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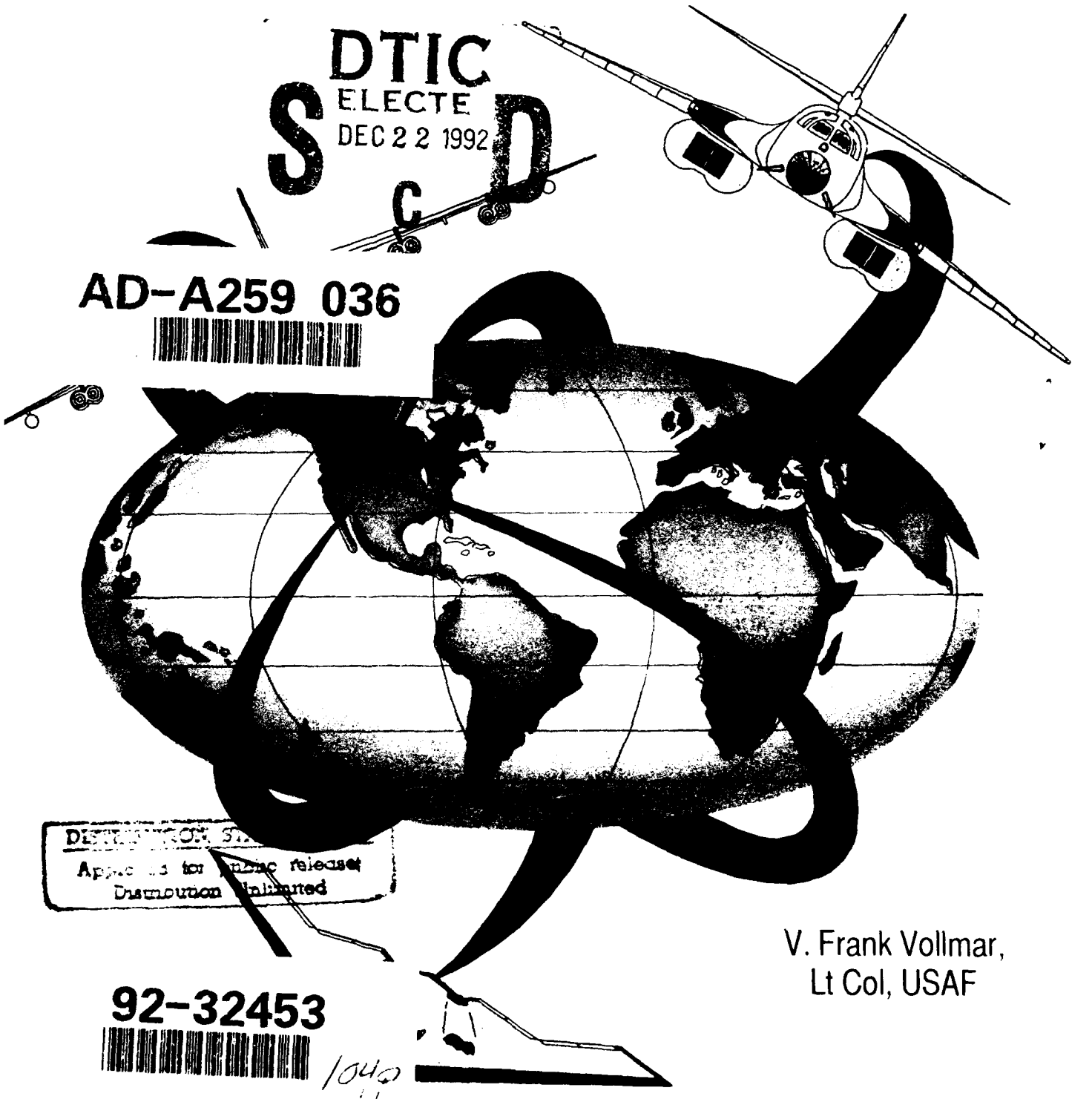
THE CONVENTIONAL BOMBER FORCE WAR-HORSES FOR GLOBAL CONFLICTS

Capabilities, Limitations, and Modernization



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Vollmar

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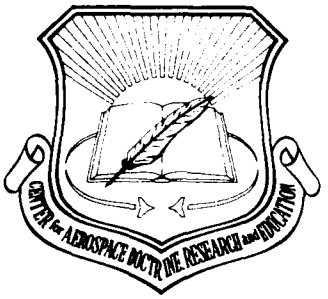

Research Report No. AU-ARI-91-6

The Conventional Bomber Force War-Horses for Global Conflicts

Capabilities, Limitations, and Modernization

by

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This publication has been reviewed by security and policy review authorities and is cleared for public release.

To my wife,
Joann

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Foreword

In the Gulf war of 1991, conventional bombers contributed significantly to our war-winning effort. Strategic Air Command (SAC) reports that the allied efforts used 64 B-52s, and that these conventional bombers flew 50 sorties a day at the height of the war. B-52s dropped approximately one-half of the total USAF bombs used in the war. Gen Norman Schwarzkopf, the commander of Operation Desert Storm, requested even more B-52s as the war accelerated. But, despite the proven value of the conventional bomber, the USAF has been slow to modernize this force because the Soviets have been a threat to our security for over 40 years, and SAC has emphasized the modernization of single integrated operational plan (SIOP) forces as a deterrent to the Soviet Union.

Colonel Vollmar's study is important because he questions whether the conventional bomber force is adequately organized, equipped, and modernized to deter conflicts as well as respond to new conflicts. Colonel Vollmar analyzes the entire conventional bomber force (B-52s, B-1s, and B-2s) and offers recommendations and solutions to increase the bombers' capabilities in conventional warfare. His conclusions present sound advice for modernization of the conventional bomber force.

About the Author

Lt Col V. Frank Vollmar

Lt Col V. Frank Vollmar was born in Raymondville, Missouri. He graduated from the University of Tampa in 1970 with a Bachelor of Arts degree in psychology and biology. Colonel Vollmar was commissioned through Officer Training School in 1971. After completing navigator training in 1972, he attended navigator bombardier school, graduating in 1973. Colonel Vollmar has served in a wide variety of air crew, missile crew, and staff positions during his 18 years in SAC. During these years in SAC, he developed his beliefs on the structure and role of the conventional bomber force. His first operational assignment was in B-52Gs at Loring Air Force Base (AFB), Maine. He was first exposed to B-52 conventional operations while serving as a navigator, radar navigator, and instructor radar navigator. As a B-52 crew member, he was able to discuss conventional procedures and bombing with crews who had just returned from combat missions in Vietnam. While assigned to Loring, he excelled in B-52 bombing procedures and in 1978 represented the wing in the annual SAC bombing competition. From Loring, Colonel Vollmar accepted an assignment in Titan II missiles at Little Rock AFB, Arkansas, serving as crew commander and sector commander in charge of three Titan II missile complexes. While assigned to missiles, Colonel Vollmar completed Air Command and Staff College and earned his Master of Arts degree in human relations and public administration.

In 1983, he returned to flying and staff duties at Barksdale AFB, Louisiana—the largest bomb wing in SAC. At Barksdale he held the positions of B-52 flight commander, chief of plans, and chief of the Bombing and Navigation Division. In these positions he was actively involved in all aspects of conventional plans, exercises, and operations dealing with the B-52. He was also responsible for training 40 B-52 crews and developing plans for over 500 conventional training missions each year. He also developed bombing plans for two operational readiness inspections (ORI), and the wing set records for two ORIs in a row in bombing accuracy. He completed Air War College while stationed at Barksdale.

