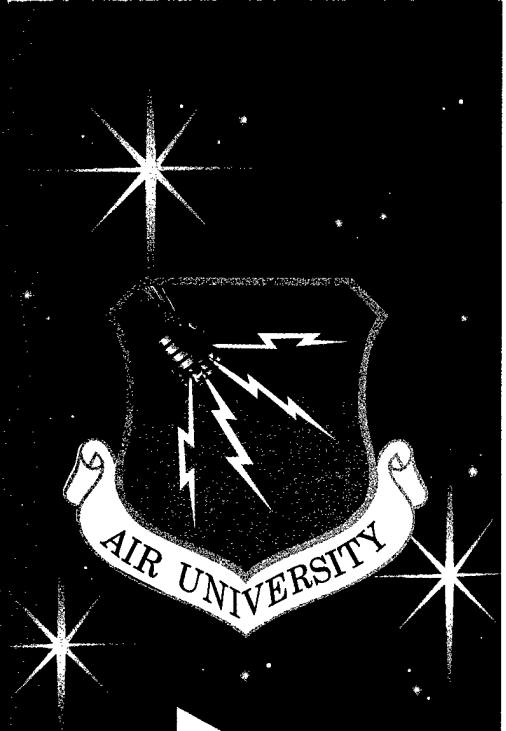

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De-Ranged

Global Power and Air Mobility for the New Millennium

Robert A. Colella, Lt Col, USAF

School of Advanced Airpower Studies

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Global Power and Air Mobility for the New Millennium

ROBERT A. COLELLA, Lt Col, USAF
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Abstract

This is a story of long-range airpower, from Gen Henry H. "Hap" Arnold's vision of a global mission to the Global Strike Task Force and expeditionary air forces of the year 2001. It examines global power from its origins as Strategic Air Command built a fleet of bombers and tankers to meet the needs of the global nuclear-deterrent policy of the Cold War. With the end of the Cold War and the changes in force structure that followed, USAF soon lost its historical roots in global power. This evolution is traced through the studies and commissions of the 1990s established to determine the force structure for the twenty-first century. The assumptions that were made to develop a force focused on expeditionary short-range airpower to project global power are established and then examined with four case studies in the application of airpower over long range. Operation Nickel Grass, the US airlift to Israel during the 1973 Yom Kippur War; the British airpower experience in the Falkland Islands War with its Vulcan Black Buck missions; Operation Eldorado Canyon; and Operation Desert Strike are used to provide evidence to support and refute the assumptions made during the 1990s to structure the USAF force structure around short-range expeditionary forces with the intention of forward deploying them in a crisis. These case studies are evaluated and recommendations are offered for the force structure of the twenty-first century to ensure an adequate global power force capable of executing a global power strategy. The conclusions of this study do not make recommendations for long- or short-range airpower but rather offer recommendations for methods to enable those forces in the future with a sturdy in-flight refueling force capable of supporting long-range missions free from the entanglements of foreign support and reliance on forward basing.

About the Author

Lt Col Robert A. Colella (BS, United States Air Force Academy [USAFA]; MS, Louisiana State University, Shreveport) received a regular commission from USAFA in May 1986. After graduation from undergraduate pilot training at Williams AFB, Arizona, in 1987, he was assigned as a pilot in the B-52G at Wurtsmith AFB, Michigan, from March 1988 to March 1992. During this tour he performed nuclear alert duties in the B-52 and upgraded to aircraft commander. He was reassigned to Castle AFB, California, in 1992 to the 34th Bomb Squadron attached to the 366th Composite Wing, Mountain Home AFB, Idaho. During this tour Colonel Colella upgraded to instructor pilot, B-52G, and was selected for the USAF Weapons Instructor Course. After graduation from Weapons School, he was assigned to B-52H Formal Training Unit duty at Barksdale AFB, Louisiana, from July 1994 to July 1996. He was selected for the B-2 program at Whiteman AFB, Missouri, in 1996. From June 1996 to June 1999, Colonel Colella was a B-2 mission commander, instructor pilot, and the wing weapons officer for the 509th Bomb Wing. He was the strike planning chief for all B-2 sorties flown in Operation Allied Force and was a member of one of the first crews to fly the B-2 into combat during a 30-hour combat mission. As a senior pilot with more than 3,000 flying hours, he was awarded the Air Force Air Medal for his missions over Kosovo and has also been awarded the Meritorious Service Medal. Colonel Colella is a distinguished graduate of Squadron Officers School and a graduate of Air Command and Staff College and the School of Advanced Airpower Studies. In July 2001, he was reassigned to the Pentagon, AF/XOOC—Checkmate. Colonel Colella is married to the former Katherine Page, and they have two children, Allison and Sam.

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Chapter 1

Global Power for America

Russia . . . does fear our long-range Strategic Air Force, which she cannot as yet match, or as yet understand. In the Strategic Air Force, coupled with our atomic bomb, at this writing we hold the balance of power in the world.

—Gen Henry H. "Hap" Arnold
Global Mission

Vision for Global Power

Gen Henry H. "Hap" Arnold envisioned a "global mission" for airpower where the force structure would meet the challenges of "range, fire power, [and] bombload" to provide what "we [Arnold and Brig Gen William "Billy" Mitchell] all preached and hoped for . . . the [strategic] independent function of airpower in which we had so long believed."[1] The force structure born under General Arnold in World War II matured within Strategic Air Command (SAC) to provide the global mission of nuclear deterrence throughout the remainder of the twentieth century. Although SAC dissolved in June 1992, the Air Force did not lose its vision of a global mission for airpower. Secretary of the Air Force Donald B. Rice's *Global Reach—Global Power* white paper in 1990 was the vision for the future without the Soviet Union as a focus for the global mission. With the disbanding of the Soviet Union, a New World Order emerged where threats, conflicts, and obstacles shared uncertainty as their most common attribute. In the United States, pressure to downsize and the promise of a peace dividend led to smaller military budgets that supported a shrinking force burdened by a mission clouded by uncertainty. Although downsizing meant the withdrawal of forward-deployed units around the world, the strategy outlined in *Global Reach—Global Power* committed America to both the presence and the ability to influence events militarily across the globe. The end of the Cold War also brought demands for thrift and limits on the research, development, and acquisition of new weapon systems to meet the undefined challenges of the New World Order. It is within this context that the strategy contained in *Global Reach—Global Power* and the force structure to support it evolved as the United States entered the twenty-first century.

Global Reach—Global Power detailed a post–Cold War strategy to rapidly deploy forces and assume a forward presence to assure regional stability and firepower wherever required. Within this strategy, long-range forces were central to satisfying "global responsibilities requir[ing] capabilities independent of the need for mobilization and the political baggage sometimes inherent in that process."[2] Strategy, however, as Carl H. Builder

points out in his book *The Masks of War,* "is not the only determinant of the purposes and kinds of military force. Institutional preferences, technological developments, [and] opposing forces [all] influence . . . the acquisition of military capabilities." Builder also points out that strategy should be an honest broker and work outside of the external influences of its "formulation and application."[3] As Builder explains, "If strategy does not adequately take into account or allow for service predilections or differing interpretations of the threat, the military forces will be driven to some degree by factors omitted from strategy. Strategy should drive the forces; if it does not it may reflect the inadequacies of a particular strategy rather than the proper role of strategy."[4]

This study asks whether the strategy contained in *Global Reach—Global Power* has evolved credibly with a force structure to project power globally in the twenty-first century. Do the needs of the global power strategy drive the force structure or, as Builder warned, do the "externalities" of institutional preference play too large a role in shaping the force structure?

Definition

Global power is rooted in the World War II and Cold War images of waves of aircraft conducting the long-range strategic attacks described in General Arnold's *Global Mission.* The force structure built to support these global missions was considered "strategic." As the Cold War ended, definitions for the terms *strategic, operational,* and *tactical* blurred until airframes and their ranges no longer defined the scope of a mission. More importantly, the term *global power* is no longer synonymous with the terms *strategic* or *nuclear.*

Vernacular, however, has a tendency to polarize issues. The concept of global power found in various vision and strategy documents requires a basic definition for use as a reference point. Since 1990 the term *Global Reach—Global Power* has taken on a variety of monikers. In 1997 it was rechristened *Global Engagement,* but in 2000 it became a part of the large concept of global vigilance as *Global Strike.* Regardless of etiology, the concept behind the strategy has remained the same. For the purpose of this work, the term *global power* refers to operations employing military power that must surmount long distances to strike or operate effectively. Historically, this brings to mind long-range SAC bombers on nuclear missions; however, as defined here, global power does not depend on an airframe or a service. An aircraft carrier that sails into a regional hot spot and uses airpower in pursuit of national interests of the United States represents an application of global power. A B-52 that launches conventional air-launched cruise missiles (CALCM) after flying halfway around the world is a projection of global power. An air expeditionary force (AEF) that deploys to a theater to provide a "presence" is a projection of global power. A C-5 that delivers humanitarian aid to drought victims in Africa is an application of global power. Regardless of the manifestation, in the

calculus of applying airpower, global power represents the ability to do so over long range or distance. For this study, the focus is the role that USAF plays in global power and how well the force structure at the turn of the millennium was prepared to meet the challenges of applying airpower over the ranges demanded in the twenty-first century.

Methodology

The origins of the concept of global power will be covered first. After analyzing how the strategy and force structure Air Force leaders created after World War II met the needs of the Cold War, the transition to the post–Cold War strategy of global power will be evaluated. In the decade following the end of the Cold War, multiple studies—many directed by Congress—addressed the question of the proper airpower force structure to meet the challenges of the twenty-first century. In each of these studies, assumptions were made to justify the proposed force structure. Those assumptions are applied while evaluating several historical case studies of global power to test their validity. After evaluating the assumptions used to justify the current force structure, recommendations for the future are offered to ensure the continued credibility and capability of US global power strategy.

The two chapters that follow examine the evolution of the strategy of global power from World War II through the Cold War and into the year 2001. The purpose of examining the evolution of the strategy is twofold: first, to evaluate the match between SAC's strategy of nuclear deterrence and the force structure it built to support it and second, to evaluate the validity of the assumptions applied after SAC stood down to determine if they drove the creation of a force structure to meet a strategic imperative or if externalities trumped formulation of sound strategy. In chapter 4, four case studies on the use of global power are presented to offer historical evidence of global power missions and the obstacles those missions had to contend with. Chapter 5 evaluates the assumptions used to justify the post–Cold War force structure of 2001 using the evidence presented in the four case studies and makes recommendations for the future force structure. Chapter 6 provides a synopsis and conclusions about global power strategy as America faces the challenges of the twenty-first century.

Notes

1. Gen Henry H. Arnold, *Global Mission* (New York: Harper & Brothers, 1949), 156.
2. *The Air Force and U.S. National Security Strategy: Global Reach—Global Power*, white paper, with a foreword by Secretary of the Air Force Donald B. Rice (Washington, D.C.: SAF/OSX, June 1990), 7.
3. Carl H. Builder, *The Masks of War: American Military Styles in Strategy and Analysis*, research study, RAND (Baltimore: Johns Hopkins University Press, 1989), 56.
4. Ibid.

Chapter 2

World War II Origins and Cold War Maturity

[T]he development of the four-engine bomber . . . was such a turning point in the course of airpower—of world power.

—Gen Henry H. "Hap" Arnold
Global Mission

Introduction

Carl von Clausewitz proposes that strategy "assigns a particular aim to" the means used within an engagement.[1] Similarly, strategy is responsible for connecting the military capabilities of a state to the ultimate interests of that state. Clausewitz also states that war is a continuation of politics, and it is policy that "converts the overwhelming destructive elements of war into a mere instrument. It [policy] changes the terrible battle sword [when required] . . . into a light, handy rapier—sometimes just a foil for the exchange of thrusts, feints and parries."[2] Policy determines the character of war, and ultimately policy determines strategy. For military planners, strategy should dictate the military capabilities a state needs and should permit military planners to advise policy makers what to do with those forces once they are constructed. If American strategy is to engage globally, then military planners must recommend a force structure capable of projecting airpower around the globe in pursuit of US interests. The global power capabilities the United States had at the end of the Cold War were the product of an evolution of strategy and force structure since the conclusion of World War II. To better understand why that force structure was constructed, it is important to understand the context of its evolution.

Between the Wars

Prior to World War II, aviation theory and development in the United States had to contend with budgetary restraints imposed by isolationist political leaders backed by public opinion. Regardless of whether it was "battleships, bombers, or the United States Infantry Rifle, Model 1903 . . . America wasn't buying any" in 1936.[3] In spite of these fiscal constraints, air leaders recognized the potential of long-range aircraft to both threaten and defend the United States. Therefore, airpower advocates pushed hard for technical improvements to overcome the tyranny of range. The B-17 was an aircraft built for long-range strike; however, isolationist sentiment

forced its true "strategic" nature to masquerade within the "tactical" mission of defending the US coast from attack by sea. Maj Gen Oscar Westover, chief of the Air Corps, "related his plea for a stronger air force to the military dangers abroad" and made this point when addressing the National Aeronautical Association in November 1936: "If and when the great European conflict occurs, the only way in which the neutral nations in the world can keep out of that conflict is to have such a strong national defense that none of the belligerents involved dare violate their neutrality."[4]

General Headquarters and Coastal Defense

In the same year, Maj Gen Frank M. Andrews, commander of General Headquarters Air Force, made similar arguments for long-range aircraft for coastal defense. In his opinion there was an inherent economy in the efficiency of longer-range patrols. He also noted that larger aircraft such as the B-17 were "especially useful for coastal patrol," carrying more defenses to protect against attack.[5] He was also emphatic that "the air weapons under development were purely defensive saying 'It is utterly absurd to consider them as anything else and I think we should emphasize this point on all occasions.' "[6]

Maj Muir Fairchild, then an instructor at the Air Corps Tactical School (ACTS), in 1939 listed three priorities for air in national defense:

- prevention of establishment of hostile air forces in threatening positions and the defeat of such forces as might have become established;
- destruction of enemy surface expeditionary forces at sea and defeat of such elements as may have gained a beachhead; and
- defeat (in cooperation with the Navy or independent thereof) enemy sea forces within range, so as to protect sea-lanes.[7]

Based on performing these "defensive" missions, development of the B-17, B-24, and B-29 aircraft was pursued vigorously before World War II. Although the capabilities of these aircraft to perform coastal defense was advertised, the long-range offensive strike potential of these aircraft is what really excited the officers of ACTS. ACTS theories of strategic bombing were developed with aircraft such as the B-17 and the B-29 in mind.

ACTS and *Air War Plans Division—Plan 1*

On the eve of World War II, the offensive bombing strategy to defeat Germany culminated in a document titled *Air War Plans Division—Plan 1 (AWPD/1)*. Under the guidance of General Arnold, the Air War Plans Division (hence the title, *AWPD*) was a subordinate organization to the Army general staff's War Plans Division.[8] Created by a team heavily influenced by the theories of ACTS, *AWPD/1* "represented the final development of American air doctrine prior to our entrance into World War II and was to serve as the actual blueprint for air operations against the Axis." The plan called for strategic bombing of "the National Economic Structure"[9] of an

enemy nation and required intelligence about the enemy's economy, an accurate bombing system, and self-defending bombers in large numbers in order to be successful.[10]

To accomplish the plan and execute its strategy, *AWPD/1* advocated creating a force of the following:

- 10 groups medium bombers—B-25, B-26;
- 20 groups heavies—B-17, B-24; and
- 24 groups [very] heavy—B-29, B-32.

In addition, provisions were made for 33 groups of super bombers (4,000-mile radius), or what eventually became the B-36.[11]

The United States entered World War II with its two "super eggs"—the B-17 and the B-29—as the outgrowth of a substantial and sustained interwar development program designed to increase performance parameters of long-range aircraft.[12] *AWPD/1* provided a template for the force structure to accomplish the strategic bombing mission and ensured that the force would have the range qualities to meet the challenges the United States would face in each theater of World War II.

World War II—Europe

As the United States entered the war in Europe, the White House pressed air leaders for results. This action caused the Army Air Corps to rush into the combined bombing offensive with its *AWPD/1* strategy of daylight high-altitude precision bombing without the numbers of aircraft, or force structure, needed for the strategy to work. Poor intelligence about the German economy, poor accuracy—due in part to bad weather—and the inability of the small formations of B-17s to penetrate and survive in daylight produced heavy American losses and little impact on the German economy. It was not until February 1944, when Gen Carl A. "Tooey" Spaatz took command of the American effort, that tangible degradations in oil, transportation, and the Luftwaffe were noted.[13]

Many factors worked together to produce victory in Europe. The introduction of the P-51 helped protect the bomber formations and, simultaneously, contributed to the overall decline in strength of the Luftwaffe. The ground offensives by the western Allies and the Red Army also made the bomber attacks on transportation, petroleum, oil, and lubricants more effective. Airpower, while significant, was not clearly decisive in the eventual defeat of Germany.[14]

Fortress Britain provided the forward operating bases for US bombers to reach the European mainland and the heartland of Germany. Without this forward operating location, the United States would have been forced to fight at a greater distance. The initial shock of Nazi Germany's success in Europe convinced strategists that the United States might be forced to fight Germany *from* the United States and drove the requirement for an

intercontinental bomber. The B-36, which evolved from this requirement, was designed to overcome the range problem of flying unrefueled missions to Germany from the United States in the event that Britain fell.

The World War II strategy to bomb the industrial heartland of Germany faced problems of range, forward basing, and access to Britain. Aircraft were developed and envisioned prior to the war to meet the needs and challenges of this strategy. B-17s and B-24s operating from the "unsinkable" aircraft carrier that was Britain provided the global power needed to project force in the European theater. The force structure, while not capable of producing the results outlined in the strategy, was designed to surmount the range requirements and represented the best technical solutions to the problems at that time.

World War II—Pacific

In the Pacific theater, range was also the major obstacle for the effective employment of airpower. The B-29 dominated this theater with its 4,000-mile range, but it was not until naval and marine amphibious campaigns captured forward bases within range of Japan that B-29s were able to take the fight directly to the enemy heartland.[15] In a joint effort, the services worked together to secure and then exploit access within the region to execute the long-range airpower strategy against Japan. With the bloody seizures of the Mariana Islands and Iwo Jima by the Navy and Marine amphibious forces, brute force overcame the need for a technological solution to aircraft range limitations in the Pacific. From the Marianas, Maj Gen Curtis E. LeMay's B-29s could range the Japanese homeland, while fighters flying out of Iwo Jima could provide cover for the bomber streams.[16] The B-29's service ceiling of 30,000 feet allowed it to outperform many of the defenses arrayed against it; however, the winds at these higher altitudes over Japan led to ineffective bombing results and the need for a different bombing strategy.[17]

AWPD/1 drafter Brig Gen Haywood S. Hansell commanded XXI Bomber Command in the Pacific. *AWPD/1* called for targeting critical nodes; but in Japan the wartime economy was dispersed, and critical nodes did not exist. Hansell failed to modify his strategy in the face of poor results in Japan. General LeMay replaced him and used the flexibility inherent in airpower to pursue a different tactic in the strategic bombing campaign.[18]

On 9 March 1945, LeMay attacked the city of Tokyo with B-29s loaded with incendiary bombs. Attacking individually and at night, the 300 aircraft were stripped of their guns and flew with reduced crews to increase bomb loads from six to eight tons. To reduce engine mechanical trouble and to mitigate the bombing errors induced by the jet stream above 20,000 feet, the crews flew at low altitude—between 5,000 and 8,000 feet. The lead bombers used radar to aim on the city of Tokyo. The incendiary weapons they dropped set fire to the city and provided a visual aiming ref-

erence for the follow-on bombers.[19] On this raid, few B-29s were lost to air defenses—while 16 square miles of the city burned, inflicting more than 80,000 casualties.[20] The success of this raid inspired LeMay to switch to a strategy of burning every major city in Japan. Just as his goal was within reach, the Japanese surrendered when the atomic bombs were dropped on Hiroshima and Nagasaki. Throughout his tenure as the commander of XXI Bomber Command, LeMay carried with him an understanding of the price the United States paid in blood to gain forward bases for B-29s in the Pacific.

The precision bombing strategy prescribed by *AWPD/1* did not work in the Pacific due to the nature of the target and the available technology of the time. LeMay's genius as an airman was in adapting his strategy and taking advantage of the flexibility of airpower to accomplish this mission. The flexibility of the B-29 allowed him to adapt the long-range bomber for effective attacks against the Japanese homeland continuously as he modified his bombing strategy. When LeMay became the commander of SAC years later, he would remember the cost and time required to gain forward bases and the flexible nature of airpower to adapt itself to the requirements of its mission.

World War II—Aftermath

World War II ended with a force structure limited in range and dependent upon forward bases to reach targets located outside of the United States. In-flight refueling did not emerge as a viable solution to the problems of range in World War II. The "silver bullet" atomic weapons over which the United States had a monopoly required a credible force structure and strategy for their delivery. As the Cold War began, solutions for the problems of range and forward basing were needed to make the air-atomic strategy of deterrence viable.

The Cold War—Strategic Air Command

After World War II, strategy for the use of airpower focused on deterrence and containment of the Soviets with the threat of atomic weapons. President Harry S. Truman held a tight line on the military budget. The budget fell from its World War II high of $45 billion in fiscal year (FY) 1946 to $14.5 billion in FY 1947.[21] Truman's $11 billion FY 1949 budget only supported 11 of 25 requested Army divisions, 277 of 300 requested ships for the Navy, and only 48 of 70 groups requested by the Air Force.[22] With an overall Defense Department budget of only $11 billion, battles over roles and missions were furious, with the fate of each service's future hanging in the balance. For Truman the strategy of nuclear deterrence was purchased as a cheap life insurance policy for the "worst case" scenario; and, like life insurance, it only insured against the "least likely" ca-

tastrophe. SAC's force structure to support the strategy of nuclear deterrence was incapable of accomplishing its mission until after the Berlin crisis when General LeMay took charge and equipped SAC with a credible force structure of bombers and tankers.

On 21 March 1946, SAC was formed as the lead agency within the Army Air Forces (AAF) for building a credible nuclear-deterrent threat.[23] As an added pressure, the raison d'être for an independent air force was the strategic bombing mission placed in SAC's care. Gen George C. Kenney was the first commander, and he made little headway under Truman's tight budgets and research and development constraints. In 1947 SAC's ability to deliver conventional and atomic weapons to enemy targets depended on forward bases in Western Europe, the Far Pacific, and the Arctic region. With 160 B-29s, of which only the 27 assigned to the 509th Composite Bomb Group were nuclear capable, SAC hardly represented a credible atomic deterrent to the Soviets.[24]

For SAC to have credibility as a deterrent force, it would have to be able to strike the Soviet Union within a week's time—the time estimated it would take for the Soviets' enormous conventional forces to overrun Germany and France.[25] The 27 "Silver Plate" B-29s that were modified to carry atomic bombs followed procedures that required five to six days to depart Roswell Field to proceed to a storage location to load atomic weapons. Once loaded they would fly to a forward base in range of the target and recover and refuel before launching a retaliatory nuclear strike.[26] These procedures, coupled with the 4,000-mile range of the B-29, severely limited options for American strategists. Just as in World War II, the issue of range limited strategic options for effective airpower strategy. Consequently, the force structure developed after World War II and the procedures for its use did not support either the policy of containment or nuclear deterrence. It was, as Harry Borowski states in his book, a "hollow threat."[27] SAC did have a weak retaliatory capability, but it did not have a credible threat to deter the Soviets from a fait accompli in Europe. The force structure did not support the timing, flexibility, or range required for the missions the nuclear-deterrent force faced. Methods to build that force structure evolved after events in Berlin catalyzed US fears.

General LeMay took command of SAC in October 1948 on the heels of the Berlin airlift and in an atmosphere of renewed national and presidential support for the creation of a credible air-atomic strategy as the bedrock of deterrence.[28] To capitalize on the new attitude of the national leadership toward developing effective instruments of deterrence, LeMay called upon his personal experiences as an air leader and strategist in World War II. He realized that intercontinental bombers that required forward bases were vulnerable to preemptive strikes that would deny the use of those forward operating locations. "Many doubted that bases in England and the Middle East could endure . . . at the outset of a war . . . A solution to the problem of intercontinental reach became essential."[29] That solution would depend upon overcoming the tyranny of range in-

volved in striking the Soviet Union from bases in the United States. The B-36 represented one option to match force structure to strategy, forward basing for ground refueling was another, while in-flight refueling represented a possible third alternative solution.

The B-36

Building an aircraft with intercontinental range was SAC's first attempt at building a force structure to meet the needs of the deterrent strategy. Although the B-36 was originally designed to permit American airpower to strike continental Europe if Britain fell, in 1943 it was earmarked for use in the Pacific in the event B-29 production problems could not be surmounted.[30] Ultimately, the B-29 was fielded in time to see combat in World War II; and the B-36's own developmental problems delayed delivery until well after VJ-day. The 10,000-mile range of the B-36, more than double that of the B-29, represented a method for attacking the Soviet Union directly and rapidly from the United States.[31] The B-36's deterrent value surpassed that of forward-deployed B-29s and made sense economically, as aircraft were cheaper than the costs associated with supporting all the possible forward locations a short-range force required.[32]

By the time the Air Force became an independent service in 1947, the B-36 was plagued by developmental problems. In addition, test flights had revealed its many vulnerabilities. The phenomenal range of the B-36 was purchased at the cost of increased size and poor speed over the target. Its size made it more vulnerable to air defenses, and the aircraft required construction of very long and robust runways to support its massive weight. These and other performance factors served to "prove [the super bomber's] own fallacy and insure its own oblivion."[33] In spite of its technological sophistication when conceived, the B-36 was too vulnerable at the start of the Cold War to survive as the cornerstone of an air-atomic strategy of deterrence. It revealed the marginal utility of increasing size to enhance long-range aircraft. Instead of carrying all the fuel required to conduct a 10,000-mile mission from takeoff to landing, air leaders contemplated two alternatives: continued use of forward basing and the development of tanker aircraft to perform refueling in flight.

