINC's arsenal. However, this high value asset is limited to its current inventory of approximately two thirds of a wing less attrition. In each of the envisioned political scenarios, it would be called upon to conduct night operations at a rate highly dependent on its peculiar basing needs. There may

be situations or locations which would preclude other than out of theater operations, thereby limiting its impact.

F-15E. The dual role F-15E is a, if not the, principle component of the Air Force's current interdiction modernization effort. With its sophisticated systems, growth potential, flexibility in contributions to the battle, designed reliability and maintainability and newness, it represents a substantial capability for the next several decades. Its final procurement total is only 200 of the originally planned 392, yielding an eventual combat inventory of only two wings.[35]

BOMBERS. Like the F-111, the B-52 has been a stalwart component of the Air Force conventional capabilities for years. The FY-92 budget only funds approximately 40 of the current total inventory of conventional B-52Gs. This compares to the 170 used in the Vietnam War and retains a fleet with an average age in excess of 30 years.[36] With the cloudy future of the B-2 and only 97 B-1s, the FY-92 budget retains all remaining B-52Hs (approximately 130) for the strategic nuclear deterrence role, a mission they will likely retain until they retired from the active inventory. [37] The bomber equation has a number of variables to consider, including START, the future of the triad and the final buy of the B-2. Under any circumstance, the future of the manned bomber in strategic nuclear operations will not be resolved in the near-term unless driven by budgetary reasons. This would result in a further reduction to an already limited force. There is little prospect, then, of a substantial boost beyond two B-52G

squadrons for conventional interdiction options in the inventory.

CONCLUSION

The political world is dynamic and unpredictable. The military threat is unclear. The defense budget is finite and decreasing. Air Force programmers and planners have not been provided a clear national strategy and subsequent military strategy to guide force structure decisions that will shape the force of the immediate and intermediate future. Interdiction is a force employment option effectively exercised in all U.S. wars since World War II. Interdiction is a cornerstone of Air Force contribution to the national defense and consistent with its far reaching Global Reach Global Power perspective of the future. In any scenario envisioned in an uncertain political environment, around-the-clock interdiction capability will remain absolutely indispensable to the National Command Authority and theater CINCs. Traditionally, the sortie allocations toward interdiction have run at least 33-50 % of total theater sorties with a large number achieved by large and medium bombers. Today's U.S. Air Force interdiction assets are primarily fighters and fighter bombers and are as formidable a force as any ever assembled in history. The inventory of dedicated interdiction assets in the form of F-111Fs, F-117s and F-15Es, however, is and will remain only approximately 10% of the tactical force structure. As the near-term fighter force down-sizing materializes, the interdiction fleet will shrink to

one wing of F-111Fs, slightly less than two wings of F-15Es and two thirds of a wing of F-117s as primary interdictors capable of around-the-clock operations. This force can be supplemented by several hundred LANTIRN equipped F-16s and approximately 40 B-52s.

The distant future will no doubt have space-based weapons, sophisticated unmanned vehicles and super-smart cruise missiles. Between these periods, however, is a problem that must be addressed now. The F-111s will attrit and become a liability logistically, unaffordable sometime after the turn of the century. The same will be true of the B-52s. The F-117 is highly capable and will be improved, but is limited in number and employment options. The bomber force is becoming not only extremely small but expensive to the point of questionable utility as a conventional bomber. Until recently, the answer was the ATA. It offered stealth, combined with range and payload as well as a sufficient quantity to provide a credible capability to perform the interdiction mission in combination with remaining resources. It has been cancelled. There will be long and hard looks at suitable replacements. Everything from variants of the cancelled version to altered F-14s, F-16s, F-18s or Advanced Tactical Fighters (ATFs). While one of these may be the answer, time and money will delay its development and acquisition for a period beyond the turn of the century.

Tomorrow's war will be come as you are. The answer is to increase the

buy of the F-15E by approximately 100 to give the Air Force three wings. This will provide a proven replacement for the F-111Fs that can bridge the gap until the new technologies can reduce the requirements for fighter force structure. This system more than meets the needs identified as weapon system success factors identified earlier in the paper. It is capable of night and all-weather operations and can carry a significant payload a considerable distance. It enables the CINCs to apply the principle of mass to the battle. The platform offers the flexibility to be used in the air-to-air role, if necessary, in addition to the around-the-clock interdiction campaign. It would have the force life to provide an alternative platform for support roles such as reconnaissance or enemy air defense suppression when the advanced interdiction assets enter the inventory. Cost and politics are issues. Buying the F-15E is more expensive than buying F-16s. This, with a variety of political considerations and conflicting Air Force requirements, elevates the decision above operational questions and complicates the process. In the interest of national defense and military preparedness, however, the prudent course is to reconsider and buy the additional F-15Es. The FY-92 budget has gone from the President to Congress and closes the F-15E line. The Department of Defense will need to request a supplemental budget to pay for the Persian Gulf War. It is in the best interest of the service and nation that a portion of the supplemental be used to arm the nation with another 100 F-15Es.

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