Colonel Vollmar then moved to Eighth Air Force headquarters in 1988 as the director of target intelligence. As such, he developed the target intelligence plan and exercise scenario for the two largest conventional bomber exercises ever held: Mighty Warrior 1988 and 1989. Following his assignment at Eighth Air Force, he became SAC's 1990 research fellow at the Airpower Research Institute, Maxwell AFB, Alabama, where he completed this study.

Colonel Vollmar is a master navigator with over 2,500 flying hours in the B-52. He is married to the former Joann Boyd of Houston, Missouri, and has three sons, Tad, Frank, and Brock.

Acknowledgments

This research fellowship was a great opportunity for one who has spent 18 years as either a crew member or staff officer in Strategic Air Command. Few are offered the opportunity to devote a year to focus on one endeavor and associate with the professionals in the Air Force's think tank. I would be remiss if I did not extend my gratitude to all those who made this rewarding year possible.

First, I thank those who trusted my judgment enough to recommend me for the fellowship: Lt Gen E. G. Shuler, former commander of Eighth Air Force, and Col Frederick W. Strong III, director of Intelligence Applications at Headquarters SAC.

I also thank the professionals at the Airpower Research Institute who contributed a great deal to my study: Dr Karl Magyar, my superb research advisor; Emily Adams, my remarkable editor; Col Dennis Drew, former director of the Airpower Research Institute; Col John Sams, commander of Air University's Center for Aerospace Doctrine, Research, and Education (AUCADRE); Lt Col Les Kool, Lt Col Rick Clark, and Dr David MacIsaac.

I extend a special thanks to the Air War College SAC chairman, Col Richard L. Hamer. He arranged briefings for my topic at SAC headquarters and provided several research documents and updates on the conventional bomber force.

Headquarters SAC was also helpful in this study. I thank the people who reviewed my study and provided vital suggestions. First and foremost, I thank Maj Jim Brogan who patiently listened to all my ideas and wasn't afraid to tell me when I was wrong. Maj Dan Hobbs and Maj Greg Teman also gave me valuable information on the B-1 and B-2.

Besides the Air Force, I thank the people of Prattville, Alabama, for welcoming us to the community and treating us with sincere warmth. Alabama also provided me with a great hunting opportunity outside of the research project. I'm thankful that Lowndes County, Alabama, allowed me to harvest three white-tailed deer and two wild turkeys during my year.

My family deserves most of my appreciation for their special contributions. My wife, Joann, spent hundreds of hours at the word processor and also provided editing and encouragement. Finally, I thank my sons, Frank, Jr., and Brock, for their patience and understanding during this fellowship.

Introduction

Two words best describe the global environment today—they are uncertainty and instability (fig. 1). Secretary of the Air Force Donald B. Rice says we must change our force structure to meet new conventional war challenges in an unstable world. Rice argues that we should be able to fight conventional theater wars as well as regional conflicts:

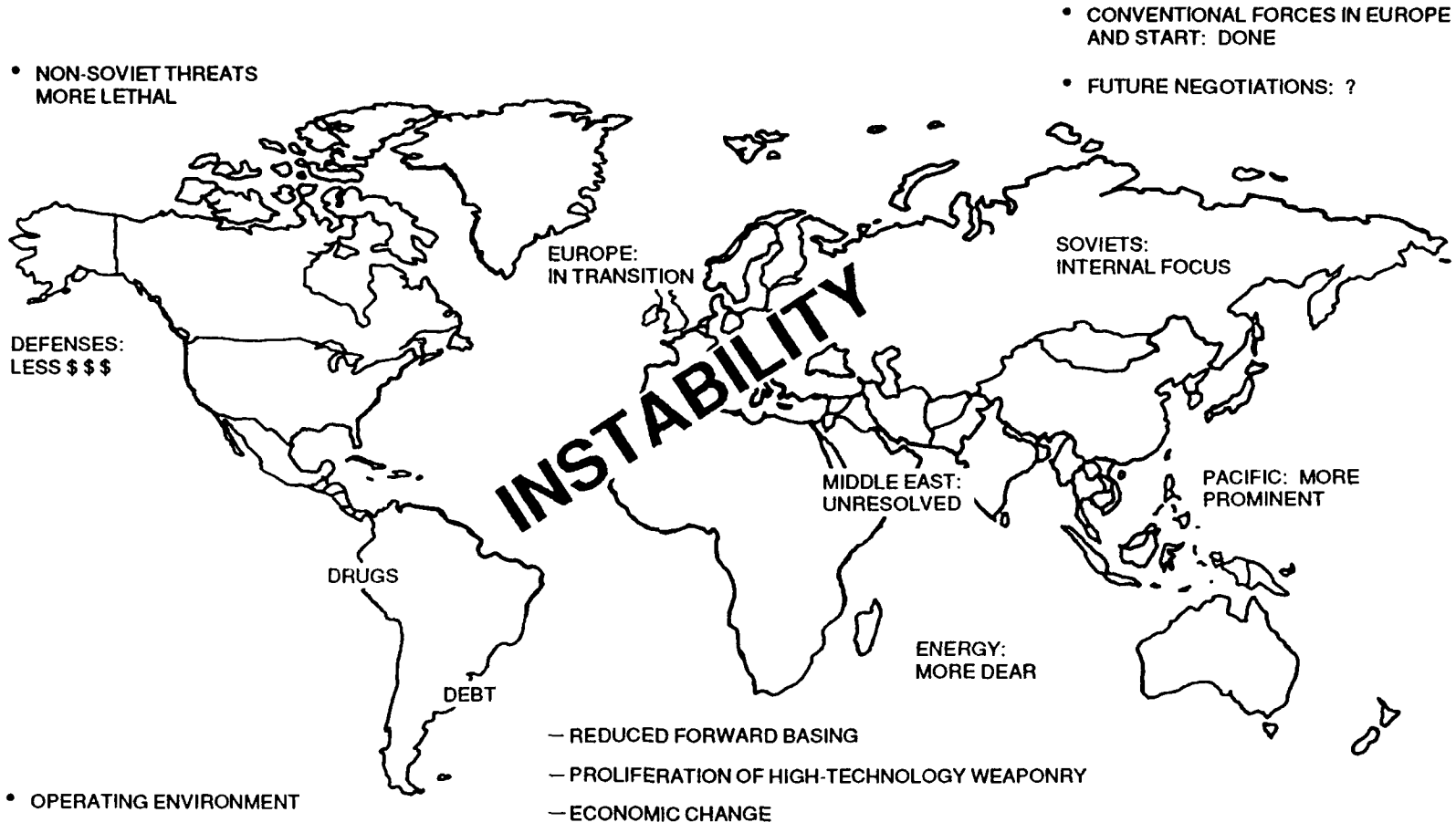
> In those more frequently occurring scenarios, use of military forces . . . must be able to provide a rapid, tailored response with a capability to intervene against a well-equipped foe, hit hard, and terminate quickly.[1]

The only national asset we have which is capable of supporting the tactic of hitting hard and projecting heavy conventional firepower on a global basis within 24 hours is the long-range conventional bomber.[2] As the US cannot depend on keeping all of its overseas bases and forward operating locations, it must place greater emphasis on war-fighting systems that can operate from fewer locations and at longer ranges.[3] Experience has shown that the conventional bomber is capable of delivering massive conventional firepower to any location. In the Vietnam War, B-52 bombers based on Guam flew several thousand miles and dropped thousands of tons of bombs and then returned to Guam. In 1983 B-52s flew from stateside bases and dropped conventional bombs in Egypt in an exercise called Bright Star. This was a nonstop flight to demonstrate the power projection of US conventional forces. Bombers have a proven record in massive bombing campaigns (Vietnam) as well as in low-intensity "Libya style" raids.