Garrison Strategy

In 1952 the Air Force strategy for nuclear war depended upon forward basing of medium-range B-29 and—by 1954—B-47 bombers. USAF planned to build 82 overseas bases to support its "reflex" mobility plan.[34] This strategy called for a permanent forward presence with some of the force, while retaining the ability to rapidly deploy forward hundreds of bombers upon strategic warning during a crisis. This strategy was designed specifically to meet the threat posed by an expansionist Soviet Union and was "underwritten by a ring of alliances and bases around the Soviet Union." The RAND Corporation was tasked in 1953 to study the

process of designing a base structure to meet the needs of this strategy. The findings of their study, "Selection and Use of Strategic Air Bases," actually became the catalyst to "a much more secure strategic capability" and determined the strategy and force structure of bombers and tankers SAC maintained until it was dissolved in 1992.[35]

The RAND study looked at various options available at that time for force structure and concepts of operation to perform nuclear strikes. The study discounted the idea of a "single stage" bomber, like the B-36, without refueling of any kind as "the cost to buy and operate bombers big enough to reach targets without refueling was found to increase at an accelerated rate with distances from bases to targets."[36] The project concluded "that for the period through 1961 . . . no bomber was likely to be capable of operating at full intercontinental radius without any refueling whatsoever."[37] The other options examined consisted of

- systems where bombers would deploy to forward operating locations within striking range of targets,
- a system where bombers would refuel in flight in missions flown from the United States, and
- a system where the bombers would ground refuel at forward bases in range of the targets during missions flown from the United States.[38]

While RAND determined that forward-basing solutions were the most economical, they discovered that this option was also the most vulnerable to a Soviet first-strike attack. RAND determined that basing the bombers where they would have the maximum warning time in case of an enemy first strike and refueling them in the air was the most *survivable* option. Based on this discovery, RAND recommended that the best location for bomber bases was in the northern tier of the United States. Far from the coast and deep in the interior of the United States, the bomber fleet would have time to launch on warning of attack and ensure a retaliatory strike capability. While RAND did look at ground-refueling options, they were discarded as being too predictable and presenting the Soviets with a concentrated and vulnerable target once the bombers were on the ground.[39]

The RAND study started out as an assessment for the most efficient way to choose forward bases. However, its conclusions called for a radical change in force structure as forward-basing options for nuclear operations were proven to put US strategic retaliatory forces at great risk of not surviving a first strike.[40] This drove the force structure to acquire long-range bombers with in-flight refueling capability and a fleet of tankers to support the long-range operations of the air-atomic strategy.

The Tanker—World War II

In the Pacific, the United States did not have the "reach" to bomb Japan directly until its forces gained a foothold in the region within range of the

home islands. Although Capt Ira C. Eaker demonstrated it in 1929 in the Question Mark, in-flight refueling was not adopted during World War II. It could have extended the range of escort fighters in Europe and permitted operations across larger swaths of the expansive Pacific, but in-flight refueling was never employed as a capability. In the spring of 1943, in-flight refueling between a B-24D tanker and B-17E was demonstrated; and although the concept was viable, it seemed too difficult a tactical application within the large bomber formations used in Europe. In the Pacific, the concept of using a B-24 to increase the range of the B-29 was studied; but the marginal return offered in range did not justify the time it would take to modify the B-29 fleet.[41]

The Tanker—Cold War

During the Cold War, the B-36 pointed to the need to find a method of increasing range other than increasing the size of the airframe. Faced with a similar problem for escort fighters in World War II, the AAF eventually developed drop tanks. During the Cold War, the solution for long-range bombers was in-flight refueling.

For a long period, air refueling was not considered a solution to the problem of range. Engines with lower fuel consumption and performance tradeoffs in speed were the popular constraining variables.[42] Solutions to the range problem included General LeMay's one-way mission concept that would "expend the crew, expend the bomb, [and] expend the airplane all at once."[43] Faced with the obvious morale problems of this approach, more rational approaches—such as forward bases for ground refueling on the way to the target for missions launched from the United States—were considered. However, in-flight refueling, which had a record of success with past demonstrations, was pursued as a more survivable and economical solution to the vexing problem of range.[44]

A force structure of bombers and tankers emerged in 1948 as B-29s and B-50s were modified as receivers, or "ruralists." They were also modified as tankers, or "supermen," and redesignated as KB-29s and KB-50s.[45] In-flight refueling training missions were soon common; and on 22 March 1949, a specially outfitted B-50A bomber, Lucky Lady II, completed the first nonstop around-the-world flight utilizing in-flight refueling from KB-29 tankers. The 92-hour mission covered nearly 24,000 miles.[46] The problem of overcoming range was no longer tied directly to aircraft size or forward basing for the bomber. Only the tankers risked the vulnerability inherent in forward basing.

KB-29s and KB-50s were replaced by KC-97s. Although still a propeller-driven design, it was better suited to match speeds with the all-jet bomber fleet of B-47s and B-52s. In January 1957, three B-52s—the lead aircraft christened Lucky Lady III—flew around the world in 45 hours and 19 minutes using the support of 98 KC-97s.[47] In 1957 the first all-jet

tanker, the KC-135, entered service and provided a better match for the speed and altitude of the fleet of jet-engined bombers. The B-52/KC-135 combination was stationed at SAC bases in the northern tier of the United States, from which they were able to strike the Soviet Union independent of forward bases. This force structure fit the needs of the strategy and became the model for SAC to provide nuclear deterrence with long-range global power projection.[48]

Tactical Air Command (TAC) took SAC's discarded KB-50s, added surplus B-36 pod-mounted jet engines to the wing tips to increase refueling speeds, and used them to refuel TAC jet fighters.[49] Using drogues from wing-tip mounts and from beneath the aircraft, the KB-50 was able to refuel three aircraft at a time. Aerial refueling lifted some of the range restraints from the tactical air force; however, the utility of this arrangement was not capitalized upon as the SAC force structure developed to support single-receiver operations.

SAC derived the Cold War force structure for containment and nuclear deterrence through a realistic assessment of the mission requirements and the operational environment. Range, speed of response, access to forward operating locations, survivability at forward operating locations, warning time, and ability to survive a first strike were the factors SAC leadership balanced to arrive at a force structure capable of meeting the needs of the strategy. In its final evolution, SAC built a force of bombers and tankers that were survivable, had the range to accomplish the mission, and could respond to a first strike in a rapid manner without the need for forward basing. As a force capable of executing an assigned strategy, SAC provided a good model.

An unintended by-product of this force structure was a flexible system that could respond to threats below the level of nuclear war. SAC's assets were utilized in Korea, Vietnam, and Desert Storm. Using progressively higher levels of integration with each conflict, SAC's tankers and bombers provided range extension for short-range fighters and long-range conventional bomber strikes from outside the theater.

The Tanker—Korea

In the Korean War, SAC's global power force structure was not a major contributor to the air battle. The first combat in-flight refueling occurred in July 1951 when SAC KB-29s refueled a flight of four RF-80s.[50] When the Joint Chiefs of Staff directed SAC to keep one of its fighter escort wings on a rotational tour in Japan, in-flight refueling made a significant contribution. Up until that time, TAC's fighter units had moved in and out of the theater by ship transport. SAC, however, had modified some of its bomber escort fighters—as well as its bombers—with an in-flight refueling capability. In July 1952, KB-29s were used to deploy 58 F-84Gs from SAC's 31st Fighter Escort Wing at Turner AFB, Georgia, to Japan. Three

months later, in a similar fashion, 75 F-84Gs flew from Bergstrom AFB, Texas, to Misawa AB, Japan.[51] In-flight refueling made both trips possible and demonstrated the "practicability of moving operational fighters to the Far East by air in a short time and without the corrosion difficulties of a water voyage."[52] Missions that included in-flight refueling to extend range were the exception rather than the rule in Korea, as few aircraft were equipped for this task.

SAC's second-echelon conventional B-29s were assigned to the Far East Air Forces to drop conventional bombs and flew more than 20,000 sorties operating from bases in Japan and Okinawa. The distances flown from these bases did not necessitate in-flight refueling for the B-29s, while forward basing allowed the bombers to take advantage of logistic support from outside the immediate theater.

SAC's force structure continued to evolve. Starting in 1951 and accelerating in 1953, B-47s replaced the B-29s and B-50s in SAC's inventory. By the end of 1954, all of the B-29s were gone; and by 1955 all the B-50s were retired as bombers. In 1955 a transition began as B-52s began to replace B-36s, and SAC's mobility increased as the KC-135 came on line.[53] SAC's force structure of bombers and tankers was used sparingly in Korea, and the forces that were used were not the first-echelon nuclear forces. SAC's force structure found greater utility and had greater flexibility as the United States entered the Vietnam War. Concepts of in-flight refueling for combat operations and long-range conventional bombing saw wider application during America's war in Southeast Asia.

The Tanker—Vietnam

Although SAC's nuclear mission was its primary focus, the force structure designed for long-range nuclear missions was able to support conventional bombing operations in Vietnam. The use of tankers for short-range fighters as well as bombers for long-range conventional strikes came of age.

In Vietnam the routine use of in-flight refueling to support fighter operations was an innovation. Jet-powered KC-135 tankers could refuel at altitudes up to 35,000 feet at 500 knots and were capable of off-loading up to 50,000 pounds (lb) of fuel per sortie to support prestrike and poststrike refueling of F-4 and F-105 combat missions into North Vietnam.[54] By 1966, 60 KC-135 tankers were deployed to the theater. KC-135 refueling became routine, and to some extent "getting the most out of the tanker force drove mission scheduling."[55] Refueling of short-range aircraft to extend range and increase weapon loads became *de jour*.

SAC's bomber/tanker combination was used in a conventional role in Southeast Asia. KC-135s deployed to Okinawa supported B-52 operations from Guam. Flying 10-hour missions at high altitude, the in-flight refueled B-52s supported Operations Rolling Thunder and Linebacker I. As

negotiations stalled to end the war honorably, B-52s garnered fame during bombing missions over Hanoi during Operation Linebacker II and facilitated a negotiated closure to the Vietnam War.[56] Air refueling and long-range conventional bomber sorties were SAC's global power contribution to the Vietnam War.

The Tanker—Desert Storm

Operation Desert Storm ushered the complete integration of in-flight refueling into combat operations for US forces. SAC's B-52s also provided long-range combat power from bases inside and outside the theater.[57] Tankers were used to support missions inside the theater, to build the air bridge to support the deployment of forces into the theater, and to support long-range B-52 strikes from both inside and outside the theater.

Tankers were integral to all attack operations. In fact, "some 60 percent of all attack sorties required aerial refueling."[58] The initial Central Command estimate of 68 tankers to support Operation Desert Shield/Storm blossomed to 230 to support combat operations in the theater, to include support of naval fleet air operations.[59] Eventually 100 tankers were used to support the air bridge to deploy fighters into the theater, while 256 KC-135 and 46 KC-10s deployed into the theater to 10 separate bases to support combat operations.[60] During Operation Desert Shield, SAC tankers flew 4,967 sorties and refueled more than 14,500 aircraft (including 5,495 Navy and Marine aircraft), off-loading 68.2 million gallons of fuel. Seventy-five percent of the KC-10 fleet and 44 percent of the KC-135 fleet were committed to the crisis in the Gulf.[61] When combat operations started, the coalition tanker fleet—made up of tankers from the United States, France, and the United Kingdom—performed on the order of 50,000 refuelings to 2,000 aircraft, transferring more than 700 million lbs of fuel. Gen Merrill A. McPeak, then chief of staff of the Air Force, noted that "the tanker contribution to Desert Storm is what made it [the air war] work." While indispensable, tankers were also "the limiting factor" in generating combat sorties.[62]

SAC B-52s under operational control of theater commander Gen H. Norman Schwarzkopf launched 1,741 long-range strikes from the United States, United Kingdom, and Spain, as well as shorter sorties from bases within the theater.[63] The B-52s dropped mostly unguided bombs—but dropped almost 32 percent of the total bomb tonnage in the war. "Even without precision munitions, the B-52s became one of the most sought-after aircraft by ground commanders for strikes against Iraqi ground forces."[64] Deployed to the theater and operating from forward bases well outside the theater, the B-52—with its range designed to meet Cold War requirements—provided an effective combat punch.

The most striking B-52 mission was accomplished by seven aircraft during a round-trip combat mission from Barksdale AFB, Louisiana. This

mission began on 16 January 1991, well before the first shots were fired in Operation Desert Storm. In this global power mission, the seven B-52s launched 35 modified air-launched cruise missiles (ALCM). Updated avionics and Global Positioning System navigation, as well as the replacement of the "physics package" with a high-explosive warhead, made each ALCM a CALCM. In the flight from Barksdale, these seven B-52s used in-flight refueling support from 38 KC-135 tankers that had forward deployed to Lajes Field, Azores, and 19 KC-10s that had deployed to Spain.[65]

Long-range conventional strikes with in-flight refueled bombers, as in the example above, are not synonymous with the SAC model for global power. In Desert Storm, forward bases for tankers were available due to the support of regional allies. The SAC model, however, relied on CONUS-based tankers to refuel bomber missions for strikes against targets in the Soviet Union, based on known combat ranges, without forward basing. While a subtle difference, the use versus nonuse of forward basing for tankers represents a significant chasm for global power force structure and applications in the twenty-first century.

Conclusion

The force structure that evolved after World War II to support the Cold War strategy of nuclear deterrence had great utility for conventional forces as well. Built to support the mission of long-range nuclear attacks on the Soviet Union, the bomber and tanker forces evolved in order to ensure survival of a first strike and to provide a rapid response without vulnerable forward basing or forward-base refueling. The solution matched tankers to bombers to accomplish missions of known range and found utility for conventional purposes. This force structure was useful for deploying short-range fighters in and out of theater and matured to support combat operations for short- and long-range aircraft. SAC's tankers were designed as single-point refueling platforms to pass huge off-loads of fuel to bombers; and although they had utility for smaller aircraft, they lacked efficiency when used as tankers for short-range aircraft conducting combat operations within a theater.

SAC's assumptions about the wars it would fight specifically excluded the use of forward basing on the assessment that those bases would fall under attack, as the nature of nuclear war would not allow time to either secure or repair those facilities in war. To provide the maximum amount of warning time to the nuclear bomber force, stateside basing was preferred, as it offered the largest degree of protection from first-strike attacks on the nuclear bomber force. The force structure that was developed met the needs of the strategy of nuclear deterrence.

In the 1990s, as the Air Force mission evolved, new assumptions about the nature of the world were used to support changes to the force struc-

ture for the twenty-first century. The next chapter explores the events of the 1990s and derives assumptions that will be tested by case studies in a later chapter.

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Chapter 3

Global Power—Post–Cold War: Assumptions for the Future

To postulate a scenario where you can operate no forward forces other than the bombers . . . We simply cannot settle hardly any of these kinds of contingencies we're talking about if we can't use any forward forces. Eventually we have to be able to do that, or you simply can't prevail . . . my point is that you simply cannot fight a war from the CONUS.

—Gen Larry D. Welch, USAF, Retired
Congressional testimony, 1 April 1998

Introduction

Bordered by two oceans, the United States remains insulated from invasion; however, the same borders that provide an obstacle for potential opponents also create the greatest obstacle for the use of America's military power—range. Airpower became the preferred force to overcome the problem of range during the Cold War. First with bombers and then with long-range bombers supported by tankers, airpower was the bedrock of US national security strategy for 35 years. The strategic imperative for long-range strike remained, but by the turn of the century the preferred vehicle changed to short-range fighter-bombers. In *Vision 2020,* USAF envisions a return to the post–World War II expeditionary strategy. After *Vision 2020*'s release, Gen Michael E. Ryan, Air Force chief of staff, noted "[w]e have been returning to our expeditionary roots for years now."[1] During World War II that particular expeditionary strategy relied, especially in the Pacific, upon costly action to secure and hold forward bases for air operations. Did the forward-basing and range obstacles of the Cold War and the force structure SAC used to surmount them become irrelevant in the New World Order? Additionally, although US forces may not face the threat of a nuclear first strike, was a return to a forward-based strategy sensible?

The following chronology of studies, reports, testimony, and public opinion highlights the assumptions the Air Force made in shaping the force structure for the post–Cold War era. In many ways the strategic challenges of the 1990s were not markedly different from the challenges of the 1940s and 1950s, but the assumptions of the best way to surmount these challenges did change. Political agendas, institutional preferences, and financial constraints were all factors that altered the long-held assumptions of air leaders. This chapter chronicles the assumptions the Air Force used to justify its new force structure.

The evolution of the Air Force's original global power strategy proceeded from a realistic appraisal and study of the topographical, temporal, and technological impediments to providing a credible threat. The evolution of a new strategy of global power projection has left a forensic trail that permits analysis of why the current force structure of the Air Force has evolved the way it has. During the 1990s, global power in the form of long-range airpower was not emphasized by the Air Force. Even though long-range airpower was still a part of the force, as General Welch noted above, it was no longer the primary option for supporting national defense and security strategy. How the expeditionary force supplanted long-range airpower in Air Force strategic thinking from 1990 to 2001 is chronicled in the sections that follow.

Global Reach—Global Power, 1990 White Paper

In 1990 the Office of the Secretary of Defense (OSD) issued its white paper entitled *Global Reach—Global Power*. USAF's role in national security was clearly laid out as the military was asked to shift its thinking from a "national security focus . . . dominated by the threat posed by the Soviet Union" to a "number of dynamic and rapidly changing factors" which "are creating the potential for a significantly different world environment in the 21st century."[2] The long-range bomber's role in this strategy was logical, and the advantages it brought to the fight were clearly delineated to meet the unknown threats of the future.

While the white paper was the first cut aimed at breaking away from Cold War thinking, the Air Force retained as its first priority a commitment to deterring nuclear attack.[3] In addition, the national security strategy outlined America's responsibility as the leader of the world's democracies and described the nation as having an "inescapable role to play in ensuring the stability of the international balance."[4] The strategy recognized Europe, the Pacific, and the Persian Gulf as areas where the United States would continue to have important interests and commitments. Moreover, these regions would drive the requirements for America's military forces.[5]

The white paper recognized that the United States could not maintain a continuous presence in every location where potential conflicts and threats to its interests existed. To counter this weakness, strategists were asked to contemplate "an increased emphasis on force projection capabilities—even more flexible, rapidly responding, precise, lethal forces with global reach."[6] These CONUS-based forces could provide responsive counters to the variety of future threats on the horizon.

The white paper listed five objectives for the Air Force to sustain in order to support the national defense strategy. Chief among them was the need to provide versatile combat forces for theater operations as well as CONUS-based forces for power projection. In addition, USAF needed to supply rapid global mobility through airlift and tankers.[7] In providing ver-

satile combat force, the Air Force envisioned that the more frequently occurring scenarios in the changing world environment would require airpower for "sharp, powerful, short duration operations."[8] More specifically the white paper stated that "Our global responsibilities require capabilities independent of the need for mobilization and the political baggage sometimes inherent in that process. Active forces of the highest quality will be essential to respond quickly with precision and effectiveness."[9]

Citing 1983's Operation Bright Star, the white paper praised the use of B-52s based in the United States and supported by in-flight refueling tankers in the completion of the CONUS–Egypt–CONUS mission simulating conventional bombing on the North African nation. The white paper compared Operation Bright Star to Operation El Dorado Canyon and the US raid on Libya and noted how many of the problems which hampered that operation were avoided through the use of CONUS-based long-range bombers to Egypt. Many of the issues that plagued the Libyan raid—the large numbers of strike, support, and refueling aircraft; the use of foreign bases to support flight operations; the difficulty of obtaining overflight permission from reluctant allies; and the exposure of naval assets to land-based threats—were not factors during Operation Bright Star. The white paper also claimed that long-range strike aircraft would often provide a cheaper option when compared to others and might, in some cases, be the only option capable of "threatening or hitting targets in the crucial first hours or early days of a conflict."[10]

Global Reach—Global Power described short-range fighters as the "ready and flexible tactical air forces [that] can also be tailored to provide a quick and appropriate response to support US national policy."[11] With forward basing, short-range aircraft could rapidly deploy into hot spots to provide a presence or promote stability within a region. *Global Reach—Global Power* noted that using short-range aviation required "forward basing to sustain power-projection operations."[12] *Global Reach—Global Power* also assumed that when the interests of our allies were threatened, basing would be made available and that our fighter forces could deploy within hours. These assumptions ignored several essential issues for the deployment of short-range airpower.

In addition, as there was room for both short- and long-range airpower within the strategy, there was no cost-benefit analysis of trade-offs between the two. Budgets in 1991 did not constrain either the force structure or the strategy. While recognizing the limitations of using short-range aircraft and the utility of using long-range aircraft, the white paper was not required to do more than postulate new ways airpower could contribute to the national defense policy. Roles and missions for the Air Force and the force structure to support them fit under the same roof. Within this structure the bomber emerged as an asset with greater freedom of movement and utility while remaining true to its heritage as the foundation of SAC's long-range airpower capability. Strategy and capability still

fit together smoothly. The white paper did not exude a bomber-centric tone, but it put long-range airpower in perspective for national defense.[13]

SAC Deactivated and the Decision to Halt B-2 Production—1992

In the wake of Desert Storm and the collapse of the Soviet Union, President George H. W. Bush, in a measure designed to "heat up the economy," announced in his January 1992 State of the Union Address that he was cutting the purchase of B-2s to a mere 20 aircraft.[14] Bush wanted to cancel the bomber altogether but acquiesced to finish the 20 airframes for which center sections had already been produced by the primary contractor, Northrop Grumman.[15] The Air Force appeared to raise virtually no objections, as they had already put a higher priority on procuring a new air-superiority fighter to replace the F-15.[16]

Procurement of a new air-superiority fighter at the expense of virtually all other airborne assets seemed foolhardy at a time when the American system of air dominance had no peer on the horizon. In order to present a symmetric counter to US airpower, an adversary would have to make large investments in aircraft, pilots, and command and control assets to field a challenging force. Logically, future adversaries had more to gain by procuring asymmetric challenges to US airpower—such as cheap surface-to-air missiles to counter the threat from the air and surface-to-surface missiles to disrupt and destroy the forward bases US aircraft required.[17] Although justified through the assessment of emerging air-to-air and surface-to-air threats, a replacement for the aging F-15 was likely to face few peers.

Bush's decision in June 1992 to stop B-2 production was followed promptly by the deactivation of Strategic Air Command. This action compounded the demise of the force structure to support global power through long-range airpower. Although SAC was highly structured and viewed as a rigid institution with a narrow scope and purpose, the command was the historical center of advocacy for bombers and long-range airpower. When SAC deactivated, Air Combat Command (ACC) stood up and assumed responsibility for all bomber forces, and the "institutional foundation for bombers disintegrated."[18] ACC placed a higher priority on the F-22 than on long-range airpower. While individual bomber units remained committed to long-range aviation, command leadership willfully shifted its focus away from the acquisition of bombers. Consequently, bombers lost their voice in the appropriations battles at the headquarters level before the debate got inside the beltway of Washington.

Bush's characterization of the B-2 as a nuclear bomber no longer needed with the demise of the Soviet Union revealed his inability to grasp the utility of bombers in a conventional global power role. This led to a force structure featuring short-range fighters as the "centerpiece of American air power."[19] Air Force leaders did not make the case for the use of bombers in a conventional role to the president; in fact, the top brass ap-

peared to ignore the "operational implications of long-range, stealthy bombers armed with precision-guided weapons."[20]

The institutional shift within the Air Force was best characterized by Geoffrey Perret, author of *Winged Victory,* who made this blunt assessment of the comparison between the US use of airpower in World War II and the US approach to airpower in the 1990s: "In Vietnam, SAC's bombers might have pounded the communist regime into submission, but they were not given the chance to do it. Since then, they have become irrelevant. The essential combat aircraft of the 1990s is the fighter-bomber. The present-day Air Force is run by what is known as 'the Fighter Mafia.' The long-term future of the Air Force turned out not to be in heavy bombers after all."[21] Gen Joseph W. Ralston, then vice commander of the Joint Chiefs of Staff, seconded Perret's notion in his 1996 congressional testimony as he revealed that in a military crisis the option that "contained the weapons of choice was [tactical airpower] TACAIR."[22] While an institutional preference, short-range TACAIR had limitations that were not fully appreciated.

USAF had large numbers of very capable tactical aircraft as a legacy of action in Vietnam and the confrontation with the Soviets in Europe. These assets could effectively project power within certain operating assumptions and parameters. Given ready access to forward bases secure from enemy attack and unhindered logistical support, TACAIR could replace long-range bombers. TACAIR also needed time to build up forces in-theater amid the risks inherent in forming coalitions for forward basing, overflight, and allied support. These deficiencies accentuated the virtues inherent in American-based long-range airpower: speed, flexibility, and independence. Nonetheless, a marked shift in the vision of global power had begun in favor of packages of deployable short-range assets over long-range bombers.

Bottom-Up Review—1993

In 1993 Secretary of Defense Les Aspin directed a Bottom-Up Review (BUR) of US military forces. When Aspin was the chairman of the House Armed Services Committee, he was a vocal critic of the Pentagon for what he perceived as their "top down planning." His complaint was that defense cuts were implemented by "percentage adjustments to the program rather than by a careful examination of requirements from the bottom up."[23] When he became the secretary of defense in the William J. Clinton administration, Aspin seized upon the opportunity to do his coveted BUR. The review, however, was fatally flawed. Before it started, spending caps on military expenditures for the next five years established a five-year cut of $104 billion below the final projection of the Bush administration and $245.2 billion below the 1990 defense budget baseline. The requirements and programs that could fit under that budget line awaited the BUR.[24]

Assuming a strategy centered on an America prepared to fight two "nearly" simultaneous major regional conflicts, the BUR sought to shape

the force structure to match this need. However, according to Cong. Ike Skelton (D-Mo.), the force structure flunked "simple third grade arithmetic."[25] Skelton noted that the forces as projected could not support one, much less the two regional contingencies, that the BUR expected them to handle simultaneously.[26]

By asserting budget imperatives above requirements, Aspin's BUR became the top-down process he had routinely denigrated as a congressman. Bombers were capped at 184 aircraft in the BUR. In addition, bombers and other high-demand/low-density assets were envisioned as "swinging" from one regional conflict to the other to support both conflicts. Missing from the BUR was a specificity in airlift. "A curious lapse since airlift, more than anything else, constrains deployment to the kind of regional crisis around which the Bottom-Up Review is built."[27] The BUR was criticized as an attempt to justify the enormous defense cuts that the new administration planned in a top-down method by slicing the assets on hand as well as gutting future acquisitions and programs. Within new budget constraints, the services now had to choose which new acquisitions to pursue. Biases towards the replacement of certain weapon systems appear to have had an impact on building a force structure to support the strategy of global power within the Air Force.