Nevertheless, the purpose of this study is not to demonstrate the usefulness and value of the bomber. That fact is already established by military analysts. The thesis of this study is instead to consider recent global political changes and examine whether the conventional bomber force is adequately organized to meet basic security needs in the new environment.

Chapter 1 gives a brief background of bomber conventional war fighting in past conflicts. It provides a brief synopsis of conventional bomber use in a campaign in Vietnam called Linebacker II, and in El Dorado Canyon, the USAF conventional bomber raid against Libya. In addition, chapter 1 gives background information on Mighty Warrior, the largest conventional bomber exercise in the history of SAC. We examine this exercise to determine if SAC is actually training and organizing for the "right war." After a brief look at where we've been, the study moves on to the core of the analysis—political changes and the readiness of the conventional bomber.

Chapter 2 is an investigation of general political changes and how these changes may impact the readiness and composition of SAC's conventional bomber force. It briefly analyzes the changes in the Soviet Union to determine if the bomber force should change based on a reduced Soviet threat. The second



Source: "Bomber Modernization," USAF briefing to Sen J. James Exon's (D-Nebr.) subcommittee, 5 June 1990.

Figure 1. The Contingency Mission: Diverse Threats in a Changing World

part of the chapter is a review of the potential conflicts in the rapidly arming third world. The study questions whether the bomber force in its present configuration is ready for war fighting in a third-world conflict.

Chapter 3 analyzes the technical and detailed dimensions of the topic. It evaluates the present bomber force's conventional capabilities in terms of: (1) capabilities, configuration, and training, and (2) retirement of the B-52G and future involvement of the B-52H.

Conventional bombers also complement naval forces—that is the subject of chapter 4. It assesses whether the maritime role of the conventional bomber is still valuable. The study focuses on three maritime bomber missions—aerial mining, antisurface warfare, and sea surveillance.

Chapter 5 investigates future bomber roles. This chapter is an examination of the potential of the B-1 and B-2 for projecting nonnuclear air power in theater conflicts or in the third world. This evaluation is important to military analysts because it deals with controversial bomber funding issues.

After the B-1 and B-2 inquiry, I probe into the world of standoff weapons for bombers in chapter 6. This study of standoff weapons and their value in enhancing deterrence includes an examination of the limitations and shortfalls of these weapons.

The final chapter presents a summary and conclusions. The main focus here is flexibility. The conventional bomber force of the immediate future should be a flexible force that can project from US bases or deploy to forward operating bases. This force should be able to conduct maritime operations, standoff war fighting, and conventional bombing. The conclusion and recommendations are based on two givens: (1) the bomber force is going to be reduced, and (2) theater commanders will never realize the full potential of the conventional bomber in its present configuration.

As with most studies, some background information is required to develop a discourse. The study begins with a brief background of how the US Air Force used conventional bombing in past conflicts.

Notes

1. Secretary of the Air Force Donald B. Rice, *The Air Force and U.S. National Security: Global Reach—Global Power*, white paper (Washington, D.C.: Department of the Air Force, June 1990), 6.
2. Maj Grover E. Myers, *Aerospace Power: The Case for Indivisible Application* (Maxwell AFB, Ala.: Air University Press, 1986), 66.
3. "Why America Needs the B-2," *Air Combat*, September 1990, 58.

Chapter 1

Linebacker II, El Dorado Canyon, and Mighty Warrior 1989—Lessons Learned

The effective use of bomber conventional air power is demonstrated by three recent examples. The first example is Linebacker II, a massive bombing campaign in Vietnam. The second is the Libya Raid (El Dorado Canyon), a low-intensity conflict in which the USAF used F-111 bombers. The third is Mighty Warrior 1989, a large-scale exercise that used bombers to test capabilities and readiness. The purpose of evaluating these three examples is to present a brief background of conventional bomber war fighting across the spectrum of conventional warfare from low intensity to large scale. The section on exercises examines how Strategic Air Command (SAC) prepares its force for possible conventional war. First, the study takes a brief look at a campaign using conventional bomber air power in Vietnam.

Linebacker II Experience

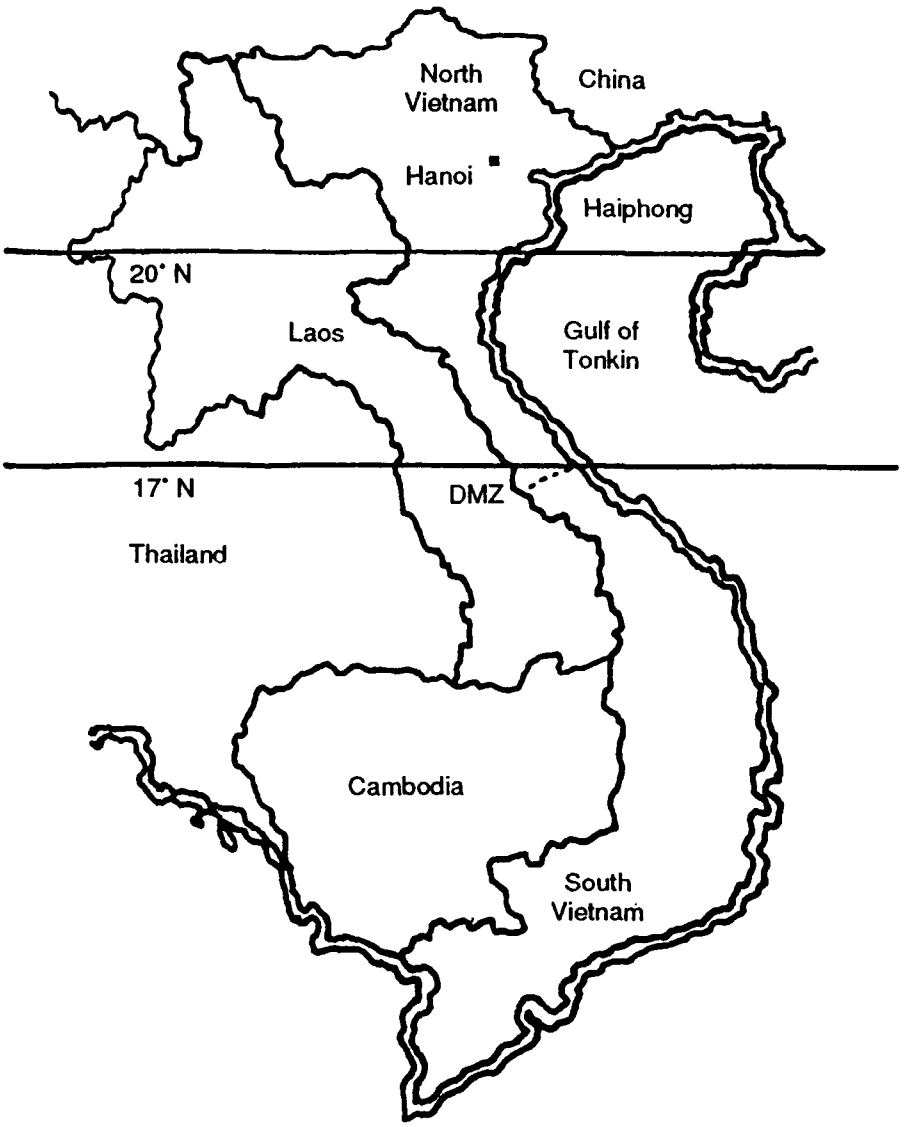
The Linebacker II campaign in Vietnam was chosen as a focus of this study because it is a large-scale example of the US using conventional air power, without land or sea forces, as an instrument of national policy. Linebacker II is also significant because it was a tactical, operational, and limited political success.[1]

President Richard M. Nixon began a drawdown of troop strength in Vietnam after he took office in January 1969. From a high of 545,000 in 1969, US troop strength was reduced steadily so that by May 1972, it was about 69,000.[2] As US forces withdrew, President Nixon warned the North Vietnamese that the US would respond militarily to any overt action against the South.[3]

The North Vietnamese saw the US reduction in troop strength as an advantage, broke off the Paris peace talks, and in 1972 launched a massive offensive across the demilitarized zone (DMZ). A historian and author, W. Hays Parks, portrayed the attack:

> Before the [1972] Easter weekend was over, twelve of Hanoi's thirteen regular combat divisions were carrying out military operations in South Vietnam. The 120,000-soldier force was equipped with more than 200 . . . tanks as well as mobile radar-controlled antiaircraft weapons and portable surface-to-air missiles.[4]

The president answered this invasion with conventional bomber air power. On 2 April 1972, the National Command Authorities (NCA) through



Source: Col Phillip R. Lumpkin, "Role of the Bomber in Integrated Air Power," Research Report (Maxwell AFB, Ala.: Air War College, May 1988), 4.

Figure 2. Southeast Asia

the Joint Chiefs of Staff (JCS) authorized B-52 air strikes against military targets and logistics supply points north of the DMZ at 17°25' N; this was increased to 18° N on 4 April 1972 and to 19° N on 6 April 1972 (fig. 2).[5]

The NCA ordered air strikes progressively farther north. On 16 April 1972 the NCA ordered air strikes against North Vietnamese targets—this was a forerunner to Linebacker II. The NCA issued orders for the USAF and US Navy (USN) to conduct one-day strikes against enemy defenses and logistics targets in the Hanoi and/or Haiphong areas to emphasize our determination to stop the Hanoi government offensive in South Vietnam.[6]

This campaign is significant because the US employed an integrated bombing force with supporting aircraft in this high-threat area. The US had not effectively used this tactic since the Korean War. Col Phillip Lumpkin summarized the integrated tactics in an Air War College research report:

> Fifteen USN A-6s struck Surface-to-Air Missile (SAM) sites in Haiphong area, and 20 USAF F-4s laid a chaff corridor to screen the B-52s entry into the threat zones. With 7th AF and naval aircraft providing [Russian MIG Fighter Combat Air Patrol] MIGCAP, IRON HAND SAM suppression, and Electronic Countermeasures (ECM) support, 17 B-52s attacked the Haiphong Petroleum Products Storage (PPS) area. . . . The second and third waves, composed of TACAIR [tactical air] assets, followed up with attacks on ten other targets in the Hanoi/Haiphong areas. This included the Hanoi PPS, two airfields, and numerous warehouse complexes.[7]

The NCA considered the April 1972 raid a success despite having encountered formidable defenses. The North Vietnamese launched over 250 SAMs, but they accounted for only two US TACAIR losses. The North Vietnamese scrambled a limited number of MiGs in the April 1972 raid, in which the US shot down two MiGs with no US air-to-air losses.[8] These raids on 16 April 1972 destroyed half of the petroleum, oil, and lubricants (POL) storage in the Hanoi/Haiphong area and gave notice to the North Vietnamese that the US was not going to employ a "slowly graduated escalation" strategy.[9]

By early May 1972, President Nixon had accelerated the bombing campaigns as the North Vietnamese intensified their campaign in the south. Nixon ordered heavy bombing farther north and the mining of Haiphong and other key harbors. Nixon's objectives were to curtail the military resupply of North Vietnam from external sources, to destroy stockpiles of military supplies, to strike targets throughout North Vietnam which were supporting the war effort in South Vietnam, and to restrict the flow of forces and supplies to the battlefield.[10]

The conventional bombing raids quickly produced results. By late June the invasion had stalled, and the North Vietnamese had signaled their willingness to resume the peace talks. President Nixon continued the bombing to maintain pressure on the North Vietnamese. By late October the principles for a cease-fire were negotiated and peace appeared to be at hand. As a sign of goodwill, the president halted bombing north of the 20th parallel.[11]

Only minor details separated the North Vietnamese and American negotiators from concluding a peace plan. But the momentum waned in November and the talks reached a complete deadlock in mid-December 1972 (over the form of government to be implemented in the South), and negotiations were broken off. True to form, when the military pressure on the North ceased, progress at the negotiating table faltered.[12]

As the process of negotiation waned, Nixon made his intentions absolutely clear. The president wanted maximum damage on North Vietnam;

the conventional bomber rose to the occasion. On 11 December, Linebacker II began with the following JCS message:

> You are directed to commence at approximately 1200Z, 18 December 1972 a three-day maximum effort, repeat maximum effort of B-52/TACAIR strikes in the Hanoi/Haiphong areas against the targets contained in (the authorized target list). Object is maximum destruction of selected military targets in the vicinity of Hanoi/Haiphong. Be prepared to extend operations past three days if directed.[13]

In conjunction with the message, the JCS also issued the following instructions:

1. Air crews will use visual and all-weather capabilities.
2. Use all available resources except those required for support of emergency situations in Laos and Cambodia.
3. Air crews and planners may use restrikes on authorized targets.
4. To minimize losses and improve air power effectiveness, US forces will strike the North Vietnamese air order of battle, airfields, and active surface-to-air missile sites.
5. Use smart weapons (laser guided bombs) to avoid civilian casualties.[14]

Linebacker II, commonly known as the Eleven Day War, was a joint and highly integrated mission (see table 1).

Table 1

Linebacker II
A Joint and Highly Integrated Mission

Linebacker II	December 1972										
Date	18	19	20	21	22	23	24	26	27	28	29
Day	1	2	3	4	5	6	7	8	9	10	11
Day Mission											
Mission Support*	0	-	-	-	81	77	-	53	65	61	53
Strike Aircraft											
(F-4, A-7)*	0	52	74	66	76	68	32	48	52	48	40
Total Day Sorties*	0	0	0	0	157	145	0	101	117	109	93
Night Mission											
Mission Support*	117	117	117	58	65	70	69	114	101	99	102
Strike Aircraft											
F-111*	16	33	18	33	33	25	8	25	24	16	16
B-52	12	93	93	30	30	30	30	119	60	60	60
Total Night											
Sorties*	145	126	111	63	63	55	38	144	84	76	70
Total Aircraft											
Sorties*	145	126	111	63	220	200	38	245	201	185	163

*Approximate or not available

Source: Col Phillip R. Lumpkin, "Role of the Bomber in Integrated Air Power," Research Report (Maxwell AFB, Ala.: Air War College, May 1988), 46.