Seven Secretaries Weigh In—January 1995

On 4 January 1995, seven former secretaries of defense wrote to President Clinton to express their concern over the "impending termination of the B-2 bomber production line."[28] The former secretaries—Melvin Laird, James Schlesinger, Donald Rumsfeld, Harold Brown, Caspar Weinberger, Frank Carlucci, and Dick Cheney—were upset that the administration did not plan to build the new bomber in the quantities they felt were necessary to meet the challenges to US security in the next century. While they were primarily concerned about the B-2, they also criticized the number of bombers proposed under the 1993 BUR. In their view, the total of barely 200 was not enough to meet future requirements—"particularly in view of the attrition that would occur in a conflict and the eventual need to retire the B-52s."[29]

The secretaries hit upon several themes for advocating greater production of B-2s in an effort to modernize the bomber fleet and to capitalize on the $20 billion in sunk costs to establish the production line. They noted that as the United States gradually withdrew from its forward operating locations it would become "increasingly difficult to use tactical aircraft in bombing missions" and that it was "essential that steps be taken now to preserve an adequate long-range bomber force."[30] The former secretaries of defense also noted that long-range airpower, even given the expense of airframes like the B-2, remained the "most cost-effective means of rapidly projecting force over great distances."[31]

As John T. Correll, editor in chief of *Air Force Magazine,* noted, "There is little if any precedent for the extraordinary statement by the seven former

Secretaries of Defense."[32] In speaking out in a public letter to the sitting president and telling him they felt he was in error, the seven secretaries advocated their view on continued production but made an even stronger statement concerning their confidence in Secretary Aspin. These men represented four presidential administrations. The former secretaries spoke with one voice to the current holder of the office with a powerful message.

Heavy Bomber Force Study—1995

The former secretaries of defense were not alone in their criticism of the decline of long-range airpower in importance and the impending closure of the B-2 production line. Certain members of Congress, distressed by the cancellation of B-2 production in 1992 and further aggravated by the conclusions of the BUR, directed the Department of Defense (DOD) to carry out a study of its bomber-force requirements in the 1995 Defense Authorization and Appropriations Act.[33] Dr. Paul Kaminski, undersecretary for defense for acquisition and technology, was responsible for this Heavy Bomber Force study. Both the Joint Staff and the Institute for Defense Analysis gave this report a chilly reception when it was presented to Congress; and as of June 1997, OSD had yet to print a final copy of this report. Its findings were judged by many in Congress to reflect a predetermined mix of bombers to support the desired direction of Air Force as well as executive office spending. This study was critiqued heavily in congressional testimony for its assumptions about strategic warning and the ability to deploy forces into a theater with an opposing force armed with weapons of mass destruction.[34]

The Heavy Bomber Force Study made a number of dubious assumptions. It assumed that the United States would receive approximately two weeks of strategic warning. Acting immediately on this warning (another assumption), the United States would use these two weeks to deploy large numbers of fighters and aircraft carriers to the theater (without encountering access or logistical support problems). The enemy, having watched and waited as the United States deployed overwhelming force into a theater (at unprecedented rates), would then attack anyway. American fighters would then fly at sortie rates far beyond those achieved during the Persian Gulf War to defeat these enemy forces.[35] In addition to these large numbers of fighters engaged in combat, the analysts added 20 additional B-2s to the planned bomber force (bringing the total number of B-2s to 40). Using a land-war simulation, the analysts then assessed the impact on the scenario of the additional 20 B-2s, which were flown at sortie rates below those achieved in Operation Desert Storm by B-52s.[36]

The study used the scenario to measure combat sortie rates and to measure bombs delivered to targets over time. The quantitative analysis favored a force structure that was able to put combat power on target in the shortest amount of time and at the least cost. In the scenario, however, the 14 days of warning allowed short-range forces to build up in the

area of operations until there were 10 times as many tactical aircraft deployed than bombers available before hostilities even started. Given the scenario assumptions, as Dr. Kaminski noted, the bomber contributions in delivering firepower were lost in the aggregate.[37] Instead of measuring bombs over time, the study could have measured bomb miles over time. This would have factored range into the cost equation and would have favored the economies of scale that long-range, large-payload bombers bring to a conflict.[38] As for assumptions about strategic warning, Gen Charles A. Horner, air component commander for Operation Desert Storm, noted that the assumption of 14 days of strategic warning "jibes neither with history nor with military logic."[39]

Cong. Duncan Hunter (R-Calif.),[40] in a hearing of the Military Procurement Subcommittee of the House National Security Committee, noted that the assumptions used in the Heavy Bomber Force Study were faulty: "The capability of projecting force deep into the heart of hostile territory has been and should continue to be the centerpiece for American air doctrine. The number of American Bases abroad declining and belligerent activity around the globe [that is] ever-present, America must retain an ability to strike afar in a variety of threats. In the conflicts of tomorrow, however, it will desperately need long-range air capability. Forward airstrips and naval aircraft carriers may not be available."[41]

The arguments over the utility and acquisition of aircraft throughout all the studies performed in the 1990s was best summed up by Glenn Buchan, RAND associate program director, in his testimony before Congress following the completion of the Heavy Bomber Force Study. He said, "The need for B-2s is governed almost entirely by scenario assumptions."[42] As the first in a series of studies to evaluate long-range airpower, this study and the ones that followed established the assumptions used to justify the expeditionary forces USAF favored for the twenty-first century.

The Heavy Bomber Force Study was followed closely by the Deep Attack Weapons Mix Study (DAWMS) where the Commission on Roles and Missions of the Armed Forces (CORM) played the primary role in crafting long-range airpower's future.

Deep Attack Weapons Mix Study—1996

The CORM looked for duplicity of roles and missions within the services as opportunities to cut costs. The CORM spoke with one voice in its final report; however, several studies generated by subcommittee, in particular the Deep Attack Study Team, were ignored in the final analysis. DAWMS examined the contribution of bombers to conventional and nuclear warfighting scenarios and considered several options to acquire funds to expand the B-2 fleet. They considered retiring the entire B-1 force, eliminating various numbers of fighter wings, percentage cuts in Marine air, and scrapping carriers and their air wings—all in various combinations. The study assumed the immediate retirement of these to purchase B-2s

in numbers funded by the savings created. The analysis showed, in the scenarios examined, that the B-2 was more cost effective over the course of a war than the systems they replaced.[43]

Unfortunately, the results of this study did not provide "the desired answers" at OSD or at the Pentagon.[44] As a result, the scenario was adjusted to a two-phased war with separate halt and counteroffensive phases. The advantages of the B-2 in the critical halt phase were negated over the course of the protracted counteroffensive, as deployed short-range fighters proved more cost effective over time once they were deployed to the theater. What was missing from the analysis was the logic that the counteroffensive could only occur after a successful halt phase—a phase in which the B-2 was proven both more cost effective and critical to success. The study also assumed that short-range fighters would have access to the theater and that once in the theater, they would operate without degradation from adversary action to deny access to or operate from forward bases.[45]

To further the case against the B-2, "capability gaps" were highlighted that emerged between the time forces traded for B-2s were retired and the time that additional B-2s, purchased with the retirement savings, came on line.[46] There was no phasing out of the retired forces as the B-2s came on line. As posed in this scenario, it is hard to imagine a weapon system that could pass this type of scrutiny. Compounding the problem for B-2 advocates, a Faustian-like bargain was presented to the Air Force. If air leaders accepted the conclusion that the B-2 was more cost efficient, the Air Force risked losing fighter wings to Navy carriers. If Navy leaders accepted that the B-2 was more cost effective than carrier air wings, the Navy risked losing carriers in favor of Air Force programs in joint budget battles. This rendered the B-2 dead on arrival for both services.

The study also highlighted the capabilities the B-2 could not perform in the theater if certain forces were retired. Drug interdiction, sea control, and antiship warfare were highlighted as missions the B-2 could not perform if aircraft carriers were traded for their purchase. Analysis supporting the shortcomings of the B-2 to perform any of these missions was missing. In addition, the potential advantages of an expanded B-2 fleet were ignored, as pointed out in the *Independent Bomber Force Review.*[47] "For example, we currently cannot halt a large-scale armored assault without tactical air forces in-theater prior to the outbreak of hostilities. How do we plan to do so in the case of a surprise attack? How do we plan on conducting a large-scale pre-emptive strike against an adversary's facilities for producing weapons of mass destruction?"[48]

Brig Gen David A. Deptula served on the staff of CORM and was the team leader for examining deep-precision attack systems on the Deep Attack Study Team.[49] He was explicit in his support of long-range aviation:

> The synergy of advanced munitions with the range and payload of long-range bombers may be more important to the Department of Defense in the years ahead than at any time during the Cold War. Combined with the stealth of the B-2, precision munitions with long-range bombers have the potential to provide key capabilities not available from any other forces to meet critical future na-

> tional security requirements. . . . The B-2 capabilities of stealth, long range, high payload, and precision strike give the United States a singular ability among nations to respond in near-real time to short-notice contingencies using conventional force anywhere in the world.[50]

The report delivered by the Deep Attack Study Team to the CORM, although ignored in the final DAWMS report, made significant recommendations. This report was never published as part of the commission's final report, *Directions for Defense.* Nonetheless, the report was quoted during congressional testimony by Cong. Norman Dicks (R-Wash.) and formed the basis for Dr. Rebecca Grant's monograph *Origins of the Deep Attack Weapons Mix Study.* The CORM released the Deep Attack Study Team's report to Dr. Grant in its draft form but also made clear that it did not necessarily endorse the opinions in the report made by the Deep Attack Study Team staff. The commission noted that this report represented one of the many inputs to the commission, which used its own judgment and experience to arrive at the conclusions and recommendations in the final report.[51] One must refer to Dr. Grant's analysis in her monograph and the few snippets of congressional testimony that referenced the report to gain an appreciation for the value of long-range bombers.

The full commission report allowed that future military operations could be uncertain due to the nature, location, scope, characteristics, and timing of the military actions required. However, the unpublished Deep Attack Study Team report went further as it questioned the potential combat environments of the future and made the case that the capabilities of stealth and precision made the *projection* of force more important than the *deployment* of force. Making the case that deployment of theater forces was not always prescribed, the smaller staff rested its case on stealth and precision and the range that long-range B-2s could bring to a conflict. The study's report indicated that mass would play a diminished role in the decisive application of force as the demands for quick response in a lethal security environment grew in the future.[52] The CORM chose instead to use assumptions in recommending a force structure for global power geared more towards smaller sized aircraft embedded in deployable expeditionary forces. The potential benefits of long-range aviation were not only dismissed, they were discredited through much of the analysis performed to determine the force structure for the twenty-first century.

Quadrennial Defense Review—1997

In 1997 the *Quadrennial Defense Review (QDR)* used the results of the DAWMS to justify a short-range force structure for the global power mission. The *QDR* also used a two-phased halt and counteroffensive scenario to justify its decision not to purchase additional B-2s. The primary logical flaw in the *QDR* assumptions rests on the lack of benefits derived from short-range aircraft during the counteroffensive if the halt phase failed. And it would fail without aircraft in-theater to make it work. The *QDR* addressed the idea that "additional B-2s deployed quickly to a conflict could improve our ability to

halt an adversary's advance during the opening days of a major theater war," but the analysis did not attribute a higher value to the halt phase for its importance within the overall strategy.[53] The *QDR* recognized that "this was especially true in cases where there would be little or no warning of the conflict or where our tactical aircraft would be restricted in access to the theater."[54] Unfortunately, the *QDR* noted that this "advantage . . . diminishes as other low observable aircraft, particularly the Joint Strike Fighter, enter the force."[55] The advantages of long-range aircraft were discounted in the *QDR* analysis. It assumed that short-range forces would overcome the obstacles of range and forward basing in future conflicts.

As former Cong. Jim Courter (R-N.J.) feared, the biased results of the DAWMS found their way into the military recommendations that became the 1997 *Quadrennial Defense Review.* The objective study that was needed did not occur. For *QDR* purposes the "capabilities" gap was manufactured, and the halt and counteroffensive phases were created to skew the data away from long-range bombers.[56]

Dr. Kaminski defended the reasoning within the DAWMS study as it was used to justify the force structure in the *QDR.* He noted,

> If you look only at the ground-attack mission, there are cases where the bombers are competitive and, per unit investment, could do even more. The problem is, that isn't the only mission. The tactical air forces perform four or five different missions that the bombers do not do, so you have to weight that. The bombers do, indeed, contribute in early phases of the air-to-ground mission before we've deployed tactical air forces [overseas in significant] numbers.
>
> What the DAWMS results show, however, is that for some period of years when you take out what's in the force today to get the money to pay for additional B-2 bombers, you have a gap. When the B-2s are in the force, they are competitive, especially under situations of early warning, but only if you're comparing them in the air-to-ground mission area. If you're looking at the other mission areas, the B-2 isn't doing those missions, so we somehow have to account for that.[57]

The capability gap Dr. Kaminski speaks of again did not consider the contributions that the B-2 could make to the "four or five different missions" that "tactical air forces perform." Also, besides roles and missions, the capabilities gap was created by the immediate retirement of one force to pay for the buildup of additional B-2s. The use of the DAWMS results to support the *QDR* left many in Congress dissatisfied about the conclusions regarding the future of long-range aviation.

Addressing Congress in April 1997 following the release of the *QDR,* Gen Ronald R. Fogleman, the chief of staff of the Air Force, answered questions about the future of long-range aviation before the National Security Committee of the House of Representatives.[58] In answer to Congressman Hunter's question concerning long-range aviation acquisitions past the year 2020 and the fact that there was no ongoing bomber program, General Fogleman testified that "by 2020 you could have a whole range of things. Perhaps your long-range strategic bomber by 2020 is a weapon from space and it is not a kinetic kill, but it is a directed energy

kill."[59] To which Congressman Hunter commented, "I hope you are not waiting for space weapons to replace your bomber force because that is pretty problematic, General."[60] Congressman Hunter scolded General Fogleman, noting that when the CNO [Chief of Naval Operations] wants to build a new carrier he starts planning for it 30 years out "because he cannot rely on space-based weapons to take the place of carriers at some point in the future. He cannot rely on things that are not tangible and have some lack of surety in terms of coming about. You have to do the same thing. And you've got to be looking at how you are going to replace bombers."[61] He ended by telling General Fogleman, "Lord knows the TAC air boys have not decided that something is going to replace tactical aircraft. You have given us a $350 billion bill through 2018 for TAC air. Now you did not come up with any space-based munitions to replace that stuff."[62] Congressman Hunter was left to wonder how long-range aviation had moved from the back burner to lost in space.

By the 1997 *QDR*, the Air Force had made the case for short-range airpower to perform the functions of long-range airpower in global power missions. The *QDR* recognized the importance of the halt phase, and it used it to bias the final analysis against long-range airpower. In addition, the *QDR* created capability gaps to ensure Air Force resources would not fund further B-2 production. While noting that access and reaction time were important during the halt phase, the *QDR* analysis failed logic in the two-phase war scenario when it did not consider halt phase success as a precursor to the counteroffensive. In addition, the *QDR* assumed that deploying forces would have access to forward bases to achieve the sortie rates necessary to complete the phase. The *QDR* left congressional proponents of the B-2 unhappy about the future of long-range airpower. Yet, the Air Force seemed more committed than ever to a strategy of global power based on short-range airpower in an expeditionary mode.

Global Engagement: A Vision for the 21st Century Air Force

Drafted as Air Force Doctrine Document 2, *Global Engagement: Operational Doctrine for the 21st Century* became the Air Force vision statement in 1997. It is in this document that the strategy of global power took on the moniker of *global attack*. In a speech delivered to the Air Force Association, General Fogleman discussed global attack:

> A core competency we've added is one we elected to call Global Attack. There are two aspects to this core competency. The primary aspect of Global Attack is the ability of the Air Force to *find and attack targets* anywhere on the globe using the synergy generated by air and space assets to operate at the strategic level of war.
>
> The other aspect of Global Attack is the *expeditionary* nature of our force. We have demonstrated this capability through a CONUS-based Air Expeditionary Force (AEF). As the United States continues to reduce fixed, overseas bases, the Air Force will use expeditionary forces to support the nation's priorities. These will consist of a rapidly deployable force tailored to the needs of the theater commander. Depending on the situation, that force can include both lethal and

non-lethal elements. This expeditionary capability will be key to rapidly providing tailored air and space capabilities to the regional CINCs in the future (emphasis added).[63]

Global power was recast as global strike within the new air expeditionary force concept. The assumptions about access and the availability of forward bases were similar to those made in the *QDR*. In this vision statement, "expeditionary aircraft" and not long-range aircraft took on the primary role of providing global attack or global power to a theater commander. The shift to short-range aircraft was leveraged by the strategy that demanded expeditionary forces to support it. Global attack removed the question of range and access from the global power problem and assumed away the concerns upon which the SAC force was built. Nevertheless, advocates for long-range airpower in Congress continued to press for reviews of strategy.

Independent Bomber Force Review—June 1997

Brent Scowcroft, a retired Air Force lieutenant general, was appointed to head a committee formed by the Military Procurement Subcommittee to study the issue of long-range airpower.[64] In 1997 he presented the *Independent Bomber Force Review* to the House Military Procurement Subcommittee of the House National Security Committee. This study was requested within the defense budget in 1997 after several members of the committee, of which Congressman Hunter was the chairman, voiced their displeasure with the findings of the *QDR* in relation to the continued production of long-range bombers, specifically the B-2. The report reached two major conclusions:

> First, long-range airpower will be more important than ever in the decades ahead. Consequently, we do not believe that the planned force of 21 B-2s will satisfy foreseeable US military requirements.
>
> Second, Pentagon opposition to further B-2 production is shortsighted and parochial. It reflects a consensus across the services that long-range air power can be safely abandoned in the long-run—a view with which we strongly disagree.[65]

The issues raised in this report centered on the ability of airpower to gain access to a theater. Scowcroft mentioned at length the roles of airpower and placed a premium on assets that could ensure access. Scowcroft made the following points to argue that long-range bombers were ideally suited for the evolving national security arena:

- Long-range bombers are the only force elements capable of stopping surprise enemy aggression while operating outside the range of theater weapons of mass destruction.
- Long-range bombers do not require bases in the immediate combat theater.
- Bombers, though expensive when viewed on a per-unit basis, are extremely cost effective compared to other force elements.[66]

In this report the assumptions made to discount long-range forces in previous studies were outlined and critiqued. As the Air Force continued its shift away from long-range aircraft, Scowcroft's report chimed in with several members of Congress concerned about the capabilities the United States was sacrificing to emphasize short-range expeditionary forces. In his review of the DOD studies to date, Scowcroft indicated that the "B-2 issue has become so captive to Pentagon bureaucratic politics that the Department has made the wrong strategic choice."[67] Simply put, Scowcroft thought the emphasis on short-range at the expense of long-range forces put the United States at risk. He was not alone in this concern.

Long-Range Airpower Study—1998

The Long-Range Airpower Study (LRAPS) was conducted at the request of Congress and was chaired by Gen Larry D. Welch, retired, former chief of staff of the Air Force.[68] His task was to lead a study to examine the role of "long-range airpower, the value of stealth, the adequacy of the current force to support likely contingencies, and the desirability of buying additional B-2s."[69] General Welch determined that the current bomber force was adequate for the next decade and a half. He based this assessment on planned upgrades in standoff weapons to the current fleet. This study looked out only to 2015. Congress was surprised to find that this report did not include a long-range plan for acquisition or research and development of bombers beyond the B-2 or beyond 2015.[70]

The LRAPS also made assumptions about the need for long-range airpower. When asked by Cong. Jane Harman (D-Calif.)[71] about the "stability of forward basing in the future," General Welch replied that the study was

> specifically asked to consider the possibility of the lock out from forward bases, and the impact of that. One of the conclusions you arrive at very quickly is that even long-range bombers will not be very effective in a demanding situation if they have to operate from the CONUS. It's too long [of a] sortie. It does too much violence to the sortie rate and to provide the weight of effort that you need in a large contingency from these precision attack systems, which long-range bombers are becoming, you need to drastically shorten that mission and drastically increase the sortie rate. Which means you need forward bases for long-range bombers. Now, clearly those forward bases can be removed from the threat. So, they don't have to face all the same threats that the tactical bases, but none the less you do have to have forward bases.[72]

General Welch further stated that in situations where access is denied, "you simply can't imagine that you could ever buy enough bombers to provide the weight of effort that would be required." General Welch did not indicate that he envisioned long-range forces as the enabler for the shorter range aircraft to gain access to forward bases, nor did he indicate that his study had a solution to the problem of gaining access to a denied forward location.[73]

The study concluded that forward basing and access was an issue for the Air Force to confront. General Welch acknowledged the importance of long-range aircraft in the early part of a war, as they were able to gain ac-

cess to a theater without forward bases. He noted that a small force of this nature could provide great advantage in striking targets in the early part of a conflict to clear a path through defenses for aircraft that followed. But he also pointed out that the capabilities of stealth and long range were not something required in all platforms.[74] This was a point well taken; however, the problem of access was still on the table.

General Welch's study affirmed the need for expeditionary forces within a theater to achieve the sortie rates required to fight and win a major theater war. He also asserted that access to forward bases and the need to deploy forward was as important to long-range as short-range aircraft. He rightly pointed out that forward deployment issues were a concern to all USAF aircraft, regardless of range. He did not mention tankers, but they also require forward bases in order to perform their mission in a theater.

The LRAPS left Congress unsatisfied with the airpower plan past 2015, and they demanded a road map to explain the long-term plan to replace bombers past that point. The *Bomber Road Map of 1999* proved equally disappointing in answering questions about long-range aviation.

Bomber Road Map of 1999

The Air Force *Bomber Road Map of 1999* did little to answer congressional questions about the future of long-range aviation. This white paper merely extended the LRAPS's projections for bombers from 2015 to 2037. This was not what Congress had in mind. During congressional testimony, Lt Gen Gregory S. Martin,[75] principal deputy assistant secretary of the Air Force for acquisition, noted, "Whether it was the Heavy Bomber [Force] Study done in '95 or the Long Range Air Power Study, more recently the QDR study or most recently the Bomber Road Map, there has never been an indication that we needed to go buy more bombers ahead of other things."[76]

General Martin indicated that the trade-offs considered within these studies did not justify sacrifices in tactical or short-range air for bombers. When Congressman Hunter asked General Martin about access to forward bases and combating scenarios where access could be denied with chemical or biological weapons, such as in Korea, he replied that he thought the effects of chemical weapons on operations would be minimal.[77] When asked to "presume the worse" about the political ramifications of a chemical attack, General Martin noted his devotion to "bringing this ABL [Airborne Laser] on board . . . to make that problem go away." Congressman Hunter noted that the airborne laser and theater missile defense both represented "another big if" and that he did not believe General Martin's assessment of the impact of chemical weapons was realistic.[78]

Congressman Hunter noted that "it would be great to be able to move long-range aircraft into that theater [Korea] without having to have the problem of operating those targeted [short-range aircraft operating] airfield[s]." He asked, "Doesn't that make bombers more valuable?" General Martin replied that "if the ranges are not accessible by fighters and air refueled fighters . . .

the value of bombers go up." But he concluded that "all the assessments we have done is what drives us to the 130 CC-coded or combat capable bombers as the correct number for us to maintain and approve."[79]

The *Bomber Road Map* as presented did not envision research and development for a new long-range bomber follow-on replacement until 2013. The testimony by General Martin indicated that "we have not yet decided on whether there will be a follow-on bomber or a follow-on fighter aircraft."[80] The *Bomber Road Map* was the last attempt by Congress to persuade the Air Force to build a global power force more heavily weighted towards long-range aviation. Institutionally, there was no advocacy for long-range bombers within Pentagon or OSD circles. The lone exception, Brent Scowcroft, had his recommendations for additional long-range bombers set aside in the Long Range Air Power Report and refuted completely in the following Air Force vision statement.

Global Vigilance Reach and Power—2000

In June 2000 the USAF published *Global Vigilance Reach and Power: America's Air Force Vision 2020.* This vision for the twenty-first century firmly established the predominance of short-range over long-range airpower for the expeditionary aerospace force of the future. The concept in *Vision 2020* has aerospace expeditionary forces rapidly deploying, after global vigilance warning, to a forward base—using global reach—to prosecute global power. The core competency of global attack discusses "the ability to engage adversary targets anywhere, anytime."[81] However, it describes that ability as the capacity to "deploy an AEF in 48 hours—fast enough to curb many crises—and [to] be able to rapidly deploy additional AEFs to deter a major theater war."[82] Long-range airpower was supplanted by short-range airpower within this context, and as noted by General Martin, "We don't talk about global attack in terms of fighters and bombers anymore; we talk about it in terms of global attack, which includes them both."[83]

The assumptions for forward basing and strategic warning (through global vigilance) are clearly stated, and assumptions about coalitions, access, and technology are implied within the vision statement. Most powerfully the vision declares, "We are an expeditionary aerospace force configured for the full spectrum of aerospace operations. We have returned to our expeditionary roots in the way we organized ourselves and present our forces."[84] The expeditionary roots are not qualified within the text of the vision statement. It is plausible that this statement refers to the manner in which the United States deployed B-29s in the Pacific and B-17s and B-24s in Europe during World War II. By this definition, airpower that was deployed forward within striking range of its targets during World War II was certainly expeditionary. However, the conditions that allowed forces to move forward in the Pacific theater of World War II, as General LeMay recalled as the commander of SAC, consisted of great struggles over time with large costs in human life. Assumptions concerning the establishment of similar conditions for the future relied on se-

curing political access and the physical ability to gain access where it was denied with little cost. These contentious issues, mostly ignored throughout the 1990s, crept into Air Force thinking as a strategy to justify the F-22 within the new force structure.