Linebacker II—A Tactical and Operational Success

The tactical success and results of Linebacker II are convincing. The US devastated the North Vietnamese by completing 729 bombing sorties and 1,100 support sorties. This equates to 15,000 tons of expended ordnance. These conventional bombs destroyed 1,600 military targets, 500 rail complexes, and 372 pieces of rolling stock. The raids also destroyed one-fourth of North Vietnam's petroleum reserves and 10 airfields, runways, or ramps.[15]

Linebacker II was also an operational success. The US achieved the above results with minimum combat losses. Looking just at the B-52s, which penetrated the highest threat zones—Hanoi and Haiphong—the loss rate was 4 percent.[16] This loss rate is low compared to the 20 to 40 percent loss rates the Eighth Air Force experienced over Germany between 1943 and 1944.[17]

A Political Success

After years of inconclusive negotiations, the North Vietnamese acted decisively during Linebacker II. On 20 December (two days into the action), North Vietnam petitioned to resume peace talks. On 27 December, the North Vietnamese accepted the American peace terms agenda. By January 1973 Kissinger made good on his "peace is at hand."[18]

Whether or not the Linebacker II bombing brought the North Vietnamese to the bargaining table is not entirely clear. The bombing certainly gave North Vietnam ample reasons to seek peace. Hanoi and Haiphong were devastated; their factories, power plants, and residential districts became a "mass of rubble."[19]

President Nixon faced threats from Congress, intransigence from Vietnamese political bodies, and mounting US troop withdrawals—all of which made a major land action highly controversial.[20] The president was backed into a corner, and he had to play his "ace-in-the-hole," conventional air power. Effective application of conventional air power accomplished in 11 days what the US had tried to do for almost 10 years. This example of hard-hitting bomber conventional power projection could also apply to future conflicts. While Vietnam serves as an example of large doses of conventional air power, El Dorado Canyon (Libya Raid) serves as a prime example of conventional bomber air power on a smaller scale.

Libya—A Conventional Bomber Air Power Response to State-Sponsored Terrorism

El Dorado Canyon (Libya Raid), like Linebacker II, was militarily successful in its application of force to support a national political objective. On 15 April 1985 the US conducted a joint service raid on Libya—the first USAF bombing raid since Vietnam. The Libya Raid is an important example of

effective conventional air power applied at the lower end of the war-fighting spectrum. Two senior Air Force officers conducted a year of research concerning El Dorado Canyon. Lt Col Larry J. Leturmy and Lt Col Geoffrey S. Parker described the Libya Raid as follows:

> This is a chapter in the story of the struggle between Colonel Muammar Qaddafi and the US over state-sponsored terrorism. While we have yet to hear from the historians, they may view this struggle as a classic political-military case were a nation methodically and exhaustively applied its full political resources to the peaceful attainment of the national objective. The objective was urgent.[21]

Colonels Leturmy and Parker further stated that when peaceful means proved futile, the nation was left no other choice but to cross the threshold to force. In a brief 12 minutes over Libya, an unambiguous military message was delivered to Tripoli. The message is that any nation that is considering state-sponsored terrorism against the US may have to face a formidable US military response. The conventional bomber may be the instrument that would deliver the response in future actions.[22]

Events Prior to the Raid

The series of events begins with terrorist attacks on the Rome and Vienna airports in December 1985. These events, even though not the first, were significant because they triggered a change in the Reagan administration. Libyan support of terrorism was not new, nor was it unusual for the US to attempt varying approaches to counter it. But, for the third time since taking office, the administration was again considering the option of a military strike against Libya. They chose instead economic and diplomatic measures, combined with military exercises off the Libyan coast.[23]

The following is a synopsis of political events from December 1985 up to and including the raid on Libya:

> 27 December 1985—Palestinian terrorists attack waiting passengers at the Rome and Vienna airport terminals. Passports used by the terrorists are traced to Libya.
>
> 6 January 1986—A Reagan administration official says the US has received intelligence information that there are as many as 15 camps in Libya for the training of Palestinian terrorists.
>
> 7–8 January 1986—President Ronald Reagan imposes economic sanctions against Libya and orders all US citizens there to return home.
>
> 22–26 March 1986—The US Navy conducts Freedom of Navigation Exercise, Operation Prairie Fire. US Sixth Fleet crosses Qadhafi's "Line of Death" into the Gulf of Sidra and stays there for 75 hours. Libya fires SA-5 missiles at US aircraft. Navy jets knock out one of the SA-5 radar sites near Surt with high-speed antiradiation missiles (HARM). Libyan patrol boats and missile corvettes (small missile ships) approach the fleet; US Harpoon (antiship cruise missiles) inflict heavy damage—sinking at least two, and disabling another.
>
> 5 April 1986—A bomb explodes in West Berlin's La Belle discotheque, killing two people and injuring 230 others including 50 Americans. The US and later West Germany, say there's irrefutable evidence that Libya was behind the blast.

9 April 1986—President Reagan approves the Libyan raid at National Security Council (NSC) meeting. Two US vessels steam towards the central Mediterranean, where they would be in a position to strike at Libya.

15 April 1986—Two A.M. Libya time, US attack aircraft strike five targets near Tripoli and Benghazi, Libya, in retaliation for Berlin bombing. Reagan charges that Qadhafi has many more attacks planned.[24]

After President Reagan was convinced that Muammar Qadhafi was behind the La Belle discotheque bombing, he took immediate action. Once again, just as in Linebacker II in Vietnam, the president chose conventional bomber air power to support a national political objective. According to Reagan, "For us to ignore by inaction the slaughter of American civilians and American soldiers, whether in nightclubs or airline terminals, is simply not in the American tradition."[25]

Conventional Bomber Objectives

When President Reagan approved a bombing attack against Libya, there were several concerns. The director of the Central Intelligence Agency, William Casey, was worried about getting agents out and Adm William Crowe, chairman of the Joint Chiefs of Staff, voiced his concern about lack of firepower in the area. Since the March naval engagement, the carrier *Saratoga* had left the Mediterranean, leaving only the carriers *Coral Sea* and *America*.[26] Since Admiral Crowe was concerned with a lack of naval firepower to support a bombing raid in the area, we chose the F-111 conventional bomber to complement naval-based aircraft in the region and conduct the attack on Libya.

With the objective of deterring current and future terrorism, the administration directed the raid at terrorist-related targets. President Reagan's philosophy was "hit hard and fast."[27]

We believe that this preemptive action against terrorist installations will not only diminish Colonel Qaddafi's capacity to export terror, it will provide him with incentives and reasons to alter his criminal behavior.[28]

Secretary of State George Shultz described the targets as two barracks, two military airports, two barracks where Qadhafi's immediate guards were stationed, and a terrorist training facility.[29] Air Force F-111 conventional bombers were to attack three targets in Tripoli—the military airport, a barracks at Sidi Bilal, and the Aziziyyh barracks. In addition, Navy A-6 conventional bombers were to attack the Jamahiriyy barracks and the Benina Air Base, both in the Benghazi area.[30] US intelligence reported that Soviet-made transports, based at the Tripoli airport, were there to transport terrorists and their weapons. The Jamahiriyy barracks served as the main alternate to the Aziziyyh terrorist command post, and Sidi Bilal was a commando training center for terrorists. The US also targeted the Benina airfield as a precaution against defensive response from MiG-23s at the airfield.[31]

Operational Considerations

After the administration and the NCA chose the targets, Secretary of Defense Caspar Weinberger stated that the US should consider various risks associated with the raid. The administration considered these risks:

1. catastrophic disaster resulting in severe civilian casualties and mission failure,
2. death or capture of the military aircrews and loss of their equipment,
3. technical and intelligence data compromised from the operation (the Soviets had been told of the operation in advance and possibly were watching),
4. error due to fatigue in the F-111 crews because of the overall length of the mission,
5. increased retaliation not only to the US but to Great Britain,
6. straining the US NATO alliance with France and Spain,
7. unfavorable reaction by moderate Arab states with common Muslim ties, and
8. unfavorable world opinion.[32]

After considering these risks, military planners decided to strike the seven targets at night, with precision, and simultaneously to limit collateral damage. This would minimize casualties on both sides. The US decided to attack at approximately two A.M. At this hour most Libyans would be off the streets, and the darkness would make it difficult for the Libyan troops to aim antiaircraft guns visually. The Libyans are notoriously poor night flyers, and at this late hour the US hoped to find the MiG-23 interceptor pilots not very alert. Also the US felt the element of surprise and the late time would catch the pilots off guard.[33]

Therefore, the US military planners decided to hit seven targets with 32 aircraft. At that time the only Navy aircraft capable of making precision strikes at night was the A-6. However, the Navy did not have enough carrier-based A-6s in the area to accomplish the mission (only 15 were available).[34] As a result, the US made the decision to complement naval air power with another extremely capable conventional bomber, the F-111 based in England.

Both the A-6 and the F-111 possessed precision bombing systems. The A-6 had the target recognition and attack multisensor (TRAM) delivery system while the F-111 was configured with the Pave Tack precision delivery system.[35]

Along with the Pave Tack, the F-111 had another advantage—the Libyans were not watching the F-111s as closely as the carrier-based A-6s in the area. Based on this, planners felt the F-111s could achieve the "element of surprise."[36]

The use of F-111s to project conventional air power from British soil was a politically sensitive issue. The US gained permission from Prime Minister

Margaret Thatcher. Even with permission, however, the action created some controversy. On the other hand, Secretary of the Navy John Lehman stated that the "U.K. came through like gangbusters, and the operation showed the Libyan leader, Muammar Qadhafi that even if there are no American carriers in the Mediterranean, his country is not beyond the reach of US force."[37]

The rationale for the raid came from the JCS chairman, when he said:

> The carriers could have taken out those targets, but not in one raid (so tactical surprise would have been lost). Secondly, the F-111s were ideally suited (for such a mission). They train over land at night all the time. The carrier training is diffuse because they do a number of things: attack ships, submarines and land targets, etc. We all agreed it was very important to present the Libyans with a new axis of attack they didn't necessarily suspect. While they were concentrating on the carriers, we wanted to throw in an element we didn't believe they were ready for or anticipated.[38]

The Raid

The element of surprise was successful in this hard-hitting raid. The raid started about noon on 14 April 1986. F-111 conventional bombers launched from Lakenheath, England, flew around the Iberian Peninsula, skirting French and Spanish airspace. These F-111s were refueled by USAF KC-10s and KC-135s. It took approximately five and one-half hours for the bombers to reach their targets. Just before the F-111s arrived, A-6s were launched from the Sixth Fleet. Military sources described the raid like this:

> So far so good—the Libyans were completely surprised. A few moments before the F-111s eased into their bomb runs, Navy A-7s and F/A-18s went after the Libyan anti-aircraft installations around Benghazi. SHRIKE missiles and HARMs quickly put them out of commission. Even the airfield's MiGs failed to get airborne—at least four were destroyed on the ground. The F-111s over Tripoli found themselves facing much the same situation. Although the Libyans knew the planes were out there by this time, they had no clue as to where they would strike. The American planes veered south into Libyan territory and punched at Qaddhafi's barracks, the airfield and the naval base from behind. Libyan radar did finally get a fix on the F-111s, but the Air Force pilots sent signals to the Navy F-14s circling nearby. They swooped in for the kill, disabling the SAMs and the radar.[39]

The raid was a definite military success according to reconnaissance and bomb damage assessment. After the raid, the USAF sent SR-71 reconnaissance aircraft to photograph the area. The aircraft failed to acquire photographs on the first two days because of cloud cover. On the third day, the SR-71 successfully photographed the target. But by this time, it was apparent the Libyans had been hurriedly rebuilding to disguise the damage.[40] At the Benina airfield, SR-71s photographed the wreckage of at least four MiG-23 Flogger fighters, two helicopters, and two F-27 aircraft. The Sidi Bilal facility was not damaged as much as planners had hoped, but the US destroyed five Il-76 transports at the Tripoli airport and inflicted heavy damage on several airport military buildings.[41]

Despite the overall success, there were some problems in the raid. Some of the F-111 strikes were only partially successful. One F-111 aircraft attacking Aziziyyh missed the target slightly because of target misidentification. Another F-111 aircraft, which had planned to attack the Tripoli military airfield, aborted because the aircraft lost its terrain-following radar. One F-111 crashed at sea en route to the target. The cause of the crash is unknown, and both crew members were killed.

Even though the US was extremely cautious in its rules of engagement, injuries, deaths, and damage to civilian property did occur. One to 2 percent of the bombs struck civilian areas. The F-111s that slightly missed the target dropped bombs in the vicinity of the French embassy. Two other bombs, which barely missed the Benghazi barracks, damaged buildings 700 yards off the target. Libyan officials reported that 37 people were killed in the attack.[42]

The Libya Raid, although not 100 percent perfect, was an outstanding application of "global reach" and conventional bomber air power projection. N. Browne described the success of the raid in *Strategic Analysis*:

> In a spectacular feat of arms, US Navy and Air Force assets separated by 3,000 miles, coordinated to execute a near-perfect mission.[43]

The Raid: A Case of Coercive Diplomacy

Coercive diplomacy is defined as a use of military power to coerce foreign leaders or governments into actions or change behavior. The purpose of coercive diplomacy is to weaken and undermine a nation's will to pursue a certain course of action.[44] It worked in the Libyan raid.

According to Dr Lewis Ware, a Mideast political specialist at Air University, the raid definitely achieved its effect as a deterrent.[45] We would be naive to think that the raid was a panacea for all future terrorism, but there has been a substantial decrease in Libyan terrorist activity directed at the United States. And the 12-minute conventional bomber raid over Libya did alert possible terrorists. According to Michael Reese, "Any government contemplating the use of terrorism . . . must now take into account the possibility of military response."[46] As the Libya Raid has deterred aggression, large SAC conventional exercises have not only trained our forces, they have deterred would-be aggressors as well.[47]

Exercises—Training as We Would Fight

Exercises keep our forces honed and ready for war. Exercises and their participants produce three vital accomplishments: (1) exercises train our forces for war fighting under the most realistic conditions possible, (2) these operations evaluate or test our forces to determine force readiness for a particular conflict, and (3) the US conducts these practice wars as a show of force. In this way, we demonstrate our national will to our enemies as well as to our allies.

Mighty Warrior 1989 is a prime example of an exercise that meets all of the above criteria. I selected Mighty Warrior because it is the largest conventional bomber exercise in the history of the Strategic Air Command.

Execution of the Exercise

In Mighty Warrior 1989, nine B-52s, two FB-111s, and two B-1 bomb wings deployed to seven continental United States (CONUS) and three European locations. SAC conducted the realistic exercise to advance the command's combat readiness. To make the exercise more realistic, SAC deployed units to austere locations. Some of these locations were "back to basics." Sites such as Roswell, New Mexico, and Biggs Army Airfield, Texas, offered only limited operating facilities. Personnel at these locations worked in tent cities erected by civil engineering squadrons. Field kitchens and field conditions were normal. While some civil engineers prepared the tent cities, others prepared the facilities for the flying activity. Civil engineers set up portable fuel bladders for jet fuel and made repairs to the austere runways.