Global Strike Task Force—2001

In February 2001, ACC commander Gen John P. Jumper introduced his concept of the Global Strike Task Force (GSTF).[85] This "kick down the door" force is the part of the expeditionary force that is tailored to gain access to a theater for the rest of the force. Within this concept, F-22s were labeled as the linchpin of the US ability to gain access to hostile regions to enable a "few B-2s" to do the "heavy lifting." General Jumper stated that "air refueling ensures that we can sustain and, if necessary, employ GSTF over long ranges," but did not go into detail on forward-basing requirements for tankers. This study also delineated many of the assumptions that defined global power in 2001.[86]

Using the experiences of the 1990s, General Jumper discussed the following assumptions for airpower in the twenty-first century:

- "We can fully expect to fight jointly alongside partners and allies.
- Although we will not do battle alone, success will highly depend upon our technological prowess.
- We should never start a limited operation if the enemy can turn it into a sustained conflict.
- Allied Force taught us that employment from great distance is possible when conducting sustained operations and that forward basing need not be a major limitation.
- We continued to conduct sustained land-based operations in the face of *Scud* missile attacks during Desert Storm . . . we have prepared ourselves for this scenario [of denial of access].
- Access assurance . . . and some consider it the key factor in the near future . . . In general, access has been granted to US and allied warplanes during the past decade, particularly when a host's sovereignty or vital interests are at stake.
- [R]estrictions to access, both physical and political, will always impact operations, and no service is immune to the problem."[87]

For General Jumper, the lack of access appeared as the "most significant of the challenges"; however, the GSTF was his solution to this problem. "GSTF overcomes range barriers by providing means to rapidly roll back adversary threats." Once this is accomplished, the AEF would gain access to its forward bases and conduct 24/7 operations.[88]

The transformation of strategy completed itself in this final version, as the short-range fighter became the dominant feature of the global power landscape. Not only did the short-range fighter have a dominant role in providing power within the theater, it was heralded as the enabler to ensure access for the expeditionary force. Budgetary spending on fighters

when compared to bombers jumped from a 5:1 ratio in 1999 to a planned 30:1 ratio in 2003. In terms of numbers, the force in the 1950s which was balanced at a 2:1 ratio of fighters to bombers shifted by 1995 to a ratio of 16:1, in which the 3,000 fighter aircraft were leveraged with a total of 187 bombers.[89] The increased utility of the B-2 and other bombers with stand-off weapons was mentioned as part of the access securing force, but the ability of the expeditionary force structure to respond to the full spectrum of conflicts was not considered in Jumper's article.

Assumptions

As the presented studies, testimony, and vision statements shaped force structure for the twenty-first century, the following assumptions about the future and the use of global power come to light. They are evident in the justification used to end B-2 production and in the absence of a follow-on bomber program until the year 2013. They were used to extend the bomber force to the year 2037 without replacement, to justify the continued development of short-range aircraft to deploy and fight the nation's wars, and were codified in General Jumper's GSTF concept for the expeditionary force:

- The United States will have adequate strategic warning of hostilities to deploy expeditionary force into a theater. (The force structure of short-range aircraft will not be "shut out" of a theater of operations due to its range.)
- Forward basing is an obstacle that US expeditionary air forces can overcome in the use of global power. (Range will not present an obstacle to US expeditionary forces in the use of airpower.)
- Conflicts the United States will face in the future will require the deployment of forces into a theater.
- The United States will fight in alliances and coalitions. Coalition partners will provide host-nation support for forward basing and allow overflight.
- The United States will be able to defeat adversary actions to deny the US access through physical or political action.
- US technological advantages will ensure the ability to overcome the obstacles of access and performing global power missions.
- US tanker aircraft will meet the needs of the expeditionary global power strategy.

Questions

The end of the Cold War compelled the United States to reevaluate its strategy and retool its force structure. Although the SAC model for projecting global power had been a bomber and tanker "system" for decades, in the 1990s the capabilities of this system were shunted aside in favor of a deployable expeditionary force. Starting with the publication of the

Global Reach—Global Power white paper in 1990, a litany of studies, commissions, congressional testimony, and vision statements reinforced this preference for a new global power force structure. The SAC force structure built to conquer the obstacles of range and access with long-range bombers and tankers faded into the background as expeditionary airpower took center stage as the model for airpower to meet the challenges of the twenty-first century.

Short-range aviation is dependent upon secure forward bases. The distance of those bases to the fight eventually determines the sortie rates those forces can sustain. The distance also determines the level of in-flight refueling support required within the theater to support operations. On top of resource requirements, forward bases assume a common political goal between the United States and the host nation. Where that is not the case, access and agreements to use force are both difficult and convoluted. A threatened ally may not have suitable facilities for US forces, while a neighboring ally with adequate facilities may choose not to commit itself to one side or the other of a regional squabble. The United States may find it is denied access to forward bases for short-range fighters by physical threats of missile, chemical, or biological attacks; but it may be political pressure within the region that keeps the United States from intervening in a regional conflict. Even with a shared goal and adequate facilities within range of the conflict, forces deployed to a region also require protection from conventional and unconventional attack. Although difficult to measure, it is fair to estimate that the closer a base is to the fight, the higher the opportunity and risk there is for hostile attacks. As with the Cold War, the amount of warning time is reduced and the energy required to protect deployed forces grows as the force is deployed farther forward. The white paper did not consider the dangers of these assumptions.

Did the Air Force choose the correct path? Were the AEF and GSTF justified by strategic considerations? Did the global power strategy of USAF make sense given the nature of the global environment? Were the assumptions made to justify this force correct? How will political and economic conditions intersect to determine how nations view their sovereignty? Does history shed any light on these questions?

The case studies that follow were chosen to answer the questions raised. Hopefully, as Carl von Clausewitz wrote about the use of historical examples, the case studies will *"eine Lehre ziehen aus"* or "learn us a lesson" from the collected experiences of others.[90]

Notes

1. SrA J. Bosker, "Air Force Evaluates Professional Development of Its Total Force," *Air Force Print News*, 9 February 2000, n.p., on-line, Internet, 24 May 2001, available from http://www.af.mil/news/Feb2000/n20000209_000184.html.

2. *The Air Force and U.S. National Security Strategy: Global Reach—Global Power*, white paper, with a foreword by Donald B. Rice, secretary of the Air Force (Washington, D.C.: SAF/OSX, June 1990), 1.

3. Ibid., 2.
4. Ibid.
5. Ibid.
6. Ibid., 3.
7. Ibid., 5.
8. Ibid.
9. Ibid., 6–7.
10. Ibid., 8.
11. Ibid., 9.
12. Ibid., 9–10.
13. The bomber force within SAC saw the B-52 emerge as the preeminent bomber solution. B-47s and B-58s were built and retired for their lack of range and limited avionics capability. The medium range FB-111 and B-1 entered the force in the 1970s and 1980s as replacements for the aging, 20-year-old B-52s. One hundred B-1Bs were purchased after President Ronald W. Reagan resurrected the program cancelled under President Jimmy Carter. B-2s, designed in the 1970s, were delivered in the 1990s to Whiteman AFB, Missouri. The B-2 was originally planned for a buy of 132; this number was reduced in 1991 to 75 and then to 20 under President Bush in 1992 and upped by President Clinton to 21 through conversion of a training test bed to full operational capability. The combat bomber force for the 1990s was funded to support 16 of the 20 stealthy B-2s alongside 84 of the remaining 95 conventional B-1s purchased in the 1980s and 84 of the remaining 95 B-52s built in the 1960s. The remaining bombers—above the funding line—would allow for attrition, training, and down time for maintenance and upgrades to the fleets. James W. Canaan, "How Many Bombers Are Enough?" *Air Force Magazine*, February 1994, 1, on-line, Internet, 16 February 2001, available from http://www.afa.org/magazine/perspectives/b2/294howma.html; and Williamson Murray, "The United States Should Begin Work on a New Bomber Now," *Policy Analysis*, 16 March 2000, 7.
14. Murray, 7.
15. Dr. Rebecca Grant, *The B-2 Goes to War* (Arlington, Va.: IRIS Press, 2001), 12.
16. Murray, 7.
17. Ibid.
18. House, *Independent Bomber Force Review*, Lt Gen Brent Scowcroft, retired, presented to the House National Security Committee, 23 July 1997, n.p., on-line, Internet, 11 March 2001, available from http://www.fas.org/nuke/guide/usa/bomber/970000-ibr.htm (hereinafter cited as *IBFR*).
19. Murray, 8.
20. Ibid.
21. Geoffrey Perret, *Winged Victory: The Army Air Forces in World War II* (New York: Random House, 1993), 464.
22. House, Testimony at Hearing on Tactical Aircraft Modernization before the Subcommittees on Military Procurement and Military Research of the House Committee on National Security, Gen Joseph W. Ralston, 27 June 1996. According to his official USAF biography, General Ralston is a command pilot, with more than 2,500 hours in the F-105D/F/G, F-4C/D/E, F-16A, and F-15A/C. "Biographies," *Air Force Link*, n.d., n.p., on-line, Internet, 10 June 2001, available from http://www.af.mil/news/biographies/ralston_jw.html.
23. John T. Correll, "The Bottom Down Review," *Air Force Magazine*, December 1993, 1.
24. Ibid.
25. Ibid., 2. Congressman Skelton is the ranking Democrat on the House Armed Services Committee. He is a staunch supporter of the military and the B-2. The B-2 is based within his district in Missouri at Whiteman AFB.
26. Ibid.
27. Ibid.
28. Seven former defense secretaries to President William J. Clinton, 4 January 1995, Center for Security Policy, n.d., n.p., on-line, Internet, 19 February 2001, available from http://www.security-policy.org/papers/1995/95-D1at.html.
29. Ibid.
30. Ibid.
31. Ibid.

32. John T. Correll, "A Message from Seven Secretaries," *Air Force Magazine,* March 1995, n.p., on-line, Internet, 13 February 2001, available from http://www.afa.org/magazine/editorial/03edit95.html.
33. Murray, 11.
34. *IBFR.*
35. Ibid.
36. Ibid.
37. Ibid.
38. Ibid.
39. Gen Charles A. Horner, "What We Should Have Learned from Desert Storm, But Didn't," *Air Force Magazine,* December 1996, 52. According to his official USAF biography, General Horner is a command pilot with more than 5,300 hours in the F-100, F-105, F-4, F-16, and F-15. "Biographies," *Air Force Link,* n.d., n.p., on-line, Internet, 10 June 2001, available from http://www.af.mil/news/biographies/horner_ca.html.
40. Congressman Hunter is a Republican who represents California's 52d District (southern California's Imperial and San Diego counties). Southern California is heavily vested in the defense industry and was at the time the home of Northrop Grumman's B-2 production facilities in Pico Rivera and final assembly facilities farther west in Palmdale, California.
41. House, *Hearing of the Military Procurement Subcommittee on the House National Security Committee,* 12 September 1996, n.p. Federal News Service.
42. House, *Military Procurement Subcommittee of the House National Security Committee, Military Modernization and the B-2 Bomber,* testimony of Mr. Glenn Buchan, RAND analyst, 12 September 1996, n.p. Federal News Service.
43. *IBFR, QDR* section.
44. Ibid.
45. Ibid.
46. *1998 Secretary of Defense Report to President and Congress,* n.d., n.p., on-line, Internet, 12 March 2001, available from http://www.dtic.mil/execsec/adr98/chap5.html.
47. *IBFR, QDR* section.
48. Ibid.
49. Maj Gen (Sel) David A. Deptula is director, Air Force Quadrennial Defense Review, Headquarters US Air Force, Washington, D.C. He is the focal point for Air Force efforts, analysis, and articulation of aerospace power positions for the 2001 *Quadrennial Defense Review.* He is a command pilot with more than 2,900 hours, including 400 combat hours, in the F-15A/B/C/D. He was instrumental as a planner in the Instant Thunder air campaign used in Operation Desert Storm. "Biographies," *Air Force Link,* n.d., n.p., on-line, Internet, 12 June 2001, available from http://www.af.mil/news/biographies/deptula_da.html.
50. Commission on Roles and Missions, *Future Bomber Force* (Washington, D.C.: Aerospace Education Foundation, 1995), 10–11.
51. Dr. Rebecca Grant, *The Origins of the Deep Attack Weapons Mix Study* (hereinafter cited as *DAWMS*) (Arlington, Va.: IRIS Independent Research, 1997), ii. Dr. Grant is an airpower advocate and a strong advocate for the B-2 and its long-range capabilities. Congressman Dicks's district in Washington is heavily vested in the defense industry. The Sixth Congressional District is located 30 miles south of Seattle, and it includes McChord AFB, B-2 subcontractor Boeing Aircraft, and the Puget Sound Naval Shipyard within its borders.
52. *DAWMS,* 14.
53. William S. Cohen, secretary of defense, *Report of the Quadrennial Defense Review* (hereinafter cited as *QDR*) (Washington, D.C.: Department of Defense, May 1997), 11, on-line, Internet, 16 February 2001, available from http://www.defenselink.mil/pubs/qdr/.
54. Ibid.
55. Ibid.
56. Jim Courter and Loren Thompson, "What Is the Bomber's Role?" *Defense News,* 6–12 January 1997, 1–3, on-line, Internet, 12 March 2001, available from http://www.adti.net/html_files/defense/defnews.html. Congressman Courter is highly visible within the defense establishment as an advocate for many modern weapon systems. As a congressman, he led two rounds of the base closure commission and now heads the defense program of the Alexis de Tocqueville Institution.

57. "Reengineering the Acquisition Process: An Interview with Dr. Paul G. Kaminski, Undersecretary of Defense for Acquisition and Technology," *Armed Forces Journal International*, June 1997, n.p., on-line, Internet, 13 February 2001, available from http://www.afji.com/mags/1997/June/feat_kaminski.html.

58. According to his official USAF biography, General Fogleman is a command pilot with more than 6,500 flying hours in the T-37, T-33, F-100, F-4, F-15, F-16, A-10, C-21, and C-141. "Biographies," *Air Force Link*, n.d., n.p., on-line, Internet, 10 June 2001, available from http://www.af.mil/news/biographies/fogleman_rr.html.

59. House, *Hearings before the Committee on National Security, The Quadrennial Defense Review*, 16 April 1997, n.p., on-line, Internet, 12 March 2001, available from http://commdocs.house.gov/committees/security/has160000.000/has160000_1.htm.

60. Ibid.

61. Ibid.

62. Ibid.

63. Gen Ronald R. Fogleman, chief of staff, US Air Force, "Strategic Vision and Core Competencies," address, Air Force Association National Symposium, Los Angeles, Calif., 18 October 1996, Air Force Historical Research Agency, Maxwell AFB, Ala., IRIS K239.057-5; and on-line, Internet, 14 February 2001, available from http://www.au.af.mil/au/awc/csafafa.htm.

64. General Scowcroft spent the majority of his career in political and diplomatic posts. He is rated as a pilot; however, after only five years of active flight duty, he pursued academic interests and can best be described as a generalist in matters of airpower. He served as military assistant to the president in February 1972, and in August 1973 he was reassigned as deputy assistant to the president for national security affairs. He is currently president of the Scowcroft Group, Inc., an international business consulting firm. He is also the founder and president of the Forum for International Policy, a nonpartisan, nonprofit organization providing independent perspectives and opinions on major foreign policy issues. After his retirement from active duty, General Scowcroft served as assistant to the president for national security affairs to Presidents Ford and Bush. "Biographies," *Air Force Link*, n.d., n.p., on-line, Internet, 10 June 2001, available from http://www.af.mil/news/biographies/scowcroft_b.html and http://www.ndu.edu/ndu/nwc/Calendar/nwc_cal_doclinks/Scowcroft_bio.htm.

65. *IBFR*.

66. Ibid.

67. Ibid.

68. General Welch is rated as a command pilot with more than 6,500 hours, including combat time in the F-4 over Vietnam. He served as the vice chief of staff of the Air Force as well as the commander of Strategic Air Command. "Biographies," *Air Force Link*, on-line, Internet, 10 June 2001, available from http://www.af.mil/news/biographies/welch_ld.html.

69. Murray, 11.

70. House, *Hearing of the Military Procurement Subcommittee of the House National Security Committee, Testimony by Gen Larry D. Welch, Long Range Airpower Report*, 1 April 1998, Federal Information Systems Corporation transcript, 20–24 (hereinafter cited as *LRAP Report*).

71. Congresswoman Harman is a Democrat from California's 36th Congressional District located in the heart of Los Angeles. At the time of this testimony, she was in favor of continued B-2 production as quoted on page 9 of the proceedings noted in the previous citation.

72. *LRAP Report*, 10.

73. Ibid., 24.

74. Ibid., 22.

75. Gen Gregory S. Martin is currently the commander of USAFE and is a command pilot with more than 3,200 flying hours in the AT-38, F-4, and F-15. He is a Vietnam combat veteran with 161 missions in the F-4 over Southeast Asia. "Biographies," *Air Force Link*, n.d., n.p., on-line, Internet, 10 June 2001, available from http://www.af.mil/news/biographies/martin_gs.html.

76. House, *Hearing of the Military Procurement Subcommittee of the House National Security Committee, Testimony by Lt Gen Gregory S. Martin, Principal Deputy Assistant Secre-*

tary of the Air Force for Acquisition, 3 March 1999, "Service Aviation Modernization Plans," Federal Information Systems Corporation transcript.

77. Ibid.

78. Ibid.

79. Ibid.

80. Ibid.

81. *Global Vigilance Reach and Power: America's Air Force Vision 2020,* with a foreword by Gen Michael E. Ryan, chief of staff of the US Air Force and F. Whitten Peters, secretary of the Air Force, June 2000, 5–6.

82. Ibid.

83. House, Martin testimony.

84. *Air Force Vision 2020,* 5–6.

85. General Jumper is currently the commander of Air Combat Command. He is a command pilot with more than 4,000 hours, including combat time in the C-7 and F-4 in Vietnam. He has flown a variety of aircraft including C-7, C-20, T-37, T-38, F-4, F-15, and F-16. "Biographies," *Air Force Link,* n.d., n.p., on-line, Internet, 10 June 2001, available from http://www.af.mil/news/biographies/jumper_jp.html.

86. Gen John P. Jumper, "Global Strike Task Force: A Transforming Concept, Forged by Experience," *Aerospace Power Journal,* Spring 2001, 30; and "ACC Chief to Unveil 'Global Strike Task Force' Concept Next Week," *Inside the Air Force,* 9 February 2001, 1, on-line, Internet, 10 February 2001, available from http://www.airpower.maxwell.af.mil/airchronicles/apj/apj01/spr01/spr01.html.

87. Jumper, 27.

88. Ibid.

89. Murray, 1, 5.

90. As translated from German *Lehre Ziehen* in original German printing of Clausewitz, *On War (Vom Kriege).*

Chapter 4

Case Studies in Global Power

Air strategy begins with airplane ranges. Airplane ranges determine the location of bases. The proximity to the target of the bases under one's control fixes the weight and rhythm of the attack.

—Gen Carl A. "Tooey" Spaatz

Use of Case History to Assess Global Power Assumptions

Experience is a cruel teacher. States that err in judgment and pursue policies of war are ill equipped to implement leave as spoils lessons about the miscalculation of "ultimate possibilities" and "immediate probabilities."[1] Airpower history of the last 30 years provides many examples of global power in practice. Some of these cases reveal means that did not meet the ends of strategy. In many of the cases "human spirit" and ingenuity filled the gap between the means required and those available to make it happen. In some cases, the lack of capability in force structure resulted in increased risk and losses for the forces involved. The case studies that follow inform the debate on global power forces. They suggest that faulty assumptions may result in a force structure that mortgages too much risk.

As the previous chapter detailed, Air Force global power strategy and force structure is focused on deploying expeditionary force as the means of projecting power globally. Assumptions were made to justify the paths of acquisition and force structure to support an expeditionary force.

In addition to testing the efficacy of assumptions, historical evidence should be scrutinized to determine if it is relevant. Context is important. The case studies chosen challenge some of the assumptions about the application of airpower in an expeditionary manner.

The case studies range from small-scale operations like Operation Desert Strike in 1996 to the major theater war, by British standards, in the Falklands in 1982. Operation Eldorado Canyon in 1986 and Operation Nickel Grass in 1973 are also used as small-scale applications of global power. All of the cases shed light on the difficulties of employing force at long ranges. They are presented in chronological order, starting with Operation Nickel Grass.

Operation Nickel Grass—1973 Yom Kippur War

Unfortunately, the Military Airlift Command could not even use established United States bases in England, Germany, Spain, Turkey or Greece. The problem

was that the Arabs had another weapon which they were learning to use well. It was oil. Any nation helping Israel would not get any.

—Kenneth L. Patchin
Flight to Israel

For generations to come, all will be told of the miracle of the immense planes from the United States bringing in the material that meant life to our people.

—Israeli Prime Minister Golda Meir

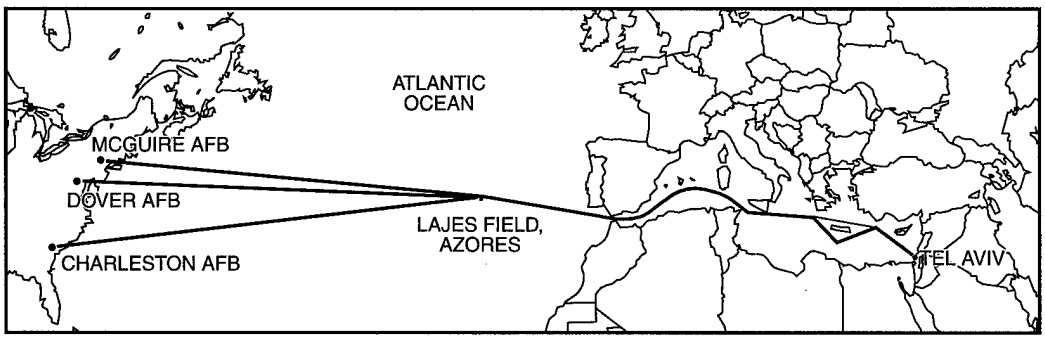
Operation Nickel Grass was the code name for the major airlift operation the United States undertook to resupply Israel during the 1973 Arab–Israeli war. This operation highlights the problems for global power when there is a lack of forward basing, a lack of support from allied and coalition partners for overflight, and a force structure that is not trained for long-range operations.

Background

On 6 October 1973, Egyptian and Syrian forces launched a two-front attack on Israel. As Egyptian forces crossed the Suez Canal and pounded Israeli positions in the Sinai Desert, Syrian forces to the east attacked the Israeli-occupied Golan Heights. The Arab objective was to regain territory lost to Israel in the 1967 Six-Day War.[2] While the actual attack itself did not come as a surprise to Israel or the West, the ferocity, coordination of effort, improved technology, and mass the Egyptians and Syrians brought to the fight caught both off guard.[3] In a short period, the Egyptians secured both banks of the Suez, moved their air defenses forward, and dug into defensive positions. In the east, the situation was more precarious because there was less room to give. The Syrians initially recaptured the Golan Heights; but by the end of the first week, Israeli forces, through a massive effort, advanced 10 miles inside Syria.[4] Although both fronts had stabilized, the losses accumulated were huge for each side. A war of attrition—the type of war Israel could not afford to fight logistically, economically, politically, or socially—loomed.

Diplomatically, the United States attempted to get the Russians to agree to mutual restraint in weapons deliveries and instead to use their influence to bring about a cease-fire. Unfortunately, four days after the war started, the Soviets began an airlift of replacement parts and ammunition for their allies, Egypt and Syria.[5] Israel, badly outnumbered from the start and pushed back from their defensive positions along the east bank of the Suez Canal, had suffered its "worst military setback in the country's short existence."[6] Israel looked to its only ally for logistical assistance. The urgent message sent from Israeli Prime Minister Golda Meir stipulated that "the war's outcome would be in doubt if Israel did not receive help soon."[7] The United States considered the use of shipping to resupply the Israelis, who had less than a two-week supply of ammunition remaining; however, the shipping time of 12–14 days would not provide help in time. The speed required and the desperate nature of the situation made airpower the only solution. On 14 October 1973, USAF

began Operation Nickel Grass with C-5s and C-141s moving cargo from the United States to Israel in about 18 hours flying time (see map titled Operation Nickel Grass Routing).[8] When the operation ended 32 days later, US aircraft had airlifted roughly 22,300 tons of supplies to Israel.[9] While US airlift had experience flying long distances to support operations, this was the "first time that the men and machines of the strategic airlift force were called upon to virtually go it alone."[10]



Operation Nickel Grass Routing

Problem

The primary obstacle for an efficient US airlift operation was the lack of allied support. The lack of forward basing and overflight rights along the preferred Great Circle route meant that the airlift crews had to make a more lengthy transit at lower latitude across the Atlantic, using the Azores as a refueling stop. Along this route, the transit from domestic American bases to Tel Aviv averaged 6,450 miles. The leg from the United States to the Azores depended upon the point of departure on the East Coast, but it was roughly equal to the Azores to Tel Aviv leg of 3,300 nautical miles (NM).[11] Throughput was limited due to the nature of the cargo and the distance between refueling stops. The dense ammunition and the additional fuel required to make the trip along the nonoptimal routing usually meant that aircraft weight limits were reached before the internal volume capacity of most of the transports was filled.

With the Azores as the only refueling point for east and west transit, it was, as Gen Paul K. Carlton, commander in chief of Military Airlift Command (MAC) warned, "only a matter of time until we are going to get bottled up on one base out there."[12] Unfortunately, even without cargo on the return trip, C-5s and C-141s fully loaded with fuel could not make the trip west from Tel Aviv to the United States if, as was most often the case, the prevailing headwinds were greater than 35 knots.[13] Efforts to gain access to US bases in Europe, including mainland Portugal, to support even the empty westbound trips home met with rejection. Spain's large Arab

population drove its vehement opposition to the use of any Spanish airfields, "in even the most insignificant way," to support Israel.[14]

The need for alternate bases became critical. General Carlton was aware that the crosswinds at Lajes were prone to going out of limits for several hours at a time. If this happened, it would prohibit takeoffs and require inbound aircraft—that would not have enough fuel to return to the United States or Israel—to divert to alternate bases. He noted that if this situation occurred, inbound aircraft from the east and west would be forced to divert; and because the choices of options to the aircrews were limited, there would rapidly be "14 aircraft at Torrejon [Spain]" and "then you would really have some diplomatic problems."[15] It was fortunate that the only day the winds actually went out of limits was on the first planned day of the airlift. This caused a weather hold on the commencement of the operations from the United States. However, once Operation Nickel Grass started, the winds at Lajes remained favorable.