The purpose of the exercise was to engage these bomb wings in a highly realistic European theater war-fighting exercise. Lt Gen E. G. Shuler, Jr., the Eighth Air Force commander and director of Mighty Warrior, said:

> Eighth Air Force's 14 bomber and tanker wings engaged in this highly realistic conventional warfighting exercise during September of this year. Our troops performed superbly. They displayed SAC's enormous capability to deliver a global conventional punch while placing would-be aggressors on notice that we can and will respond to any assault on our nation's vital interests.[48]

The order of the day was realism. Eighth Air Force intelligence developed an authentic European conflict scenario based on WINTEX-CIMEX '89, a detailed European command post exercise. One of the primary goals of the exercise was to test our readiness to integrate with North Atlantic Treaty Organization (NATO) forces in wartime. In this manner SAC would "change of operational control" (CHOP) bombers to NATO to demonstrate SAC's commitment to the conventional defense of Europe.

The simulated war against the enemies of NATO worked as planned. First, the Eighth Air Force staff that had planned the exercise initiated a simulated conflict in Europe against the Soviet Union and Warsaw Pact nations. After this alert order on 5 September, units airlifted troops and equipment to deployed locations stateside and three European locations. This involved over 4,000 people and 1,000 short tons of equipment. Military Airlift Command's C-5s and C-141s carried troops and equipment to Europe while SAC's KC-10s and KC-135s airlifted troops and supplies in the CONUS.

In less than a week, the units were in place, set up, and ready for war. On 11 September the flying phase of Mighty Warrior began. In the next two weeks 68 deployed bombers would strike targets requested by NATO planners.

To add a realistic command and control element, the Eighth Air Force staff of 34 people assembled in NATO's primary static war headquarters in Mons, Belgium. From this bunker, General Shuler and his staff acted in the role of Supreme Allied Commander, Europe (SACEUR) Air Apportionment Group. This staff worked around the clock for two weeks and became intimately familiar with NATO command and control procedures and how best to integrate SAC bomber participation.[49]

As the planners directed the exercise from the NATO bunker, bombers deployed in Europe flew diverse missions to demonstrate and evaluate the use of conventional bomber air power to complement tactical air forces (TAF), NATO forces, and naval operations. SAC flew sorties in Southern Europe, the Mediterranean, the English Channel, central Europe, and the North Sea. Bomber crews flew simulated conventional bombing missions against challenging European bombing ranges, participated in joint combined raids, and flew long-range strike missions. Several of these missons were either live bomb drops or drops of simulated (concrete-filled) bombs with no explosives. Meanwhile, bomber crews also earned their keep over the oceans. The crews performed tactical air support of maritime operations, mine laying, sea surveillance, and Harpoon missile (a B-52 ship-killing missile) launches.

The pace was grueling for the overseas deployed units. Maintenance organizations were challenged to keep the airframes flying at a level of frequency close to wartime rates. The maintenance troops performed superbly and kept the aircraft flying despite typically bad European weather.

Meanwhile, units in the CONUS fought the same simulated European conflict stateside. To enhance realism, the Eighth Air Force gave the units only 18 to 24 hours' notice to prepare for a new target. Bomber crews and planners demonstrated their responsiveness to NATO by meeting all time lines for these taskings. This was not an easy task because planners and crews are normally given two weeks to perform the same funtions they accomplished in 24 hours or less. When the stateside units planned the missions, crews then flew day and night missions against a variety of CONUS bombing ranges to simulate NATO-directed strikes. Many of these ranges and targets were new to the crews—this is close to the environment they would experience in an actual war. Since the units bombed with both live and inert munitions, this too added realism to the scenario. In addition, when the crews did not drop live or inert munitions, the bombing ranges scored the bombing electronically, a very precise method. These scores provided valuable feedback that helped to refine aircrew bombing skills.

While bomber crews flew to practice ranges in the CONUS and Europe, the wing staffs at all locations participated in a two-week command post exercise (CPX). As a part of this exercise, units correlated real live-fly results with the CPX. The CPX units planned missions on short notice and computed penetration analysis against real-world targets. Unit intelligence

staffs also analyzed the bombing results to determine bomb damage assessment and need for restrike.

Conventional bombers proved their worth throughout Mighty Warrior; the results were outstanding. Bomber crews posted numerous bomb scores at less than 100 feet, and a B-1 bombed its target with a score of 10 feet. Aircrews honed their bombing skills by participating in a joint night attack with Tactical Air Command (TAC) assets. This raid took place in the Nevada Red Flag Range. As the bombers flew at 200 feet above the ground, F-15 fighters engaged a force of 24 B-52s and FB-111s. The SAC crews used low-level, terrain-masking, evasive maneuvers and electronic warfare to defeat the interceptors. Bombers then dropped their bombs squarely on the target in the Nevada desert range. At the end of the exercise, the conventional bombers put on another convincing show of air power. General Shuler described this event in an interview.

> The grand finale of MIGHTY WARRIOR 89 occurred on Friday, 22 September, when 12 B-52s, and 12 FB-111s released live and inert weapons on the Nellis Range in an impressive display of SAC's enormous conventional firepower. This concentrated attack culminated a highly successful exercise.[50]

Exercise Lessons Learned

When the exercise was complete, planners at Eighth Air Force tallied the results. In 12 days, bombers flew 632 sorties and tankers flew 537 sorties under simulated wartime conditions. Bomber crews achieved a 92 percent bomb release rate and tanker crews off-loaded more than nine million pounds of fuel.[51]

The exercise was an unprecedented success for all involved—military analysts and planners were pleased. In summary, the Mighty Warrior exercise accomplished four major objectives: (1) it demonstrated to our NATO allies that we are ready to respond to any infringement on their countries, (2) the exercise proved that we can strike unfamiliar targets on a very short warning (18 to 24 hours) in large conflicts as well as third-world conflicts, (3) we confirmed that bomber units can deploy and successfully operate from austere forward operating bases, and (4) units certified their war readiness for theater war fighting.

As our allies and enemies watched, this war readiness exercise and show of force demonstrated that the SAC conventional bomber force is capable of wielding its sword with devastating effect.[52] This was but one of the many exercises that SAC conventional bombers have been a part of in the last five years. The other exercises accomplished the same objectives but not to the scale of Mighty Warrior 1989.

Mighty Warrior, even though a practice endeavor, is related to Linebacker II and the Libya Raid. Linebacker II and El Dorado Canyon substantiated the overwhelming power of conventional bombing in varying degrees of application. In addition, the Mighty Warrior 1989 exercise successfully

trained and increased the war-fighting skills of our conventional bomber forces for potential future large conflicts.

Notes

1. Lt Col George R. Jackson, "Linebacker II: An Examination of Strategic Use of Airpower," Defense Analytical Study (Maxwell AFB, Ala.: Air War College, May 1989), 1.
2. W. Hays Parks, "Linebacker and the Law of War," *Air University Review* 34, no. 2 (January-February 1983): 4.
3. *The United States Air Force in Southeast Asia: 1961-1973 An Illustrated Account* (Washington, D.C.: Office of Air Force History, 1977), 94.
4. Parks, 2.
5. Ibid., 5.
6. Headquarters Pacific Air Forces (PACAF), "CORONA HARVEST: USAF Air Operations against North Vietnam, 1 July 1971-30 June 1972," 8 June 1973, 72.
7. Col Phillip R. Lumpkin, "Role of the Bomber in Integrated Air Power," Research Report (Maxwell AFB, Ala.: Air War College, May 1988), 44.
8. Ibid.
9. Headquarters PACAF, "Project Checo Report," 27 September 1973, 14.
10. Parks, 5.
11. Ibid., 17.
12. Lumpkin, 45.
13. Ibid.
14. Ibid.
15. Jackson, 2.
16. Brig Gen James R. McCarthy, Col Robert E. Rayfield, and Lt Col George B. Allison, *Linebacker II: A View from the Rock* (Washington, D.C.: Government Printing Office, 1979), 172.
17. Jackson, 2.
18. Henry A. Kissinger, *White House Years* (Boston: Little, Brown and Co., 1979), 1457.
19. Wilfred Burchett, *Grasshoppers and Elephants* (New York: Urizen Books, 1977), 177.
20. Jackson, 55.
21. Lt Col Larry J. Leturmy and Lt Col Geoffrey S. Parker, "The Libya Raid: A Joint Response to State-Sponsored Terrorism," Research Study (Maxwell AFB, Ala.: Air War College, 1986), iv.
22. Ibid., iv.
23. Ronald Bruce St. John, "Terrorism and the Libyan Foreign Policy, 1981-1986," *World Today*, July 1986, 111-15.
24. The chronology was compiled from the following sources, which are listed in the order of the magnitude in which they contributed:

John Coleman, "Libya, A Chronology of Colonialism, Coercion and Combat," *Soldier of Fortune*, August 1986.