The lack of basing, as well as anxiety over what to do if an emergency required an aircraft to divert as it traveled from Lajes to Tel Aviv, caused General Carlton to warn, "I just can't impress upon you the weak reed we are leaning on here." Unfortunately, the problem of alternate bases was not only out of the Air Force's hands, it was out of DOD's hands as well. On 15 October 1973, Secretary of State Henry Kissinger outlined the policy for the use of alternates. The United States would not ask for permission but would rely on established international procedures already in place for aircraft in distress to land at the nearest suitable field.[16] It was much easier to deal with the problem in this manner than to risk refusal upon asking permission. This left the crews in a precarious position on the trip from Lajes to Tel Aviv should an emergency require them to divert.

To accomplish this mission, 36 C-141s and six C-5s flew daily to Tel Aviv. This meant that the crews and support in the Azores had to handle a "combined east-west flow of 72 C-141 and 12 C-5 flights daily."[17] Had the return trips flowed through a different forward base, the throughput to Israel using the same amount of effort at the Azores might have been doubled.

General Carlton proposed a solution to the problem of forward basing by in-flight refueling the C-5s. He proposed sending the C-5s all the way to Tel Aviv by refueling them as they left the East Coast of the United States. Planning the route to overfly the Azores would ensure a divert option if in-flight refueling proved too difficult for the crews.[18] This option was not pursued for several reasons. First, only 19 crews were trained and proficient in this difficult task at the time of Operation Nickel Grass.[19] Unfortunately, this number of crews would not satisfy the mission requirements. Gen Thomas Wade, vice chief of staff of the Air Force, felt that in-flight refueling of the C-5 was "too marginal a capability" and provided "too little gain for crews."[20] In addition, General Wade was concerned that it would "demonstrate that it [the USAF] could go nonstop with refueled airplanes, [and] the United States might lose the use of the Azores," which it needed for other missions.[21]

The C-5 could have flown directly from the United States to Tel Aviv without in-flight refueling or stopping at Lajes to refuel on the ground. However, this option sacrificed cargo for fuel and would have reduced the planned 80 tons of cargo per planeload to only 20 tons. In addition, as already noted, the C-5s lacked the fuel capacity to make the return trip west without favorable winds on a direct flight from Tel Aviv to the United States. Even if the C-5 could have made the round trip, the reduced cargo load would have upped the required sorties from 145 to 500 to accomplish the same amount of lift—numbers that just did not add up with the force of C-5s and crews available.[22]

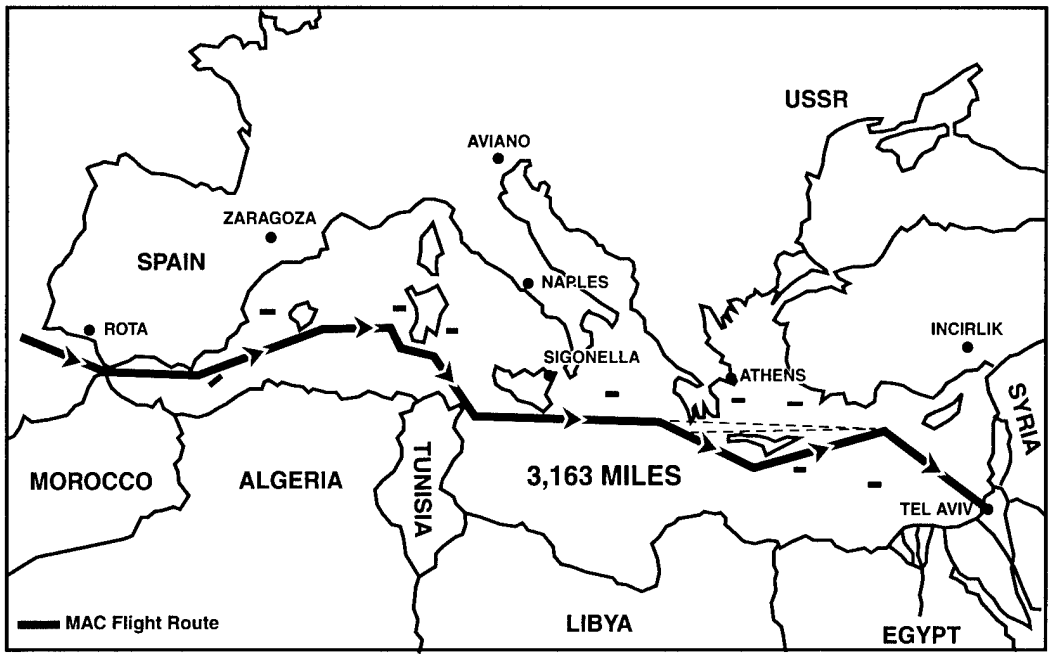
Answer

Although there were many obstacles to supporting Israel, the United States could cobble together the capability to accomplish the mission. The political and diplomatic pressures applied by the Arab nations and NATO allies unwilling to support the US action further aggravated the inherent difficulties presented by the physical limits and capabilities of the available force structure.

Had Portugal not allowed the United States access to the Azores, the airlift operation would have been impossible.[23] The Portuguese could withstand an oil embargo by the Arab states because they imported twice their daily need from their West African territory of Angola.[24] "In yielding, Portugal considered the American utilization of the Azores as use for NATO defense and simply looked the other way as far as Israel's support was concerned."[25] For its part, the United States made promises of concessions to Portugal concerning foreign aid legislation.[26] Additionally, the existing agreement for the United States to use Lajes Field was due to expire in February 1974. Allowing the United States to use Lajes for Operation Nickel Grass secured a degree of leverage for the upcoming renewal agreement and the anticipated revenue it would provide.[27]

With only one forward operating base, the United States began to move supplies to Israel. The initial plan had called for US aircraft to move material to the Azores where Israeli commercial aircraft would then transport it the rest of the way to Tel Aviv. However, due to limited Israeli cargo capability, the decision was made to take the material all the way to Tel Aviv; and this required the United States to plan a route through the Mediterranean Sea. Within the Mediterranean, NATO allies refused to allow overflight of any sovereign land masses, forcing MAC crews to take a zigzag path—as seen in the map titled Routing through the Mediterranean—through the region to ensure compliance while avoiding more hostile Arab-controlled airspace.[28]

The route through the Mediterranean Sea exposed American aircrews to potentially hostile Arab airpower. The crews flew past Morocco, whose troops were in the Golan Heights. They also passed by Algeria and Libya, both of whom were anti-United States. Algeria actually had MAC aircraft under radar coverage throughout their transit and air defense fighters on strip alert. The MAC crews also had to contend with the two active belligerents, Egypt and Syria. Both had radar coverage of the Mediterranean Sea, inter-



Routing through the Mediterranean

cept forces armed with air-to-air missiles, and ballistic surface-to-surface missiles that could range US aircraft on the ground in Tel Aviv.[29]

The US Navy supported the airlift operation in a unique way. Two US Navy carrier battle groups, the USS *Independence* and the USS *Roosevelt*, took up positions in the Mediterranean Sea to provide air cover and early warning along the North African coast.[30] This air cover protected the airlift crews from potential hostile intervention and established a US presence to respond to threats.

The MAC crews successfully moved material along this route despite many distractions. Most significant were the multitude of foreign air traffic controllers of various nationalities that attempted to put the MAC aircrews on standard air routes through the Mediterranean to prevent conflicts with other traffic. This became a problem as many of the routings passed over the territory of NATO allies who had refused overflight.[31] While this problem was overcome by administrative action, crews were also harassed by numerous air-to-air intercepts, jamming, and false radio calls.[32]

Both fair weather and aircraft reliability helped make the airlift a success. Only once did an aircraft emergency require a landing at a "diplomatically" closed airfield. On this occasion, a stuck gear door required a C-5 crew to divert to Incirlik, Turkey. In what became the standard procedure for this situation, the Turks demanded that the aircraft not proceed to Israel from Turkey once the problem was rectified. Instead, any aircraft landing at a nonparticipating base would have to return to Lajes and then reattempt its mission to Israel. Aircraft on the westbound route

home, once repaired, could continue back to the United States.[33] Fortunately, Turkey did not take more overt measures. NATO seemed satisfied to appear noncooperative to the Arab oil-producing states.

The first relief landed at 10:01 P.M. on 14 October 1973—a C-5A touched down at Lod Airport, Tel Aviv, Israel, with 97 tons of ammunition. A cease-fire was issued on 26 October, but the airlift continued until the afternoon of 14 November. Over the 32 days of the airlift operation, 567 missions flew into Lod—delivering nearly 22,300 tons of equipment, ammunition, and relief supplies.[34]

In Operation Nickel Grass, US global power—in the form of airlift—moved material halfway around the world to support an ally. While the United States had done missions of this type in Vietnam, the Middle East mission highlights the difficulties of executing global power missions without allied support, forward basing, or overflight rights. It also points to questions for the future when adversaries adopt similar economic and political measures to thwart US intervention in their regional affairs.

Contextual Inferences

This particular case study is especially enlightening when the full context of the Cold War is taken into account. In 1973 American air, ground, and naval forces were deployed at bases throughout Europe, Asia, and the Middle East to deter Soviet aggression at the height of the Cold War.[35] Having these bases provided the opportunity for the United States to project power throughout the region. It came as a shock to US leaders that, with the exception of Portugal, none of their NATO allies allowed the use of any of these forward operating locations. It was only because the Portuguese allowed the use of the Azores as a refueling stop that the United States could come to the aid of Israel.[36] While the Soviets conducted an airlift operation to resupply the Arab nations involved in the conflict, no other NATO allies were motivated to assist the United States in its aid to Israel. The Arab threat of an oil embargo against any country that helped Israel convinced the remaining NATO allies to act in their own self-interest and refuse American access to any part of the region.[37] In addition, the United States used naval assets to provide early warning and defensive counterair, as US aircraft based in Europe could not participate. This regional confrontation had global implications with both Cold War opponents facing each other through proxy; however, from a regional perspective, none of the NATO allies were willing to risk their economic security to back the American use of global power to ensure the survival of Israel.

An unpublished RAND analysis indicated that 72 percent of the 421 C-141 missions to Israel during Operation Nickel Grass were limited by cargo weight. One factor was the high density of the ammunition cargo. But the most important reason for limiting cargo weight was the requirement to carry additional fuel for the nonoptimal routing through the Azores. The RAND re-

search noted that if the C-141 had an in-flight refueling capability, each sortie could have delivered 20 percent more ammunition.[38]

As a result of this experience, General Carlton "championed air refueling as a normal operational procedure for strategic transports." He argued that the advantages would include "more rapid worldwide response capability, heavier cargoes, shorter closure times, reduced risk of terrorism, and reduced requirements for overseas base support."[39] As an institution, USAF learned from its shortfalls and pushed for improvements in its force structure to bring more capability to the airlift fleet. With Operation Nickel Grass as a catalyst, MAC placed higher emphasis on in-flight refueling training for C-5 crews; and all were subsequently trained in this task.[40] Operation Nickel Grass also highlighted the need for in-flight refueling for all airlift aircraft. This capability was added to the C-141B in addition to 23 feet of cargo space when the fleet was "stretched" to increase range and cargo capacity.[41] Operation Nickel Grass also provided the impetus to purchase a tanker with longer range and off-load capacity. The KC-10 was developed in response to this need. It would off-load twice as much fuel as the KC-135 and also "extend" its own range as an in-flight refueling receiver.[42]

The benefits of these force structure modifications were realized in October 1993 during Operation Restore Hope II. In this airlift operation, KC-10 and KC-135s refueled C-141s and C-5s during 8,000-mile direct flights from the United States to Somalia. Tankers based in England, Spain, Greece, and the United States provided fuel as the airlift moved across the Atlantic Ocean into the Mediterranean and through the Red Sea to Somalia.[43] Air Mobility Command met the challenge of coordinating airlift and in-flight refueling to compensate for the lack of available forward operating locations along the route of flight. Unlike the Israeli airlift in 1973, this humanitarian relief effort benefited from international support of the US airlift in forward basing and overflight rights. However, even in 1993—20 years after the need for increased capability to perform in-flight refueling was identified and the force structure was altered to achieve it—shortages of C-5 and C-141 crews trained in aerial refueling "threatened the efficiency of the operation" in Somalia.[44]

Force structure debates should thus consider the limitations the United States experienced in Operation Nickel Grass. The mission will not always conform to our resources. Therefore, the United States must look to ways to better enable the forces it has to perform their missions. Global power is limited by range, and in-flight refueling can enable global power. It can also extend the range of combat aircraft. This case study suggests that a long-range tanker can have great utility in a similar scenario. In addition, the political and diplomatic problems of securing forward basing and overflight rights, even with our closest allies, should be considered when developing strategy. Finally, it appears that any increase in air-to-air refueling capability of the lift fleet should be matched by commensurate transport and off-load capability in the tanking fleet.

British Vulcan Bomber Attacks on the Falkland Islands—1982

What was most bizarre—and dangerous—about this mission, code-named Black Buck, was that it involved flying some 3900 miles over the South Atlantic, to find and bomb a single runway, when the normal range of the aircraft was just 1700 miles; and with not one alternative airfield available for emergency landings or refueling, except possibly Rio de Janeiro in Brazil.

—"First Strike: Vulcan and Harriers Hit Stanley"
Falklands War

The difficulties of the long-range missions and the arduous obstacles the British had to overcome to fight a determined enemy showcase how distance can increase friction and liability in warfare—both compounded by a lack of allies and forward operating locations. For airpower, the Falklands campaign highlights the limitations and problems of relying on a strategy of global power without an entirely capable long-range force.

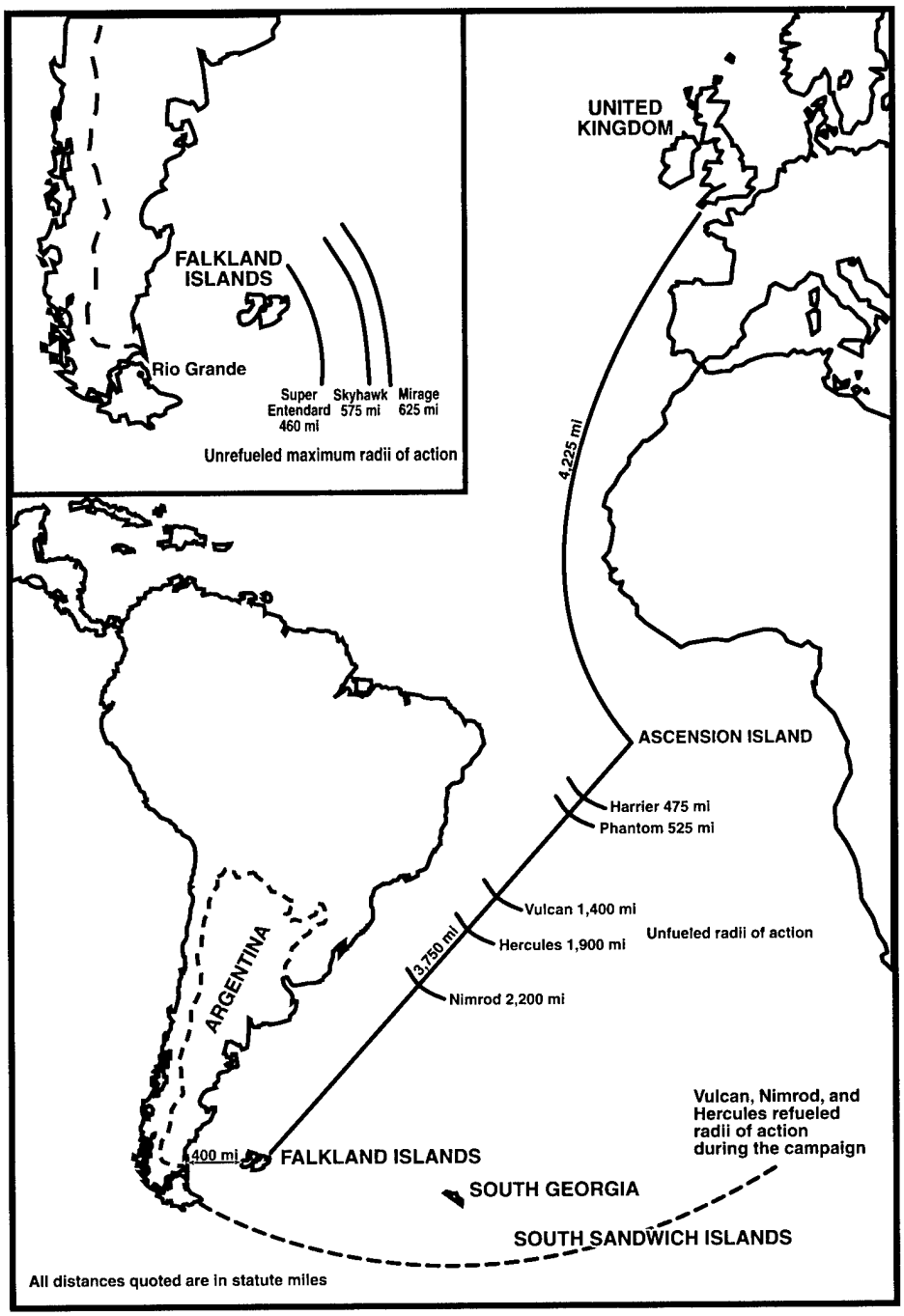
Background

In 1982 conflicting claims over the Falkland Islands, which lie 400 miles off the coast of Argentina, became a test of national will and credibility for the belligerents involved. Great Britain, whose seat of power lay more than 8,000 miles away, had colonized and populated the archipelago and was the internationally recognized—though disputed—sovereign of the island chain. Argentina had a long-standing historical territorial claim to the Falkland Islands or, as they referred to them, the "Malvinas Islands." The Argentine government pushed its claim of sovereignty to distract attention from sour domestic and political issues and enhance its credibility.[45]

The Argentines invaded in April 1982 and removed the small British marine garrison and colonial government. Britain felt compelled to respond militarily as a matter of national sovereignty and global credibility. The difficulties the British faced in liberating the colony from the Argentines were daunting. The distances were indeed global, and the United Kingdom was forced to fight its way into the area of operations to employ its forces. For the British, this was a major theater war. It required the recall of marine and paratroop forces from Easter leave, the modification of civilian ships for military transport and flight operations, and deployment of the majority of its naval fleet to protect the task force on the 8,000-mile trip to the Falklands and to sustain combat operations.[46] In addition, the Falkland Islands War "was the first time a Western Fleet had encountered mass air opposition in the jet age"[47] (see map titled Falkland Islands War Global Distances).

Problem

The British had two operational goals for airpower: (1) protect the British fleet from air attack and (2) provide close air support for the marines as they went ashore.[48] Neither side obtained total air superiority over the battlefield, and this lack of air superiority was "a contributing fac-



Falkland Islands War Global Distances

tor in the loss of five British ships."[49] The Argentine strategy was to destroy British ships. Because the Argentines operated over the Falklands at the extreme of their aircraft range, the limited loiter time available over the target drove them to attack British troops while massed at sea rather

than waiting for them to come ashore and disperse. The intent was to raise the cost to the British and force them to withdraw or negotiate.[50]

The British faced several obstacles in this scenario. The limited numbers of British carrier-based Sea Harrier aircraft had a range of just over 475 miles. The Argentines attacked the British fleet by air from the Argentine mainland, 400 miles from the Falklands, and from the airfield at Port Stanley on the Falklands. This small strip at Port Stanley could not handle the larger Argentine jets; and, fortunately for the British, the Argentines did not lengthen this runway to extend the range of their A-4s, Mirages, and Super Entendards after they invaded.[51] Consequently, the more capable aircraft within the Argentine Air Force faced the British fleet at sea at the extent of their nonrefueled combat radius.[52] The Argentines did refuel their Super Entendards during the highly coordinated Exocet attacks on British shipping. Using their Neptune aircraft for sea surveillance and early warning, the Argentines located the British fleet and scrambled their Exocet-loaded Super Entendards. They refueled them in flight with their KC-130 aircraft to extend their range and reach the British fleet.[53] Once the British fleet closed within Harrier range of the Falklands, the Argentines were able to reach the British fleet in nonrefueled attacks from Rio Grande using their A-4 aircraft armed with unguided conventional bombs.[54]

British losses were heavy. Of the 38 warships, 51 merchants, tugs, liners, and other ships deployed, six were lost and eight were damaged.[55] Five of the lost ships were warships, while the other—the *Atlantic Conveyor*—held critical supplies for the ground war.[56] The eight damaged ships were fortunate that the majority of hits came from unguided conventional bombs that did not detonate on impact. The HMS *Antelope,* hit by one such dud, later sank when efforts to diffuse the bomb failed.[57] Exocets launched from 20 to 30 miles away provided an asymmetric means for the Argentines to complicate British access to the region. In just two attacks by air, Exocets sank the destroyer HMS *Sheffield* and the cargo ship *Atlantic Conveyor.*[58] Fortunately for the British, the Argentines had only five of the air-launched versions of this missile.[59] Using $200,000 weapons to sink $40-million-dollar ships like the *Sheffield* provided a cost-efficient way for a third-world country to counter a rival it could not match dollar for dollar.[60]

The British were in the process of downsizing their navy in both numbers and capability, which left them ill equipped to defend the fleet they sent to the Falklands. The last big deck carrier of the fleet air arm, the HMS *Ark Royal,* had just been scrapped; its long-range fighter-bombers—F-4 Phantoms and Buccaneers—had been sent to the RAF; and, most costly, its Fairey Gannet airborne early warning aircraft had been mothballed.[61] This left the British fleet vulnerable to attack. The smaller carriers, HMS *Hermes* and HMS *Invincible,* carried limited numbers of short-range Sea Harriers. These aircraft, with their limited range and without early warning, could not provide an air umbrella over the fleet. The British used a defense-in-depth of screening ships with surface radars, Sea Harriers, short and medium ship-to-air missiles, and antiaircraft guns to de-

fend the fleet. However, most of the missile systems were designed for self-defense and could not provide a picket defense for the large task force.[62] Consequently, the British, in spite of their numbers and superior technology, remained vulnerable to air attack.[63] The limited numbers of Sea Harriers for interception patrols coupled with the lack of early warning aircraft guaranteed that the first major air battles of the conflict witnessed many of the intercepts occurring right over the British fleet.[64]

Neutralizing the Argentine air threat was a major concern for the heads of both the British army and the Royal Air Force (RAF).[65] The easiest way to counter this threat was to attack the Argentine airfields on the mainland, but the British could not attack the mainland without exposing the fleet to attack from land-based aircraft. Air Chief Marshal Sir Michael Beetham, head of the RAF, considered using Vulcan bombers to attack the Argentine airfields closest to the Falklands. Logistically, however, the 8,000-mile round trip would take 17 in-flight refueling tankers to get just one bomber from Ascension Island to the target and back. Since the Vulcan lacked laser-guidance systems, at least four bombers carrying gravity bombs would be required to ensure adequate coverage of a single airfield. Constrained by limited ramp space at Ascension and limited numbers of Victor tankers and crews, Vulcans could not be justified as cost effective or realistic.[66] However, the airfield at Port Stanley presented a scenario where one aircraft putting one bomb on target might be enough.[67] One Vulcan bomber could potentially deny the Argentines the use of the field for its Pucara aircraft as well as the C-130 transports resupplying the island. "Most significantly, [it would] also give the Argentinian garrison something to think about."[68] Attacking Port Stanley, however, would not give the British air superiority or prevent the Argentines from attacking the British fleet. In fact, even after two Vulcan attacks and numerous attacks made by Harriers and Sea Harriers, the British were unsuccessful in preventing Argentine operations from Port Stanley during the war.[69]

Answer: Operation Black Buck

The Vulcan missions to the Falklands were code-named Black Buck. The range and capabilities of the British Vulcan bomber and Victor tanker force were stretched to the absolute limit in performing these missions. The British-built Vulcan bomber was originally designed as a medium-range nuclear bomber to support NATO and had a limited range of 1,700 miles. To use it in this conflict, the British had to refurbish the 25-year-old Vulcan's internal air-refueling equipment and retrain its crews in air-refueling procedures.[70] The length of the mission, the fuel capacity of the bombers, and the fuel capacity and range of British Victor tankers created an air-refueling scheme (shown in fig. 1) that was graphically and operationally complex.

Flying from Ascension Island, the British used 11 tankers (which included two spares) and 17 in-flight refuelings to enable the Vulcan bomber to make the 7,732 NM round trip.[71] The limited fuel capacity of

the Victor tanker fleet meant that to accomplish the mission, tankers would refuel tankers to provide fuel to the attacking Vulcan at various points along the mission route. Although the British asked the United

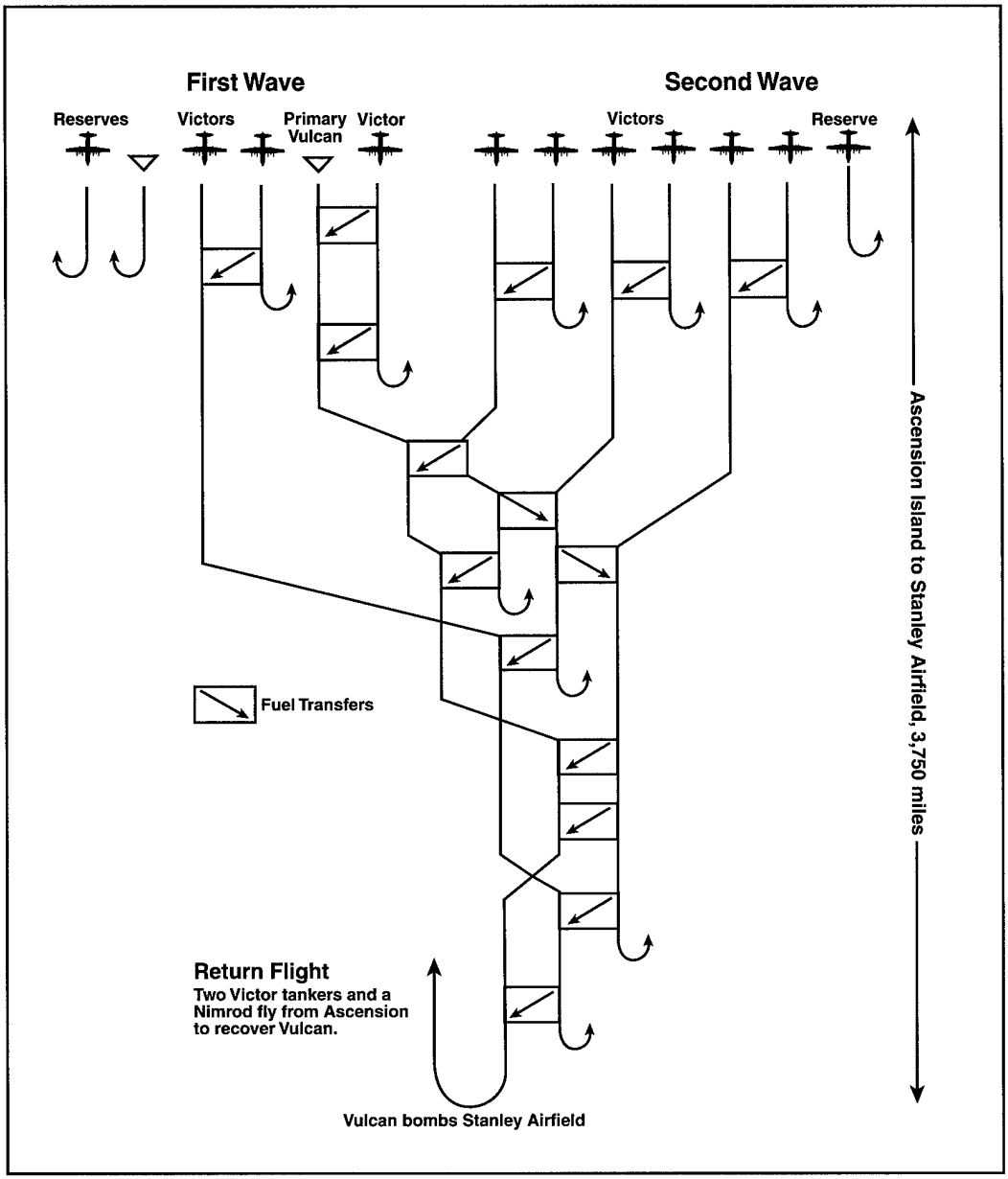


Figure 1. Operation Black Buck Refueling Plan

States for in-flight refueling support from KC-135 Stratotankers, President Reagan permitted only limited American actions. Military supplies were offered to Great Britain and sanctions, both military and economic,

were imposed against Argentina. No American personnel were involved in direct support of hostile actions.[72]

The Vulcan missions flown during the war were, at the time, the longest combat bombing sorties in the history of warfare.[73] Black Buck missions were successfully executed on five out of seven attempts. The first Black Buck mission attacked the runway at Port Stanley. This "silver bullet" carried 21 unguided 1,000 lb bombs and released them from medium altitude.[74] While this mission did manage to crater the runway at Port Arthur, it was soon repaired; and resupply flights came in and out regularly throughout the war.[75] The results of the remaining four missions were minor compared to the enormous effort expended to get the Vulcan bombers to the fight. Black Buck 2 also targeted the airfield at Port Stanley and missed with all 21 of its 1,000 lb bombs. Black Buck 5, the next mission to successfully strike, launched two US-provided Shrike antiradiation missiles against a radar early warning facility and caused minor damage. Black Buck 6 flew a similar mission profile and destroyed the fire control radar for an antiaircraft battery. Last, Black Buck 7 attacked the facilities at Port Stanley with 21 1,000 lb bombs.[76] While the British effort was admirable, it revealed the inadequacies of RAF in-flight refueling tankers, bombers, and laser-guided bomb technology for conducting long-range, precision conventional strikes.

Contextual Inferences

Many global power issues complicated the British fight for the Falkland Islands. Availability of forward operating locations, lack of allied support, denial of access, and the limits of British technology were all factors that complicated the British ability to fight this major theater war. While the British eventually overwhelmed the Argentines and gained a military advantage from the sea, their land-based third-world opponent held an asymmetric airpower advantage due to its shorter logistics trail and the vulnerability of the British fleet to attack. The real enemy for the British was the distance their forces had to travel to engage the enemy. The British could not concentrate airpower from long range to affect the battle for air superiority over their own forces on land and sea. The Argentines, on the other hand, conducted an effective denial-of-access campaign and successfully sank five British ships.

It is arguable that while "the Vulcans accomplished little tactically, they did have an important psychological effect because the Argentines were made to believe that British Prime Minister Margaret Thatcher could lose her patience and order the bomber strikes against mainland targets."[77] While that may be the case, it is also necessary to point out that British long-range airpower was ineffective in overcoming the obstacles of projecting power. It is also relevant to point out that the British ability to project force and influence events from the sea was ac-

tively denied by a third-world power using high-technology missiles in combination with airpower.

The Vulcan bombers and Victor tankers were not designed for the range of these missions. However, the problems the British faced in gaining access to the Falklands and denying the runway at Port Arthur to the Argentines was not lost on their after-action analysis. In the minister for defence's report to Parliament after the war, air-to-air refueling was noted as

> [V]ital in supporting operations at long range. In the operations from the Ascension Island, the relatively small amount of fuel carried by the Victor tanker aircraft resulted in a large proportion of the available tanker force being used for each Vulcan, Nimrod [sea surveillance], and Hercules [C-130 transport] sortie. *Large capacity strategic tanker aircraft are needed to provide greater operational flexibility in the future* (emphasis added).[78]

The report recommended the "purchase of wide-bodied tankers which will considerably enhance the capacity of the Royal Air Force's tanker force and will be a significant force multiplier for all the Royal Air Force's combat aircraft."[79] In addition, following the war British Vulcan bombers slated for retirement were converted to in-flight refueling tankers to fill the gap in refueling capability identified after the Falkland Islands War.[80]

The British did not have the ability to gain access to this theater without exposing their fleet to attack and potentially large losses. Long-range airpower was required to establish air superiority. The long-range forces available were unable to contribute to the British objectives of protecting its fleet at sea and its troops on shore from attack. This war reveals the price a nation may pay to gain access to a region without forward basing, without allied support, with an enemy that actively denies access, and without technology capable of surmounting these obstacles.

This case study suggests that long-range airpower and tanker support aircraft capable of supporting missions over long distances and without forward basing should be a focus for a nation that accepts the proposition that their adversaries will attempt to deny them access to their region. It also suggests that in situations without forward basing for ground troops and land-based aviation, having those forces afloat presents a large, visible, and vulnerable target for an adversary to attack. Depending on the technology available, an enemy may be able to deter action from the sea simply by having a credible capability to attack shipping with air- or surface-launched missiles. In this particular case, the British could not achieve air superiority, and it cost them dearly. Long-range aviation might achieve better effects against similar targets with standoff and precision-guided munitions. In situations such as this, where forward basing is not available, long-range aviation may be the only means to provide force protection for forward deploying troops and ships against an adversary such as the one the British faced in the Falkland Islands War.

Operation Eldorado Canyon—US Raid on Libya, 1986

When our citizens are abused or attacked, anywhere in the world, on the direct orders of a hostile regime—we will respond, so long as I am in the Oval Office.

—President Ronald W. Reagan
Address to the Nation on Libya
14 April 1986

When the United States is a target for terrorism, it must be prepared to act to ensure its regional and global credibility and defend its interests. Acting unilaterally, even when surrounded by allies, may be necessary again in the future. This case study reveals the political nature of allied support in the use of global power. Gaining support in Europe to use military force against Libya was intertwined with the regional and internal politics of the many European states. The desires of the United States to act against a regional aggressor were balanced not only by US political motivations but also by the internal machinations of all the European allies. For the United States to act in its own interests without allied support, it must have a capable independent force structure. Building force structure that is dependent on allies for its use may reduce its utility in operations below major theater war. This case study reveals the difficult nature of gaining allied support for military action at the lower ends of the spectrum of conflict where the lines between politics, regional interests, regional security, and military action blur according to the vision of those involved and their own local politics.

Background

Since President Reagan took office in 1981, the United States had used military, economic, and diplomatic actions against Libya as a means to discourage its support of terrorism. Because of Libya's continued support of terrorism, US relations with Libya were completely broken off in January 1986.[81]

President Reagan adopted a policy in April 1984, National Security Decision Directive 138, which stated in principle that the United States would act preemptively and in retaliation against terrorists.[82] State-sponsored terrorism is a difficult crime to prove and prosecute due to its very nature. In order to act, the United States required solid evidence that a state was actively engaged in sponsoring terrorism against America. If the United States was going to convince its allies to take a large-scale military action against Libya, the "US needed to make public some solid evidence of an anti-American act by Libyan President Moammar Qaddafi in as short a time as possible."[83] The opportunity presented itself after the bombing of the La Belle discotheque nightclub in West Berlin on 5 April 1986. The bombing of this popular spot among US service members killed one US soldier and a Turkish woman while injuring 230 others, including 50 American military personnel.[84]

President Reagan was determined that the United States "would act with others if possible, and alone if necessary, to ensure that terrorists have no sanctuary anywhere."[85] The direct link to Libya was established by US intelligence and enabled the president to authorize air strikes against Libya. American intelligence intercepted a message from Qaddafi ordering an attack on Americans "to cause maximum and indiscriminate casualties."[86] Another communications source, an intercepted Libyan message, outlined the attack planned and executed in West Berlin. The final piece of evidence was the report after the attack from Berlin to Tripoli by the Libyan-sponsored terrorist unit, the Libyan People's Bureau, exalting the "great success" of the mission.[87] While sufficient for the United States to act, this evidence was not as compelling to our NATO allies in the region to gain their support for military action. In essence, allied support became the obstacle for the use of global power against Libya.

Problem

US attempts to gain support for measures to isolate and punish Libya throughout Europe met with little success. The United States found that its European allies were unwilling to support what the United States believed was a logical and just military strike. The international behavior of the European allies was heavily flavored by domestic concerns on the part of governments and individual leaders. In order to support actions against terrorism, a state, its government, and its leadership all have to weigh the long- and short-term impact of taking action. Political and domestic capital, much like economic capital, has a wide audience in any state when it is spent. Regardless of the "righteousness of the cause," each nation had to consider its own economic, political, and internal interests. These interests dictated the level that the heads of state or governments could align themselves with interests outside of the state. For each state there was an internal domestic price as well as an external security price for alignment with the United States. In the end, each European ally made its decision based on its own interests.

The United States worked hard to gain allied support. Why the United States chose not to act unilaterally with the naval assets it already had in the region is a matter of debate. It is arguable that the United States wanted to include other European allies to legitimize its actions politically.[88] After the raid it became apparent that "US military action had a central role in galvanizing the allies to adopt positions that were markedly closer to those of the United States."[89] Regardless of motive, the United States argued to its allies that in order to achieve tactical surprise it was necessary to hit all of the planned targets at the same time. In addition, the United States argued that to limit collateral damage and risk to US aircrews, precision weapons must be used. At that time the only aircraft in the US inventory capable of conducting a precision night attack were the Navy's A-6 and the Air Force's F-111F.[90] The Navy had two carriers in

the Mediterranean, USS *America* and USS *Coral Sea,* and each had 10 A-6 aircraft. However, this was not enough aircraft to hit all five targets at once.[91] The Navy could have hit the targets on successive attacks, but that would have exposed the fleet and the aircraft to a fully alerted air defense network during the second attack wave. This prompted military strategists to explore using F-111Fs in conjunction with the A-6s. The closest F-111Fs in the theater belonged to the 48th Tactical Fighter Wing at RAF Lakenheath in the United Kingdom.[92] Using the F-111Fs added a layer of complexity and coordination to the mission as it became a joint Navy–Air Force operation. Gaining permission from the British for the use of Lakenheath and coordinating the strike routing over France and/or Spain to the target rapidly became the focus of this global power effort.

While domestic and economic concerns played a role, the difficulty in obtaining allied support can also be described as a cultural confrontation between the United States and Europe. While the United States was an activist in global affairs, "Western Europeans were more accustomed to coexisting with unpleasant neighbors."[93] The firsthand experience of Europeans with domestic terrorism has made them "wary of American appeals to uproot a phenomenon that has shown considerable resistance."[94] The British have had to contend with the Irish Republican Army, the Spanish with Basque separatists, the Germans with the Red Army Faction, and the Italians with the Red Brigade. In fact, one unidentified French diplomat summed up the European view as "We accept the idea that some loss of life, at home and abroad, is and will continue to be a fact of life, however wasteful and tragic."[95] If war is a continuation of politics by other means, this case study reveals the multipolar nature of those politics when they involve an alliance. Eldorado Canyon also reveals the difficulty of gaining access to forward basing and overflight rights even in regions where the United States already has a large presence and the impact that can have on the application of global power.

Answer

Initially, the British objected to US military action. In a *New York Times* article dated 11 January 1986, Prime Minister Thatcher is quoted as speaking out against possible US retaliatory strikes against Libya, "warning that such strikes were 'against international law.'"[96] To gain her approval to use the F-111F aircraft stationed in England, President Reagan appealed directly to Thatcher. He told her the F-111F aircraft were needed "because by virtue of their special characteristics they would provide the safest means" to carry out the raids "with the lowest possible risk of civilian casualties and casualties among United States service personnel."[97] Mrs. Thatcher had to consider the 5,000 British citizens living in Libya as well as the United Kingdom's economic relationship with Libya in making this decision. This was balanced against Great Britain's "special relationship" with the United States and the "Falkland Factor." In making her de-

cision, Mrs. Thatcher reminded the British citizens that "[w]e must never forget that the United States forwent regional interests in Latin America to give us fantastic help on the Falklands."[98] In the end, Mrs. Thatcher told the president she would support "action directed against specific Libyan targets demonstrably involved in the conduct and support of terrorist activities."[99]

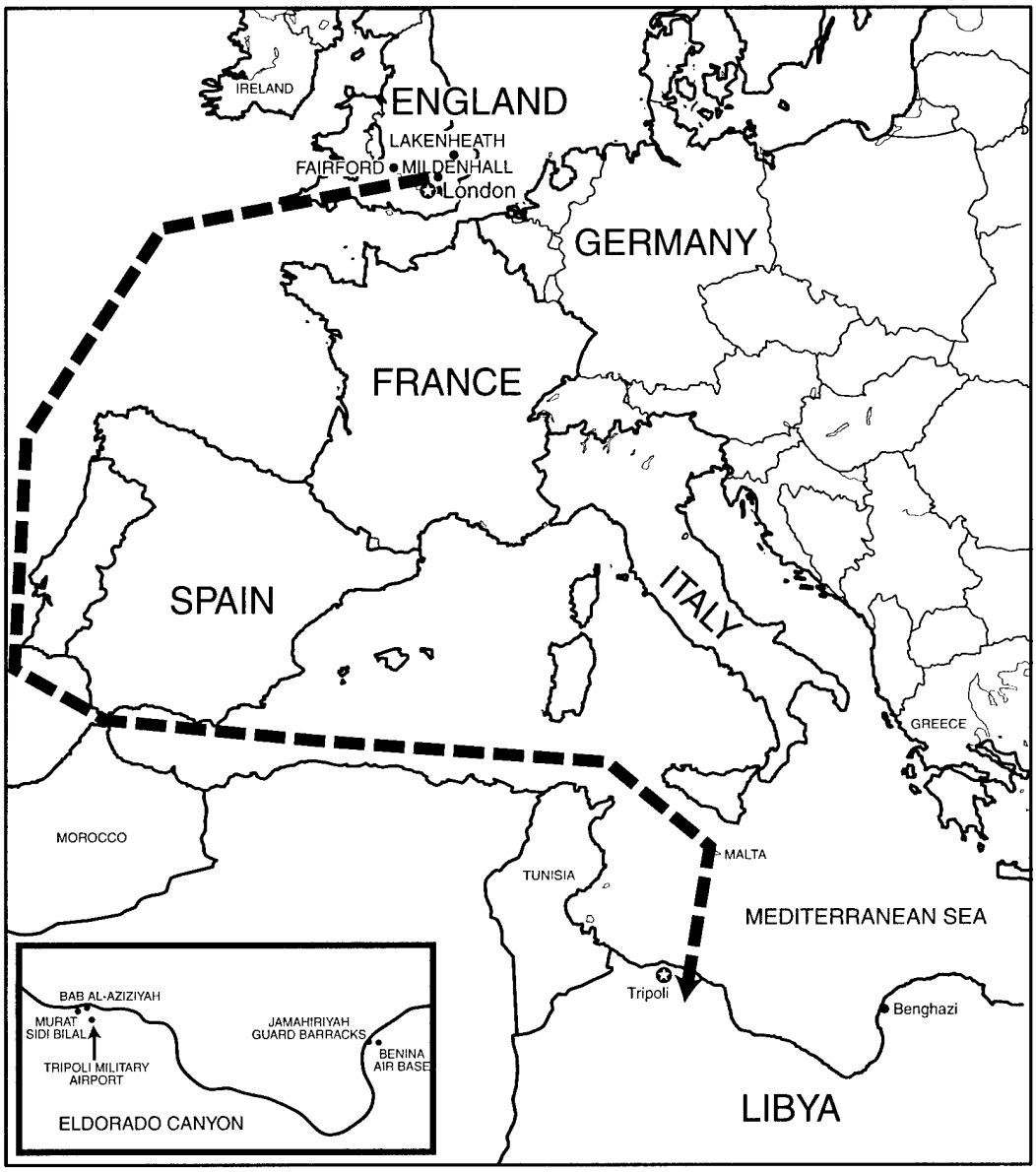
Presented with the evidence the United States had gathered after the 5 April terrorist attack in Berlin, the British allowed the use of its territory as a forward base. The domestic political cost was high for Mrs. Thatcher, as two-thirds of British voters opposed this support.[100] In addition, anti-American sentiment in the United Kingdom, measured by a February 1986 poll, showed that 54 percent of the British questioned agreed that the "United States was either as great a threat to world peace as the Soviet Union or a worse threat."[101]

President Reagan made similar appeals to both France and Spain, but each refused overflight rights. The one-way distance grew from 1,500 miles to 2,800 miles, which added approximately seven hours of flight time to the round-trip mission and required additional air-refueling support (overview shown on map).[102] The French objected because they felt the United States involved the French too late in the planning and presented them with a fait accompli. They argued that the raid would increase terrorist activity in Europe and that it was too weak to achieve its objective.[103] Spain's refusal for overflight required the attack to fly around the entire Iberian Peninsula. Spain's prime minister, Felipe Gonzalez, also disagreed with the method of the raid. Faced with sharp disagreements from potentially useful allies, the United States diplomatically chose to emphasize the positive by noting that neither Spain nor France revealed to the Libyans that the United States had secretly asked for overflight rights.[104]

The Attack

On the evening of 15 April 1986, the first aircraft to take off from the United Kingdom were 28 KC-10 and KC-135 tankers. They were quickly followed by 24 F-111Fs and six EF-111 Raven jamming aircraft. After the first in-flight refueling, the six spare F-111Fs and the one spare EF-111 returned to base as planned.[105] Four in-flight refuelings and several hours later, the remaining planes entered the Mediterranean Sea by a circuitous route and joined the waiting Navy strike force. To facilitate attack coordination, the strike was operationally and geographically divided between the Navy and the Air Force. Navy A-6s struck the two targets in the Benghazi area while the Air Force F-111Fs hit the other three targets in the vicinity of Tripoli.[106]

The attacking aircraft dropped 60 tons of munitions. There was little resistance other than antiaircraft artillery; however, one F-111F was lost, for reasons that are still unknown. After two in-flight refuelings on the return trip, the remaining aircraft returned to the United Kingdom except for one



Operation Eldorado Canyon Overview

F-111F that landed in Spain with an engine problem.[107] The entire flight duration from takeoff to landing was approximately 13 hours.[108]

Results

The measurable damage that resulted was consistent, on the tactical level, with what US planners expected to achieve. Of the 18 F-111Fs, one aborted because it could not meet timing criteria, one aborted over the water, and three aborted in the target area after equipment malfunctions

restricted their weapons release under the rules of engagement. One lost its terrain-following radar and also aborted. Of the 11 aircraft left, one made a radar aiming error and damaged the French embassy instead of its intended target. Five dropped their laser-guided bombs and damaged their targets while the remaining five released unguided weapons on the Tripoli airport, damaging several IL-76 transport aircraft and facilities located there.[109] On the Navy side, one A-6 aborted on deck and two aborted in the air, leaving 12 to strike the two targets. These strikes caused significant damage.[110] The high abort rate was disappointing to the Air Force but was a reflection of the restrictions imposed by the strict rules of engagement for timing and equipment, as well as the fragility of some of the critical F-111F subsystems.[111] The United States considered the raid a military success and a political success as it galvanized European attitudes towards Libya making "several European leaders eager to limit their differences with Washington and poised them to move well beyond past summit declarations on international terrorism."[112]

Contextual Inferences

In this case study, carrier-based aviation played a significant role. In fact, it is arguable that carrier-based aviation was the optimal solution in this scenario because all the targets were near the coast and because the Navy could accomplish all the required support roles of air superiority and electronic combat. The use of long-range aviation from the United States could have played a similar role; however, at a minimum, forward basing for tankers to support the force structure would have been essential. Consequently, limited allied support would have been required. If the United States really wanted the ability to act unilaterally in this scenario or one like it in the future, a long-range strategic tanker paired with long-range bombers based in America would be required.

The ability of the United States to act unilaterally was blocked by the interests of the individual Western European states. Understandably, there are times when developing a coalition and holding an alliance together are part of the process of using force to pursue national interests. By involving the United Kingdom and attempting to involve the French and Spanish, the United States sought to gain wider, even latent, participation. The desired effect of Operation Eldorado Canyon extended beyond the weapon effects on the ground. The political effect was to build consensus among our European allies to further isolate Libya for its support of terrorism. The line between politics and war is thin, and part of the long-term political solution for Libya rested in gaining consensus for a military course of action among the European allies. Therefore, gaining access to forward basing and overflight rights was part of the political and military solution to ensure the diplomatic tranquility of the region and the US legitimacy to involve itself in this regional issue.

The ability to act unilaterally was also hampered by force structure limitations during Operation Eldorado Canyon. The Navy was constrained by the small number of strike aircraft aboard ship and the inability to drop precision-guided munitions, and the Air Force was hampered by the distance its medium-range bombers had to fly and the inability to operate without allied assistance. Although long-range strike was a strategy pursued by the United States, the force structure to enable this strategy was underdeveloped and forced American leaders to pursue a riskier operation.

Operation Desert Strike—1996

Once, I remember, we came upon a man-of-war anchored off the coast. There wasn't even a shed there, and she was shelling the bush . . . In the empty immensity of earth, sky and water, there she was, incomprehensible, firing into a continent. Pop would go one of the 6-inch guns: A small flame would dart and vanish . . . a tiny projectile would give a feeble screech—and nothing happened. Nothing could happen.

—Marlow
Heart of Darkness

The focus of this case study is not to evaluate the congruence between the political or military objectives at the national command level and the eventual outcomes of this operation. Although the United States and its Arab allies saw the situation differently, the United States employed its global power strategy to act in its primary interests in the region without damaging the coalition. Even if the political context of this operation begs the question of whether or not the United States should have taken action, the global power question is more basic: When the United States decides to act, does its force structure allow it to act? While apparently confirming the ability of the United States to project power with long-range bombers, this case raises questions about the utility of expeditionary forces that are reliant on forward basing, allied support, and strategic warning.

Background

When Operation Desert Storm ended in 1991, the 3.5 million Kurds living in northern Iraq joined factions to gain independence from a weakened Iraq. Iraqi Republican Guard forces violently ended this insurrection, and a million Kurds fled their homes and cities for Turkey. The flow of refugees destabilized the region, and the United Nations (UN) reacted with UN Security Council Resolution (UNSCR) 688, which led to Operation Provide Comfort.[113] US-led coalition aircraft established a no-fly zone (NFZ) above 36 degrees north latitude to secure a safe haven for the relief effort. Coalition aircraft continued to enforce the northern NFZ during phase two of Operation Provide Comfort, which in early 1997 became Operation Northern Watch.[114]

On 31 August 1996, approximately 40,000 Iraqi ground troops moved above the 36th parallel in northern Iraq to remove some Kurdish factions

from the city of Irbil, which was located inside the safe haven. US efforts to influence the situation were complicated. Britain supported the US position that the Iraqi incursion into the northern NFZ was prohibited by the UNSCR. However, most of the Arab nations and Turkey, in particular, viewed the incursion as an internal security measure. The lack of Middle Eastern support for the American position meant that Arab and Turkish allies in the region refused to allow the United States to use any of its forward-deployed forces on the Arabian Peninsula or in Turkey to retaliate against Iraq.[115] Without these aircraft, American military options quickly devolved to Navy tactical land attack missiles (TLAM), carrier-based aircraft, and long-range aircraft.

Problem

The United States intended to "punish and weaken Hussein"[116] by targeting his ability to harass aircraft enforcing the southern NFZ. In addition, the United States wanted to send a "signal of international condemnation for the latest violation of UN resolutions."[117] The decision to attack targets in the south in retaliation for Iraqi aggression in the north was also dictated by several factors. First, politically, land-based aircraft were not available due to the lack of host-nation support. Second, carrier-based aircraft lacked the range to reach targets in the north without land-based in-flight refueling support; and US allies in the region also denied this limited support. The decision to use cruise missiles was driven by the lack of stealthy carrier-based aircraft to attack the air-defense targets in the south.[118] Secretary of Defense William Perry noted that the whole mission could have been done by either TLAMs or by B-52s with CALCMs. He also indicated that Navy air could have been used, but cruise missiles provided the advantage of minimizing risk to the US forces involved. He emphasized that "[t]he choice of a combination of TLAMs and B-52s [was] a choice of convenience, not a necessity."[119] While many have questioned the logic of the decision to attack the targets in the south in retaliation for the Iraqi incursions in the north, this attack represented the limits of what the force structure could accomplish, given the political constraints of the situation.[120] The United States was able to overcome the lack of political support in the region through a global power response with naval forces and the deployment of long-range bombers armed with ALCMs. These weapons and the force structure to support them ensured the United States had the ability to act in its interests in the region regardless of allied political support.

Answer

From 3 to 4 September 1996, Operation Desert Strike used Navy TLAMs and B-52 CALCMs against air-defense targets in southern Iraq. The mission began on 31 August when three B-52Hs armed with eight CALCMs and a C-5 with additional aircrews and support personnel deployed from

Barksdale AFB, Louisiana. After a 16-hour flight with in-flight refueling support from 14 tankers and a time change across the international date line, the aircraft landed at Andersen AFB, Guam, in the early morning of 2 September.[121] KC-135 tankers from Fairchild AFB, Washington, and KC-10 tankers from Travis AFB, California, and McGuire AFB, New Jersey, were used to support the deployment and strike portion of the 14,300-mile mission. Several of the tankers deployed to Diego Garcia, a British-held territory in the Indian Ocean, to support poststrike in-flight refueling requirements. Additional KC-135 tankers already in place at Kadena AB, Japan, also provided in-flight refueling support for the strike mission.[122]

On 3 September 1996, less than 18 hours after landing on Guam, the three B-52s and two KC-10 tankers took off together for what would be the longest combat sortie in history.[123] After the first in-flight refueling, the single airborne spare B-52 returned to Guam and the two remaining B-52s attacked the 16 assigned targets.[124]

In-flight refueling was critical to extend the range of the bombers for the 34-hour strike mission. KC-135s from Kadena AB met the formation over the South China Sea to refuel both the B-52s and the KC-10s. During the 14,300-mile mission, 15 tankers off-loaded 1,360,000 pounds of fuel to support the nonstop round-trip to Guam.[125] The British allowed the use of Diego Garcia for deployment of tankers to support the operation. The KC-10s that took off from Guam were scheduled to land in Diego Garcia, while other KC-10s deployed to Diego Garcia launched to support poststrike in-flight refueling requirements for the bombers' return leg to Guam.[126]

The flexibility of this force structure, the range and fuel capacity of B-52s, and the large off-load capability of the KC-10 provided a large degree of slack for this mission. One of the KC-10s that departed Guam suffered an engine failure during prestrike refueling and had to abort prior to completing its transfer of fuel. The remaining KC-10 off-loaded additional fuel to make up for the loss and then diverted to Utapao, Thailand.[127] One of the KC-10s at Diego Garcia scrambled to perform an additional prestrike refueling to make up for the lost fuel in flight.[128] After landing at Diego Garcia, this same KC-10 crew refueled and was back in the air in one hour to support the post-strike refueling for the B-52s on their return leg to Guam. Fifteen tankers spread out over the Pacific at locations in Guam; Kadena AB, Japan; and Diego Garcia made it possible to complete the mission.[129]

The US Navy's destroyers USS *Laboon* and USS *Shiloh* fired the first shots of Operation Desert Strike in the late evening of 3 September 1996 when they launched 14 TLAMs from their positions in the Persian Gulf. In the early morning hours of 4 September, the two Air Force B-52s, escorted in the Persian Gulf by F-14s from the USS *Carl Vinson*, fired 13 of their 16 CALCMs.[130] All of the weapons launched were targeted against surface-to-air missile sites and command and control nodes in southern Iraq.[131] Later, on 4 September, the US Navy's destroyers USS *Russell Hewitt* and USS *Laboon* and the nuclear-powered attack submarine USS *Jefferson City* launched a second strike of 17 TLAMs.[132] In addition, the NFZ in the

south was extended from 32 degrees to 33 degrees north latitude, just below Baghdad. This forced Iraq to relocate the aircraft and air defenses in this region farther north.[133]

Contextual Inferences

In the following weeks, the bulk of Iraq's forces stood down and withdrew to garrison.[134] Iraq, however, had achieved its objectives in the north. Iraq installed a favored Kurdish faction in Irbil, established its secret police and intelligence organizations in the area, and executed or expelled the Kurds who were aligned with the West.[135] The US response, while not congruent with stopping Iraqi aggression against the Kurds, was aimed at influencing Iraq's behavior in the future. When he was questioned, General Ralston, vice chairman of the Joint Chiefs of Staff, explained that the US intent was to reinforce the point that "if he [Saddam Hussein] violates the norms that are expected . . . he will suffer a penalty. In this particular case, he is suffering a penalty in loss of sovereignty over his airspace, and his armed forces are suffering a penalty in terms of their ability to train and of their combat readiness."[136]

Allied Support. Allied support from the British allowed long-range airpower to complete in-flight refueling for the mission. The British territory of Diego Garcia in the Indian Ocean is an important forward operating base in this region and ensured access for US long-range aircraft to Southwest Asia. In addition, Diego Garcia provides a forward operating base outside of the theater to protect against and provide additional warning time for potential theater ballistic missiles or hostile air attacks. The geography of the Pacific Ocean and the availability of forward operating locations in the region point to the need to maintain a flexible and healthy long-range striking force of bombers and large capacity tankers in the US force structure.

The difficulties of gaining support from regional allies for limited strikes supports the notion that the interests of the United States may not always be congruent with the interests of regional allies. In the future, it is likely that a clash between US desires to pursue limited aims in a region and regional allies' desires for diplomatic solutions will temper the US pursuit of regional interests. In this particular case, it was difficult for allies to connect the dots between the targets, the strategy, and the desired political outcomes. The commander of ACC, Gen John P. Jumper, acknowledged that our coalition partners in the Gulf region did not agree with our "asymmetrical strategy of bombing targets in southern Iraq in retribution for Iraqi actions against the Kurds in the North." General Jumper noted that the cruise missile attacks "clearly demonstrated the US resolve"; however, the United States did not deny the Iraqis the ability to violate the UNSCR established to protect the Kurds.[137]

The lack of political support in the region did not thwart the US desire or ability to strike. Secretary of Defense Perry made it clear after

Operation Desert Strike that "we acted on our own national interests, which is the President's responsibility." He also emphasized that while "[w]e expect most of our allies to be supportive . . . most importantly, I would point out we did not need their participation in this strike. We have the national resources to conduct this strike."[138] The force structure must continue to provide the resources to conduct strikes of this type on a similar scale.

Tankers. KC-135s and KC-10s extended the range of the bombers to accomplish the mission. KC-135 tankers extended the range of KC-10 tankers for later in-flight refuelings of the B-52s. The ability of the KC-10 to receive fuel in flight makes it a valuable asset for future global power missions as it solves the problems of range and forward basing. Although this mission required a high ratio of tankers to bombers, the obstacles of mission length, distance, forward operating bases in the Pacific, and in-flight aborts for emergencies were surmounted by the flexibility provided in the force structure.

Results. The 44 cruise missiles launched during Operation Desert Strike achieved mixed results against their assigned air defense targets. "Folks used to seeing better performance than this were disappointed" by the lack of accuracy and effectiveness of the attacks.[139] The accuracy of the cruise missiles came into question when the second wave of 17 TLAMs attacked targets that the first strike had either missed or did not damage sufficiently.[140] General Ralston explained that damage assessment was impeded by weather and where there "was any doubt at all as to whether we reduced the effectiveness of his air defense system, we thought it prudent to go back with a restrike."[141] Global power to conduct air strikes requires weapon systems that are capable of achieving desired results. Cruise missile attacks such as these may not provide the level of accuracy or effects needed for the future. Systems that are capable of penetrating enemy defenses to deliver precision munitions are required for global power to be a credible threat. If cruise missiles cannot provide the needed punch, modifications, new acquisitions, and delivery methods to provide the desired effects must be pursued.

Conclusion

The US strategy of maintaining a forward presence in the Gulf to deter Iraqi aggression and to enforce UNSCRs did not provide the means for the United States to respond to this particular instance of Iraqi aggression. The difference of opinion on the nature of the conflict led to a lack of support within the Gulf Cooperation Council to support reprisals or to allow the use of airfields where US forces were based. The aerospace expeditionary force in the region was restrained by politics; however, Navy ships deployed to the Persian Gulf as well as rapidly deployed long-range bombers provided the means for the United States to strike unilaterally. Air refueling played a key role in deployment of and execution of the missions flown in Operation Desert Strike.

Case Study Summary

The evidence presented in the four case studies reveals much about the nature of the world and global power. While an acid test of US policy may be found in the ability to secure allies and forward basing, each case represented an instance where the United States chose to act without the desired level of allied support. In each case, diminished allied support led to a range problem that the force structure was left to resolve. The US airlift to Israel during Operation Nickel Grass is a case in point where American allies were coerced into refusing to allow the United States access to forward bases on their territory. Combat operations in Libya and Iraq faced similar opposition and forced the United States to craft solutions that were overly dependent upon limited air-refueling resources. The Falkland Islands War and the Operation Black Buck refueling plan provide sobering examples of the cost of a force structure that lacks range and is forced to operate over long distances. The United States faces similar long-range scenarios within the Pacific theater in the twenty-first century that are further complicated by issues of active access denial. In the future, regardless of whether the United States is able to build a political/military bridge, if the United States wants to act unilaterally, it must have more than the will to act—it must also have the force structure that can act independent of foreign entanglements.

Notes

1. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 606.
2. Kenneth L. Patchin, *Flight to Israel* (Scott AFB, Ill.: Office of Military Airlift Command History, 1 July 1976), available from Air Force Historical Research Agency (AFHRA), Maxwell AFB, Ala., doc. no. M300.03-87, 3.
3. Ibid., 3–5.
4. Ibid., 5.
5. Ibid.
6. Ibid.
7. Ibid., 4–6.
8. Ibid., 5.
9. A. Timothy Warnock, ed., *Short of War—Major USAF Contingency Operations, 1947–1997* (Washington, D.C.: AF History and Museums Program, 2000), 80.
10. Patchin, 7.
11. Paul Killingsworth et al., "Tankers: Air Mobility Roles for the 1990s," RAND study, DRR-913-AF/OSD, November 1994, 8.
12. Patchin, 102.
13. Ibid., 100.
14. Ibid., 101.
15. Ibid., 34, 102.
16. Ibid., 34.
17. Ibid., 10.
18. Ibid., 34.
19. Warnock, 81.
20. Patchin, 34.
21. Ibid., 32, 86. These other missions are not discussed in the history; however, the history reports that on 14 October, SAC deployed 13 KC-135 tankers and 142 personnel

to Lajes—further congesting the overcrowded outpost—without consulting MAC. When queried by MAC, SAC responded that "refueling concepts" necessitated a beddown of nine KC-135s and aircrews at Lajes. This indicates to the author, as does the evidence of an increased defense readiness condition alert status, that SAC was dispersing and forward deploying its forces in accordance with single integrated operational plan nuclear war plans. It makes sense that General Wade would be aware of this, while General Carlton—as the head of MAC—would not.

22. Warnock, 81.
23. Ibid.
24. Patchin, 36.
25. Ibid., 37.
26. Ibid.
27. Ibid., 99.
28. Ibid., 57.
29. Ibid., 59.
30. Ibid., 68.
31. Ibid., 67.
32. Ibid., 72–74.
33. Ibid., 103.
34. TSgt Charles Ramey, "Dover Remembers Operation Nickel Grass," 436th Airlift Wing Public Affairs, 23 October 1998. Note: 14 October to 14 November encompasses at most 31 days; however, when the first aircraft touched down on 14 October 1973, it was 13 October in the United States with the time change—hence 32 days.
35. Williamson Murray, "The United States Should Begin Work on a New Bomber Now," *Policy Analysis*, March 2000, 2.
36. Warnock, 81.
37. Patchin, 8.
38. Killingsworth et al., 8.
39. Ibid., 8–9.
40. Lt Col Peter Wangler, USAF Doctrine Center, Tanker/Transport Doctrine Office, interviewed by author, 24 March 2001.
41. Killingsworth et al., 9.
42. Warnock, 81.
43. Ibid., 216–17.
44. Ibid., 218.
45. Bruce W. Watson and Peter M. Dunn, *Military Lessons of the Falkland Islands War: Views from the United States* (Boulder, Colo.: Westview Press, 1984), xi; and Rodney A. Burden et al., *Falklands: The Air War* (London: Arms and Armour Press, 1986), 101–4.
46. *Sunday Times of London* Insight Team, *War in the Falklands—The Full Story* (New York: Harper & Row, 1982), 30–62.
47. Watson and Dunn, 21.
48. Ibid., 43.
49. Ibid., xi.
50. Ibid., 44.
51. Martin Middlebrook, *The Fight for the "Malvinas": The Argentine Forces in the Falklands War* (New York: Viking, 1989), 122.
52. Watson and Dunn, 37–47.
53. Middlebrook, 121–23.
54. *The Falkland Campaign: The Lessons* (London: Her Majesty's Stationery Office, 1983), 4.
55. Watson and Dunn, 135–70.
56. Ibid., 158.
57. Ibid., 135–70.
58. Ibid., 45.
59. Ibid., 151.
60. Ibid., 83.
61. Ibid., 44, 129.
62. Ibid., 158.
63. Ibid., 26–30.
64. Ibid., 28.

65. *Sunday Times of London* Insight Team, 157.
66. Ibid., 157–58.
67. Ibid., 158.
68. Ibid.
69. Watson and Dunn, 4.
70. "First Strike: Vulcan and Harriers Hit Stanley," *Falklands War,* no. 3 (London: Marshall Cavendish Limited, 1983), n.p.; and *Sunday Times of London* Insight Team, 157.
71. "First Strike."
72. Watson and Dunn, 149, 157.
73. Ibid., 43.
74. *Sunday Times of London* Insight Team, 158.
75. "First Strike."
76. Burden et al., 365–67.
77. Watson and Dunn, 43.
78. *The Falkland Campaign,* 26.
79. Ibid., 34.
80. Burden et al., 367.
81. Frederick Zilian Jr., "The US Raid on Libya—and NATO," *ORBIS—A Journal of World Affairs,* Fall 1986, 502; and David Shipler, "'Libyan Clash' Chance to Flex Muscles," *New York Times,* 26 March 1986.
82. Warnock, 146.
83. Ahmed K El Din, "The US: Striking at the Libyan 'Pariah,'" *Arabia,* May 1986, 16–17.
84. President Ronald Reagan, statement, "American Bombing of Libya," 446–47.
85. Ibid., 449.
86. Ibid.
87. Ibid.
88. Judith Perera, "Voyage to Disaster," *The Middle East,* May 1986, 7–8.
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90. Lt Gen Mike Short noted that he was the F-117 vice wing commander during this strike and that his crews were demoralized over the fact that they were not used for this mission. As reported in [Dr.] Rebecca Grant, *The B-2 Goes to War* (Arlington, Va.: Iris Press, 2001), 32.
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98. Ibid., 513.
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103. Zilian, 514.
104. Ibid., 517.
105. Warnock, 151.
106. Ibid., 53.
107. Zilian, 517.
108. "Hits and Misses in Libyan Raid," *Defense Attaché,* no. 2, 1986, 11–14.
109. "Weinberger, Crowe Provide Additional Details on Libya Raid," *Aerospace Daily,* 26 June 1986, 495–96; and Warnock, 153, 155.
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124. Beck interview.

125. "Desert Strike."

126. Ibid.

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Chapter 5

Evaluations and Recommendations

Historical examples clarify everything and also provide the best kind of proof in the empirical sciences . . . This is particularly true of the art of war.

—Carl von Clausewitz
On War

Evaluation of Assumptions

Air Force thinking in the 1990s circumvented the obstacle of range through assumptions about forward basing, allied support, and the ability to rapidly deploy expeditionary forces. The case studies, however, reveal the shortcomings of those assumptions and affirm that range remains as the primary obstacle for America's forces at the turn of the millennium.

Strategic Warning

The assumption about having adequate strategic warning to deploy expeditionary forces in the BUR and the Heavy Bomber Force Study is discounted by General Horner, commander of US and allied air forces in Operation Desert Storm. He asserts that the United States should have learned this lesson in Iraq in 1991. He notes, "We must assume that any future US adversary is likely to do everything possible to mount 'a bolt from the blue' attack."[1] Indian Brigadier V. K. Nair offers a sobering view in *War in the Gulf, Lessons for the Third World.* Nair warns that the third world should fear a New World Order dominated by US interests and recommends that India prepare for "the eventuality of a repressive foreign policy by the United States." States such as India must "be prepared to resist the [US] designs to project power beyond its immediate sphere." He confirms this advice for potential US adversaries as he advocates that third world countries use surprise and technology in the future as an asymmetric means to thwart US airpower.[2] General Horner laments the inability of the expeditionary force to deploy quickly enough to stop an adversary short of achieving its military objectives. His solution is to ensure a capability for "prompt denial" through forward presence—which he deems too expensive—or else a return to a focus on long-range airpower to deal with situations where the United States is given little strategic warning.[3]

Forward Basing

The US strategy in a major theater war is to deploy expeditionary forces in order to achieve higher combat sortie rates. For many cases, this is a viable and sound strategy; however, if expeditionary forces cannot deploy

to a forward location to support combat operations, their utility is suspect regardless of the level of war. Forward basing was not available in the optimum locations in Europe for Operation Nickel Grass, and it was denied in Operation Desert Strike. In the Falkland Islands War, geography limited forward-basing options for the British to the carriers and converted cargo ships used to support air operations. The National Defense Panel objected to the assumptions about forward basing made in the *1997 Quadrennial Defense Review.*[4] The National Defense Panel report stated that "US forces' long-term access to forward bases . . . cannot be assumed. Access may be granted or denied for any number of military or political reasons. Moreover, US forces may find themselves called upon to project power in areas where no substantial basing structure exists."[5]

As the United States attempts to gain allies for future conflicts, it is worth noting that allies may view forward-basing support of US air-refueling operations at a lower political threshold than basing for US combat strikes. While this may "allow an allied nation to maintain the fiction that it is not directly supporting US combat operations," it in no way compels regional bad actors—who seek to deny US access—to distinguish among the latent and active participants as they respond to US-sponsored air strikes in their region.[6] Even if the proverbial camel's nose is already under the tent, as with the forces deployed to the Persian Gulf in the 1990s to defend Kuwait, Operation Desert Strike reveals how allies can refuse the United States permission to use forces already deployed in their country. Building a force structure that depends upon forward basing leaves US policy vulnerable to the political support of regional allies; the case studies reveal that an expeditionary force structure may severely limit freedom of action in the future.

Requirement to Deploy

Arguments that a major theater war will require short-range airpower in order to produce the required number of sorties for a successful counteroffensive must contend with the potential for denial strategies that prevent deployment to locations where the higher sortie rates are possible. If short-range forces are denied access, a theater commander should have other options for airpower. Long-range aviation in these situations ensures a flexible and unilateral option free from many foreign entanglements. General Horner opines that a war-fighting strategy that hinges on gaining access to forward bases has grave risks. He notes that foreign support is not guaranteed and cites Operation Desert Strike as an example.[7] The Falkland Islands War also underscores this point, as does the airlift for Israel in Operation Nickel Grass. Nair notes that the United States relies on the resources of third world host countries for its airpower and that the locations of these facilities are usually well known. He makes the point that "Iraq could have taken numerous measures to degrade these facilities in the run up to the war [Desert Storm]," but failed to seize

the opportunity.[8] A long-range force structure that is capable of unilateral action is required to ensure a credible US response.

Fighting in Coalitions

The case studies reveal how minimal allied support generally compounded the problem of range. While the ability to form alliances or gather the support of allies should serve as an acid test for the use of military force in most cases, lack of allied support should not prohibit US unilateral action in others. Richard Andres notes that nations, including allies, quite often become unwilling to help powerful states during a militarized crisis and are more likely to help the opposition. While states may form alliances with strong nations in peacetime, they tend to oppose the actions of powerful nations once the shooting starts.[9] The four case studies in this research verify his findings and discount the assumptions made in the 1990s about the United States fighting in coalitions and with allies. This conclusion should serve as a warning to those who would design a force structure and strategy that relies upon foreign support for the application of military force. Regardless of the US ability to gain allies, credible airpower options for the twenty-first century demand a force structure that ensures capability for unilateral response.

The US difficulties in Operations Eldorado Canyon, Nickel Grass, and Desert Strike and the British difficulties in the Falkland Islands War indicate that building alliances for future military action may be a flimsy assumption. A May 2001 RAND report holds that in the Persian Gulf, Britain may soon be the only US ally within NATO to fully cooperate with US military efforts.[10] In addition, as Brigadier Nair suggested after Operation Desert Storm, wise adversaries will attack US coalitions to deny the United States the ability to use airpower in their regions. Although he does not cite Sun Tzu, it is obvious Brigadier Nair is following his ancient prescription to attack an adversary's strategy and his alliances before attacking his army.

Access Denial

Denial of access represents more than the physical problems posed by weapons of mass destruction, ballistic missiles, and other barriers. The case studies support the contention that political denial is a constant problem that theater missile defense, airborne laser platforms, or the GSTF are ill suited to solve. While technological systems may help the United States gain access to a region and protect US forces at deployed locations, the extension of that protection to a host nation is not as easy to provide physically or promise politically. The physical ability to protect an ally and forces in-theater does not guard against the myriad of political reasons for an ally to turn away from supporting American use of force in its region.

Assumptions about a GSTF's ability to "kick down the door" to gain access do not deal with the issue of political denial, which is much more prevalent than physical danger. Richard Haass notes in *Reluctant Sheriff*

that the world is much "more discrete and divided in the political."[11] His point is best confirmed by the lack of NATO support, during the height of the Cold War, for the US airlift to Israel. Operation Eldorado Canyon is another case where allies posed an obstacle to the use of force. Although the United States will continue to do what is necessary to gain access—as the British did in the Falklands—when national interests are at stake, the question that remains is the cost of that access.

Physical denial, however, is still a problem. As Brigadier Nair notes, US logistic lines are vulnerable and the success or failure of US strategy often depends on secure passage for its forces abroad.[12] He notes that 90 percent of all forces moved by sea during Operation Desert Storm and that Iraq failed to put at risk any of the nations whose flags were flown by the non-US sealift. Had Iraq attacked shipping in and out of port, the United States would have had to use its naval strength to protect sea lines of communication "forcing [the United States] to stretch [its] naval assets to the point where the [US] ability to concentrate for combat becomes questionable."[13] Attacks against the logistic Achilles' heel of US strategy during prehostilities can severely reduce the combat potential of deployed forces.

Nair suggests the following actions to deny US airpower in the future:

1. Attack high-value assets like [airborne warning and control system] AWACs and [Joint Surveillance Target Attack Radar System] JSTARs.
2. Attack air-refueling tankers, forcing the coalition to deploy them in greater depth to erode combat ranges of the fleet and increase the cost of the air effort.
3. Attack forward operating locations with commando-type raids.
4. Conduct raids against logistic bases that are vulnerable and have a disproportionate value to the forces required to strike them.
5. Use shoulder-fired surface-to-air missiles against hostile air targets—even with limited success, this type of action would cause the redeployment of high-value assets to rear areas and would be worth the effort.[14]

Taken together or in combination, these actions directly target the US strategy to deploy and utilize expeditionary forces. Sen. Sam Nunn (D-Ga.), chairman of the Armed Services Committee, asked Dr. Kaminski, the Heavy Bomber Force Study chairman, what would happen if the United States was taken by surprise and theater access was a problem. Dr. Kaminski replied "Then I am going to need a lot more bombers than I have in the current force."[15]

Technology

Will technology protect deployed forces? Congressional testimony by Generals Fogleman and Martin in chapter 3 concerning the use of theater missile defense and the airborne laser to thwart ballistic missile threats to forward-deployed forces is a step in the right direction. However, Nair

points out that asymmetric threats to US forces are more likely, and high technology is difficult to employ against terrorist commando attacks. At the present time, theater ballistic missile defense, as Congressman Hunter noted, is still a "big if."[16]

Third world countries pursue and will continue to pursue asymmetric means to thwart the US intervention in their regional affairs. The goal will not be to "win" engagements with the United States but to raise the cost, as the Argentines were able to do, to an unmanageable level and deter US intervention at its inception.[17]

Tanker Force

Tankers emerge as one of the most important features of a credible global power force for the twenty-first century. The tanker force was adequate for Operation Eldorado Canyon; the tanker-to-bomber ratio in Operation Desert Strike was high—and even higher during the Operation Black Buck missions. The high tanker to bomber ratios in these operations should suggest to USAF leadership that a strategic long-range tanker is needed to ensure access and flexibility. Long-range tankers efficiently close the distance between the fighting force and the adversary.

Operation Desert Strike used the flexibility of the current force for its long-range missions but also revealed the difficulties of range in the Pacific and the need for tankers with greater range and off-load capability. As retired Air Force Lt Gen Thomas G. McInerney commented in *USA Today* in May 2001, "Keeping the Asian Pacific secure and stable in this century will take the same wisdom and dedication we devoted to Europe in the last—and the right weapons systems to do the job."[18] The SAC tanker fleet that remained after the Cold War is not well suited for the mission demands of the twenty-first century, where mission ranges may be dramatic and the need for large off-loads to bridge gaps are required to ensure a capable and credible force.

Recommendations for Tankers

For both short-range and long-range airpower, the in-flight refueling tanker is the key to extending range. With the demise of SAC in 1992, tanker aircraft joined other airlift aircraft in AMC and were assimilated into a community with different priorities. Although SAC's tankers had played second fiddle to bombers within SAC, tankers in AMC found advocacy for in-flight refueling even farther down the pecking order of the new command's priorities for replacing aging C-141s and C-5s.[19] The in-flight refueling capability SAC built to support the nuclear-deterrent mission suffered from a lack of attention in force-structure debate that followed the Cold War. KC-135s purchased in the 1950s were built to satisfy the needs of SAC's long-range bombers in the event of a nuclear war. In Korea, Vietnam, and Iraq, SAC's tankers found great utility supporting conventional operations within and during deployment to the theaters of operation. The KC-135 and KC-10 force

proved that it was flexible and a great force enhancement to the rest of the combat air force, but it has aged and lacks range.

As the Black Buck missions show, pyramid schemes for air refueling require many assets to ensure support for the scheme as the range increases. For this reason, a long-range strategic tanker that can provide a large amount of mission flexibility is a necessity to ensure access for US forces in the future. General McInerney noted in a May 2001 op-ed piece in *USA Today:*

> Pentagon airpower planners are developing a form of conventional deterrence that links networks of sensors and shooters to deliver rapid and intense firepower. Their plan is eventually to invest more than $300 billion in short-range fighter/attack aircraft, while all but ignoring long-range air power.
>
> If there are regional bases and port access, as there would be during another war against Saddam Hussein, this rapid application of aerospace power promises overwhelming effectiveness. But in the Asian Pacific, where the Chinese can deny US military forces regional access, this approach would be a serious mistake, leaving the United States without credible military options.
>
> Ignoring long-range airpower denies the strategic reality of political constraints on regional bases, the tyranny of distance in the Asia Pacific, and the proliferation of sophisticated military capabilities such as space-based intelligence and satellite-guided missiles. Rapid application of aerospace power won't work if our short-range fighters are denied the bases or the access they need.[20]

General McInerney recommends that the United States purchase 40 additional B-2s to increase the number in the fleet to 61 and ensure a long-range capability in the Pacific theater. His reasoning is sound; however, purchasing additional B-2s to meet the threats in the Pacific will mean very little without a tanker force to support the long-range global power a force like that could project. Using the same 11:1 tanker ratio of Desert Strike, it would require 440 tanker sorties to support the 40 B-2s he envisions using in the first 24 hours of a war for similar strikes on Iraq from Guam.

Current tanker planning guidance indicates that there are 472 KC-135 and 54 KC-10 aircraft available for combat missions through the year 2001. Their off-load capabilities are as shown in table 1. The surge utilization rate for the KC-10 is given as 12.5 sorties per day.[21] With only 12.5 sorties, it is doubtful that an in-flight refueling plan to support a force of 40 B-2s is possible without an excessive use of KC-135 aircraft, in an inefficient manner like Operation Black Buck, to fill in the gaps.

Global power strikes also have to compete with other users during the initial stages of a conflict. The KC-10 has an air mobility role as well as a tanker role. Additionally, the KC-10 is used to deploy aircraft into theater and to support the tanker-bridge for air transport. All these demands on the tanker force sharpen the need for a tanker designed for long-range global power missions. Even if there were 40 B-2s, the 400 tanker sorties required to put them to good use would price a long-range airpower solution out of the market.

Table 1

Tanker Off-load Capabilities

Aircraft	Takeoff Gross Weight (lbs)	Takeoff Fuel-Load (lbs)	Max Off-load Available (lbs) Mission Radius			
			500 NM	1,000 NM	1,500 NM	2,500 NM
KC-135E	275,700	160,000	101,200	78,600	55,800	10,500
KC-135R/T	301,700	180,000	122,200	99,400	76,400	30,700
KC-10	587,000	327,000	233,500	195,200	156,000	78,700

NM—nautical miles
lbs—pounds

Source: Air Force Pamphlet 10-1403, *Air Mobility Planning Factors,* 1 March 1998, 18.

Simply put, the range and off-load ability of the tanker force cannot support the operations from CONUS. The present tanker planning guidance assumes that for sorties over 3,000 NM, tankers will deploy to multiple bases located optimally along the route of flight to support the mission. The planning guidance assumes that these forward bases exist and that they are in the optimal locations to meet the fuel reserve requirements for the receivers and tankers along the route of flight. If they are not, the refueling requirements and number of tankers required increase dramatically. Table 2 contains the tanker requirements for the case studies examined.

Operation Black Buck suffered from a small-capacity tanker, as evidenced by its ratio of tankers to bombers. While Operation El Dorado Canyon appears with a more reasonable ratio, it is worth noting that the

Table 2

Case Study Tanker Usage

Case Study	Distance Nautical Miles	Tanker/Bomber Ratio	Number/Type of Tankers
Nickel Grass	6,450	N/A	N/A
Black Buck	7,732	11:1	11 Victor
Eldorado Canyon	5,600	28:23	28 KC-10/KC-135
Desert Strike	14,300	7:5-1	15 KC-10/KC-135

range of this mission was optimal. In Operation Desert Strike, three forward bases for tankers and a 7.5:1 ratio of tankers to bombers was required. Additionally, Desert Strike required the use of KC-10s with larger off-load capability to complete the mission. If KC-135s were substituted in a similar scenario, it would result in a ratio and air-refueling plan that resembles Black Buck.

The refueling force must be focused on longer range missions for the future. While additional B-2s may provide additional delivery capability, without tankers for support additional bomber assets are of little use in global power operations. Strategic tankers built in large numbers that can support missions similar to Desert Strike are necessary. This could mean the purchase of additional KC-10s for the future, or it may mean a completely new tanker design with massive capacity. It would be a mistake to focus the next-generation tanker solely on the requirements of an expeditionary force and build it to optimize support for theater operations with expeditionary forces.

However, to support global power, this force must simultaneously support long-range bomber sorties and the movement of expeditionary forces during the initial phases of a conflict. Largely ignored in the post–Cold War force structure debates, the standing fleet may not be adequate to support this dual requirement.

Next-Generation Tanker

The current force of tankers is eroding in capability. Its numbers, age, and flexibility raise questions of utility. There is legitimate concern over depot-level maintenance for KC-135s that takes 400 days, instead of the scheduled 150 days, to complete. Admittedly, some of the backlog is due to Pacer Craig avionics upgrades to keep the aircraft flying through 2040; however, the majority of the backlog is due to the "unpredictability of major structural repairs" that have emerged with the aging fleet.[22] With 161 of the 546 KC-135s backlogged in depot in December 2000, Air Force plans for a replacement tanker—the KC-X—may need to be pushed up prior to the planned deployment in 2013.[23] Within AMC, it remains to be seen if the looming tanker shortfall will gain attention among the competing demands for airlift.[24]

To meet the needs of the various missions, USAF should look for theater-tanker options with multiple refueling off-load options to efficiently refuel short-range theater assets. USAF should also pursue a long-range high capacity "super tanker" that can provide refueling support for long-range aircraft flying missions, if necessary, from CONUS. In addition, USAF should consider hybrids to support both mission needs.

Long Range

Long-range airpower requires tankers with large capacity and off-load capability. The KC-135, while a capable tanker for missions with limited

ranges, does not provide the support and flexibility needed to plan long-range missions across long distances with flexibility. A scenario like the Falklands within the Pacific theater is a challenge for long-range operations. Without forward basing, the challenge is even greater given the limited range and fuel off-load of the KC-135. Desert Strike highlights the refueling needs of the bomber with the largest fuel capacity in the USAF fleet. B-52s required large off-loads from KC-10s to make their round-trip from Guam. They also required KC-135s from Japan to refuel the KC-10s and required the KC-10s to land in British-owned Diego Garcia. In the future, the United States must have the ability to act unilaterally. To do that, a flexible force of tankers capable of refueling each other if necessary to extend their own range is needed. Using a force such as this, unilateral bomber operations from US-held territories become an option for the future.

Presently, the British plan to purchase a new-generation tanker based on a Boeing 767 derivative that would double the fuel capacity of their current fleet of KC-135s.[25] This Boeing aircraft and other large Boeing 777 variants warrant consideration for modification for in-flight refueling missions. However, most of these off-the-shelf options, designed for the airline industry, only have two engines. A two-engine design may not meet the reliability needs of the military and may require the pursuit of a more dependable military system.[26]

A strategic tanker with extremely long range adds flexibility to a global power force. Whether used to support global power strike missions for long-range aircraft or global power deployment missions of short-range aircraft, this concept has wide application in locations such as the Pacific, where distance is the primary obstacle to the use of airpower.

In his Air War College research paper, Lt Col Stephen C. German cautioned about notions of using off-the-shelf airliners for the next-generation tanker.[27] Due to the current commercial drive for fuel economy with increased engine efficiency and super-critical wings that maximize fuel efficiency at cruising altitudes, commercial aircraft do not meet the combat needs of the Air Force. A two-engine airliner optimized for flight at 39,000 feet would have drastically reduced efficiency operating across the range of altitudes and airspeeds required to meet the performance needs of other military aircraft. As German notes, airliners make their money in the cruise phase of flight, but USAF tankers make their money in the refueling envelope that extends from 500 to 30,000 feet and 180 to 355 knots indicated airspeed.[28] A three- or four-engine aircraft is desirable to increase reliability. The KC-135R model can still perform its mission with one or two of its four engines shut down. Shutting down one of two engines on a 767 leads to "performance degradation of unacceptable parameters."[29] For these reasons, the next-generation tanker—which should have a strategic focus—will likely require an acquisition program to design and build it to meet USAF's mission needs. This follow-on tanker should also have multiple refueling connections for probe-and-drogue refueling and a separate boom refueling system for large aircraft.

Theater

The next-generation tanker should be modeled after the existing KC-135 but should take steps to counter the inefficiencies of the KC-135 in theater operations. Although the KC-135 can off-load large quantities of fuel, its transfer rate and cycle time for individual fighters make it an uneconomical choice. As proof, in Operation Desert Storm almost 40 percent of the fuel carried by tankers was unused, and combat sorties were limited by the inability of the KC-135 to service more than one receiver at a time.[30] Booms available—not fuel available—was the limiting factor and often required more tankers to be in the air than was dictated by fuel requirements alone.[31] For this reason, modifications to add flexibility into the present KC-135 fleet are necessary. In addition, this type of flexibility is required for any follow-on designs for tankers used in theater-refueling operations.

Currently an effort is under way to modify the KC-135 fleet with a multipoint probe-and-drogue refueling system. A similar modification was added to the KC-10 in the early 1990s. This system encompasses wing pods for probe-and-drogue refueling of multiple receivers. However, this arrangement is only useful to receivers configured for drogue operations. In the Air Force, that would include only helicopters; but for the Navy and other allies who primarily rely on the drogue system, this Air Force modification has great utility. In addition, this modification will allow the 45 modified KC-135R models to support both probe and drogue as well as boom in-flight refueling for operations during the same mission.[32] While the Air Force should continue to provide a boom system for its heavier aircraft, multipoint modification allows a return to early TAC KB-50 designs that had multiple drogues to refuel up to three aircraft at a time.[33]

Modifying the KC-135 in this fashion will make it a more efficient intheater tanker. However, missing from the equation is the way that current USAF short-range aircraft refuel. The F-22 is currently designed as a boom-refueled aircraft; and the Joint Strike Fighter (JSF), in its X-32 and X-35 prototypes, displays the ability to perform either based on the "service" variant.[34] Instead of a boom receptacle for the USAF version, all JSFs should be built for drogue refueling in anticipation of a KC-135 force in the near term and a possible replacement in the future designed to support multiple drogue receivers. This joint approach to refueling will allow the use of a joint tanker in future theater operations that matches not only US refueling needs but those of coalition allies as well. The theater tanker for USAF should provide the ability to refuel multiple receivers in an efficient manner.

USAF should also consider modifying or adapting current USAF F-16, F-15, and A-10 aircraft for drogue refueling. By way of example, Sargent Fletcher, Incorporated, has flight tested and offers a 370-gallon external tank for the F-16 that is modified with an external probe for drogue refueling. This adaptation allows for the rapid modification of all USAF F-16s for drogue refueling.[35] Similar concepts for other aircraft, which would

preclude expensive structural retrofit, would make a common tanker for joint and coalition operations possible. Aircraft that are unsuitable for probe-and-drogue refueling, or are too far along in the production process to alter, could continue to use the boom system. The boom should remain on any future theater tanker to allow it to refuel not only boom receptacle fighters but also other large aircraft with boom systems. The time is ripe for the Air Force to rethink its boom versus probe-and-drogue approach to the JSF, its current aircraft, and future tankers.

Hybrids

As demonstrated in the 1950s and 1960s with the B-29 and B-50, USAF should again consider various hybrids to augment both the strategic and theater-tanker missions. The B-52 has a fuel capacity of approximately 300,000 lbs, while the KC-10 has a maximum usable fuel of 342,000 lbs; and each aircraft burns fuel at comparable rates.[36] There is potential and historical precedent, in the form of KB-29s and KB-50s, for using the B-52 as a tanker. Congress has already directed the secretary of the Air Force to assess the B-52 for a standoff jamming role.[37] On top of this "new mission," USAF should consider adding a hose-reel-type refueling system. This system is currently carried on the KC-10 and permits fuel transfer through a drogue system at 400 to 500 gallons per minute (2,400 to 3,000 lbs per minute). While a hose-reel system would require an internal modification to the B-52, it would take advantage of an airframe that already exists and is part of the GSTF. In this fashion, the EB-52 could shoot its standoff missiles and then assume a jamming/refueling orbit for probe-equipped aircraft. This option puts fuel closer to the threat for receivers and provides a tanker that is capable of maintaining situational awareness and can defend itself in a hostile environment.

For F-22 operations within the GSTF, USAF should consider using the B-2 as a tanker. If the F-22's mission is to penetrate deep into enemy territory unannounced, it makes sense that it should refuel from a stealthy tanker. Rather than build a whole new aircraft, the B-2 should also be modified with a hose-reel system. As the B-2 is a key part of the GSTF package to penetrate an enemy's defenses, it can also provide fuel in flight to extend F-22 range without putting a conventional tanker at risk. In places like Iran, where the distance to Tehran from the country's border with the Persian Gulf would require refueling over land, the B-2 provides an excellent option for the F-22 to extend its global range. A hose-reel system that retracts and is stealthy would be optimal; however, it would require modification of the F-22 for probe refueling. If USAF is serious about a GSTF, it must consider this application for refueling its F-22 fleet in combat operations.

Hybrid tanker concepts are out-of-the-box answers to the problems of range. However, both of these proposals are worth exploring as the GSTF takes shape for the future. Utilizing airframes that already exist, that are already part of the strike force and plan to be on station, deserves con-

sideration. Modifying a B-2 or B-52 in the manner suggested provides an opportunity to make the current force structure more flexible and offers the ability to relieve refueling requirements from conventional tankers for long-range missions.

Summary

In General Fogleman's address to the Air Force Association in October 1996, he noted that in the twenty-first century, "it will become possible to find, fix or track and target anything that moves on the surface of the earth."[38] Missing in the "find, fix, track, target, engage, assess" loop is fuel—fuel for aircraft to get to the theater and then to get to the target. Fuel is the missing link between capabilities and expectations for global power exercised over long range.

Absent forward bases, coalitions, and political arrangements, tankers are the only viable means within the USAF force structure to extend range. Aircraft design, as the B-36 proved at the extreme, determines fuel capacity and range. The B-36 also proves that mission and performance requirements are bounded by size—that is, maneuverable fighters are small and bombers with long range and payload are big. Since range matters, the only way to enhance range without sacrificing mission or performance characteristics is through the use of in-flight refueling. Forward bases and optimal routings over allied airspace can alleviate range as an issue but require allied support. Lacking this, the GSTF is likely to find range a problem, with in-flight refueling the only solution. The solution for solving the problem of range in the future is not to be found in the numbers of tankers available but in the types of tankers available and their ability to extend the range of the force.

Notes

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2. Brigadier V. K. Nair, *War in the Gulf: Lessons for the Third World* (New Delhi, India: Lancer International, 1991) 217–20.

3. Horner.

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US forces in Korea. NDP members were selected in consultation with congressional leadership. NDP Web page, n.d., n.p., on-line, Internet, 12 June 2001, available from http://www.defenselink.mil/news/Feb1997/b020697_bt057-97.html and http://www.defenselink.mil/topstory/quad_ndp.html.

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15. House, *Independent Bomber Force Review,* Lt Gen Brent Scowcroft, retired, presented to the House National Security Committee, 23 July 1997, n.p., on-line, Internet, 11 March 2001, available from http://www.fas.org/nuke/guide/usa/bomber/970000-ibr.htm.

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18. Lt Gen Thomas G. McInerney, "Long-Range Air Power Would Keep Pacific Secure," *USA Today,* 2 May 2001, n.p., on-line, Internet, 7 May 2001, available from http://ebird.dtic.mil/may2001/e20010503range.htm. General McInerney was a command pilot with more than 4,100 flying hours, including 407 combat missions (243 in 0-1s as a forward air controller and 164 in F-4Cs, Ds, and Es). He has flown the O-1, F-104, F-4, and F-15. Before retiring in 1992, General McInerney was the commander of Alaskan Air Command/Eleventh Air Force. "Biographies," *Air Force Link,* n.d., n.p., on-line, Internet, 10 June 2001, available from http://www.af.mil/news/biographies/mcinerney_tg.html.

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35. "Sargent Fletcher's ART/S Is First Probe/Drogue Tested on the F-16," Sargent Fletcher, Inc., n.d., n.p., on-line, Internet, 20 April 2001, available from http://www.sargentfletcher.com/ARTS.htm.

36. *KC-10A Extender,* Fact Sheet, n.d., n.p., on-line, Internet, 15 February 2001, available from http://www.fas.org/nuke/guide/usa/bomber/kc-10.htm; author's experience in B-52H operations; and AF Pamphlet 10-1403, 16.

37. Senate, *2001 Department of Defense Appropriations Act,* 12 June 2000, n.p., *Defense Daily,* 32, on-line, Internet, 15 May 2001, available from http://www.defensedaily.com/cr/previous/cr0612.htm.

38. Gen Ronald R. Fogleman, chief of staff, US Air Force, address, "Strategic Vision and Core Competencies," Air Force Association National Symposium, Los Angeles, Calif., 18 October 1996. AF Historical Research Agency, Maxwell AFB, Ala., file no. IRIS K239.057-5, n.d., n.p., on-line, Internet, 14 February 2001, available from http://www.au.af.mil/au/awc/csafafa.htm.

Chapter 6

Conclusions

The world in the wake of the Cold War is turning out to be less structured and less disciplined by military force and the fear of nuclear war. It is the age of "deregulation" . . . [and it] promises to be terribly complex . . . For the United States, it is both safer (with no existential Soviet threat) and more dangerous (with the emergence of more numerous if lessor threats). It is more unified and global in the economic and information realms and more discrete and divided in the political."

—Richard N. Haass
The Reluctant Sheriff

From the Past, The Future

Clausewitz noted that history does not by itself provide relevance; however, the "combination of several events [historical examples] make it possible to *deduce* a doctrine: the proof is in the evidence itself."[1] History, from B-29s reaching out to attack Japan in World War II to the 1999 combat debut of the B-2 in Operation Allied Force, reveals that the United States has often used long-range airpower to fight its wars and pursue its interests. Range has always been key to the use of airpower and developing strategy. As General Spaatz put it, "Air strategy begins with airplane ranges. Airplane ranges determine the location of bases. The proximity to the target of the bases under one's control fixes the weight and rhythm of the attack."[2] But range is underplayed in the assumptions used to develop the force structure and strategy for the US Air Force in the twenty-first century. The range of this force is too short and the vision it embraces too shortsighted.

Motivations for Assumptions

It is difficult to determine why the historical examples in this study were not applied with greater impact in the force structure debate of the 1990s. USAF did not object, as Williamson Murray noted, when B-2 production was reduced to 20 aircraft; and it may have been, as he suggests, because the Air Force did not want to risk losing the F-22 program.[3] It is also likely, as Builder pessimistically points out in *The Masks of War,* that the expeditionary force structure has nothing to do with global power and everything to do with building the force structure USAF desires. Builder points out that in strategy, the horse often comes before the cart and that strategy becomes "the intellectual rationale that follows after and attempts to explain the forces sought or in being for other unspoken or unspeakable reasons."[4] If this is true for the pursuit of short-range expeditionary air forces to support the global power strategy, it may explain why

USAF has used the noted assumptions to frame the force structure debate around short-range airpower. The arguments for increased sortie rates and the combat "throughput" benefits of short-range aircraft deployed into a theater may not be as sinister as Murray and Builder imply. However, it is hard to imagine, given the history of SAC and the evidence presented in the case studies, that the call for short-range expeditionary forces to execute global power missions is based on a sound assessment of the available data.

Considerations for long-range global power must be included in the debate to ensure that the force structure meets the needs of the strategy and the global environment. Airmen must continue to insist upon a capable long-range force with the ability to project global power across a broad spectrum of scenarios. Currently, a realistic assessment of the global environment does not support the pursuit of short-range expeditionary forces as a credible source of global power.

Summary of Assumptions and Recommendations

The assumptions used in the 1990s to support the force structure of expeditionary forces for global power do not reflect a sound assessment of previous experience. This suggests perhaps the need to return to the SAC model, where force structure was designed around the CONUS-based nuclear force. SAC built a garrison force in the 1950s because its forward-basing strategy was vulnerable to Soviet first-strike attack. To increase warning time and ensure survivability of the force, SAC moved its bombers into a CONUS garrison and built bombers and tankers with range to reach the Soviet Union, independent of forward basing. During the Cold War, the United States matched KC-135 and B-52 range and fuel capacities to meet the range requirements of striking the Soviet Union from bases within CONUS.

In the twenty-first century, survivability for conventional operations is not the issue. CONUS may, however, be the only "operating base" for future conflicts. Ranges may indeed be greater than during the Cold War, and the United States needs to ensure a force structure that is even more flexible than the Cold War force in order to meet the challenges of range independent of access to forward bases and allied support.

An unexpected finding within the research was the discovery within each case study that the Navy and its carrier-based aviation represent a flexible means for forward basing short-range aircraft to support longer range heavy-lift aircraft. USAF should capitalize on the ability of the Navy to control the littoral areas with its "floating forward bases" and its ability to provide for air superiority, suppression of enemy air defenses, jamming support, and search and rescue. The case studies highlighted this type of integration; and while the Global Strike Task Force embraces the ideal of gaining access, perhaps the model for the future unilateral use of force lies in a broader concept of a *joint* Global Strike Task Force. Kicking down

the door in the future may be appropriate for physical barriers; however, for political barriers, a joint approach may provide the right synergy to execute strategy. Naval forces offer a great enhancement to long-range airpower. Where they are opposed, as in the Falkland Islands War, the United States must prepare responses to protect the fleet.

Concerning the mix of long- and short-range forces, balance is the key. This study at best humbly supports the conclusions reached long ago by General Spaatz at the conclusion of World War II:

> There has been a tendency to over-emphasize long-range bombardment, and to ignore the versatile application of air power. Our Air Forces were used for any mission considered important, at any given moment. Especially misleading is the distinction made between strategic and tactical air forces. That distinction is not valid in describing the use of airpower as a whole, day after day.[5]

RAND analyst and former School of Advanced Airpower Studies airpower film program director Karl Mueller's assessment of the correct balance of forces is on the mark. He argues that in the debate between a purely global power projection force of B-2s and other long-range bombers and a focus on expeditionary airpower capable of rapid deployment and sustained combat operations, a combination of the two is appropriate. His advice is to lean towards the expeditionary force but to ensure an insular approach with long-range airpower "to deal with situations where there are severe limits on US access to in-theater bases."[6]

Like Mueller and Spaatz, this study supports the idea that global airpower is best served through a balanced force structure that has the ability to provide combat power across a broad spectrum of conflict but provides a unilateral ability to project power as situations dictate. The linchpin to this ability, however, is not additional purchases of long- or short-range airframes. It lies instead in the tanker aircraft that enable the ranges necessary to pursue global power missions. Tankers are the key determinant of the amount and type of combat power that the United States will bring to bear in future operations regardless of how short- or long-range in character.

Range and the Current Fleet

If the assumptions made in the 1990s are disavowed, USAF will require a force focused with range and in-flight refueling capability to ensure access for its long-range forces. If the recommendations made here for tankers are followed, a force structure with the following attributes will result.

- A long-range force enhanced by a strategic in-flight refueling force to (1) perform small-scale strikes for contingencies at the lower end of the spectrum of conflict, (2) counter the access-denial strategies of future adversaries as part of a joint GSTF, and (3) provide sustained long-range combat power for regional conflicts.
- Theater tankers to provide efficient refueling options for short-range aircraft.

- Hybrid tankers to provide (1) refueling for short-range aircraft closer to the threat, and (2) survivable tanker support for the F-22 and other elements of the joint GSTF.

The global power force for the twenty-first century must have the range to carry out the missions that US policy demands. The danger of the current focus on short-range aircraft is that it habituates the force structure around this concept and negates both the benefits and practice of long-range airpower. If nothing else, this study affirms the notion that range is and will continue to be the primary issue for the use of airpower in the twenty-first century.

Conclusion

As defined throughout the many USAF vision statements, global power in the late twentieth century abandoned its historical long-range roots. In the words of Murray, "Long-range aviation is a national asset. Within the Department of Defense, only the Air Force operates long-range bombers. A decision within that service to exit the business is also a strategic choice for the United States—a choice with far-reaching consequences."[7]

For the future, the utility of US combat power in a given scenario is dependent upon several factors: warning time, access to the region of hostilities, the ability to deploy forces, forward bases for combat operations, denial of access strategies of opponents, and sufficient range to apply combat power. A force structure that relies on expeditionary short-range forces, allied support, and forward basing—unprepared to counter denial strategies of opponents with range—is not suited to meet the unknown challenges of the twenty-first century.

While the United States does not need to focus exclusively on long-range unilateral solutions to promote its interests abroad, unilateral solutions—leveraged by long-range strategic tankers—must remain credible options. As RAND analyst Alan Vick noted, if Desert Strike was a victory for global power, US credibility can afford "few victories" like it in the future, as the available force structure was unable to thwart the objectives of Saddam Hussein.[8] The Global Strike Task Force concept must focus on joint operations with the Navy and must recognize that range is an obstacle that forward basing is unlikely to surmount. Range is the dominant obstacle for the use of airpower, and for the United States in the twenty-first century, it cannot be "assumed away" in the force structure debate.

Notes

1. Carl von Clausewitz, On War, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 171. Howard and Paret have translated the original German text Lehre ziehen as deduce. The literal translation of this passage from the German reads "from the several combined examples make it possible to pull a teaching." The point being made is that the word deduce as found in the Howard translation is

more aptly translated as induce—to induce from a series of historical examples a teaching or doctrine.

2. *Military Air Power: The CADRE Digest of Air Power Opinions and Thoughts*, comp. Lt Col Charles M. Westenhoff, Airpower Research Institute (Maxwell AFB, Ala.: Air University Press, 1990), 26.

3. Williamson Murrray, "The United States Should Begin Work on a New Bomber Now," *Policy Analysis*, 16 March 2000, 7.

4. Carl H. Builder, *The Masks of War: American Military Styles in Strategy and Analysis*, RAND Corporation, research study (Baltimore: Johns Hopkins University Press, 1989), 54.

5. Westenhoff, 14.

6. Cindy Williams, ed., *Holding the Line* (Cambridge, Mass.: MIT Press, 2001), 236.

7. Murray, 11.

8. Alan Vick, E-mail to Dr. James W. Titus, subject: Comments on Draft Operational Doctrine, 12/18/96, Air Force Historical Research Agency file no. K239.057-5, 17 September 1997, n.p.