Kaleidoscope: Current World Data. A card file produced by ABC-CLIO, Inc., Santa Barbara, California.

"Countdown to Conflict: The U.S. and Libya," *Wall Street Journal*, 16 April 1986.

Lou Cannon and George C. Wilson, "U.S. Says Libya Eyed Sudan Coup," *Washington Post*, 19 February 1983, 1-2.

Gerald F. Seib, "U.S. Sends More AWACS in Growing Effort to Help Chad Resist Libya-Backed Rebels," *Wall Street Journal*, 8 August 1983, 3.

"Missiles Shake Island," *The Times*, 16 April 1986, 1.

25. Leturmy and Parker, 24.
26. George J. Church, "Targeting Qaddafi," *Time*, 21 April 1986, 20.

27. Leturmy and Parker, 24.
28. "U.S. Exercises Right of Self-Defense Against Libyan Terrorism," *Department of State Bulletin*, June 1986, 1–27.
29. Ibid., 6.
30. Ibid., 3.
31. Leturmy and Parker, 28.
32. Ibid., 29.
33. George J. Church, "Hitting the Source," *Time*, 28 April 1986.
34. "Hits and Misses in Libyan Raid," *Defence Attache*, no. 2 (1986): 11.
35. Anthony H. Cordesman, "The Emerging Lessons from the U.S. Attack on Libya," *Armed Forces*, August 1986, 358–59.
36. "Libya Strike Details Revealed," *Flight International*, 26 April 1986, 14.
37. "Use of Air Force Planes Raises Questions," *Washington Post*, 20 April 1986, A24.
38. "Weinberger, Crowe Provide Additional Details on Libya Raid," *Aerospace Daily*, 26 June 1986, 496.
39. "Strike One, Strike Two," *Soldier of Fortune*, August 1986, 80, 87, 132–34.
40. "Hits and Misses in Libyan Raid," 11.
41. Church, 31.
42. N. Browne, "U.S. Attack on Libya," *Strategic Analysis*, July 1989, 433–34.
43. Ibid., 438.
44. Ibid., 422.
45. Dr Lewis B. Ware, Air University, Maxwell AFB, Ala., interview with author, December 1990. Dr Ware is professor of Middle East studies and chief of the Political-Military Affairs Division, in the Airpower Research Institute, at Air University's Center for Aerospace Doctrine, Research, and Education.
46. Michael Reese, "What Have We Learned," *Newsweek*, 15 September 1986, 27.
47. Several of the ideas and structure for this Libya analysis were derived from an extensive and outstanding research study by Parker and Leturmy.
48. Lt Gen E. G. Shuler, Jr., "Mighty Warrior 89," *Combat Crew*, November 1989, 9.
49. Ibid., 3.
50. Ibid., 9.
51. Ibid.
52. Ibid., 3.

Chapter 2

The Soviet Threat and Third-World Conflicts

As USAF conventional bomber planners evaluate the security challenges in the 1990s, they may want to consider the following:

1. Is the Soviet threat really insignificant?
2. Is there more potential for third-world conflicts than ever before?

The prevailing school of thought among both congressmen and the general population is to declare that the cold war is over, and the US should benefit from a declining Soviet threat. Secretary of Defense Dick Cheney does not agree: "The end of the Cold War does not necessarily foretell the end of the war. Global conflict may become less likely, but regional hostilities and an increasingly complex and unstable international environment will still disrupt this fragile peace. This is precisely what we are seeing in the current crises [1991 Iraq] in the Persian Gulf."[1]

Are the Soviets Still a Formidable Threat?

Conventional bomber planners in Strategic Air Command and throughout the Air Force may interpret the unexpected events that are now taking place in the Soviet Union as the end of confrontation between the US and Soviets. This may not necessarily be wise. In fact, the events in the Soviet Union could create a very unstable security environment.

Present Soviet Actions

Secretary Cheney is not convinced that the basic Soviet doctrine has changed. He is skeptical about altering our defense budget priorities and letting our guard down based on Soviet rhetoric and actions. Cheney further believes that the main issue is not what the Soviets are doing in 1990, but what they will be doing in the year 2000.[2]

Before speculating about the year 2000, this analysis begins with present events in the Soviet Union. Presently the Soviet Union is making drastic reforms in leadership and freedom for its people. There have been new elections in the Soviet Union, Poland, Hungary, Czechoslovakia, and East Germany. Every former Warsaw Pact country has a new leader. The US is optimistic about the changes, and the threat of sudden Soviet attack on the central front of Europe is lower than at any time in the last 40 years.[3]

As many US analysts examine the present situation in the Soviet Union, it appears that the cold war is over. However, Cheney and other analysts are doubtful and believe that the Soviets may not change their expansionist ambitions overnight. The Soviet Union's past actions dictate otherwise.

Past Soviet Actions

Soviet doctrine is founded on force, and even with economic problems, the Soviets maintain enormous military capability. Since the cold war began over 40 years ago, the Soviets have been our primary threat to peace—the Soviet Union is the only country in the world that could wage an all-out war against us today.

Cheney further argues that we cannot disregard the past actions of the Soviet Union. The Soviets have used power as a source of intimidation, aggression, dominance, and expansion. The basic doctrine of power must change before the United States can trust the Soviets.

This change may not happen tomorrow or even in 10 years since that system has been firmly entrenched for over 70 years. Secretary Cheney describes the system as follows:

> For 70 years, the Communist Party and state elite has [sic] ruled without popular consent or political accountability. The legal system, based solely on the interests of the state, ignored the most basic individual rights. A huge internal police apparatus emerged that far exceeded anything the czars ever dreamed of. Dissidents were imprisoned in labor camps and psychiatric hospitals.[4]

And while the Soviets have ruled by force at home, they have expanded their influence by the use of force around the world. Even though the United States is optimistic about changes in the Soviet Union, historians are skeptical because of forceful Soviet actions since the late 1940s. Secretary Cheney states in *Defense 90* that the Kremlin has used its military power worldwide:

- To occupy Eastern Europe in the late 1940s;
- To blockade Berlin in 1948;
- To help supply the North Korean invasion of 1950;
- To crush the Hungarian revolt in 1956;
- To build missile bases in Cuba in 1962;
- To crush Czechoslovakia in 1968;
- To invade and occupy Afghanistan in 1979;
- To support repressive and irresponsible regimes in Nicaragua, Libya, Cuba, North Korea, Ethiopia and elsewhere; and
- To provoke conflict and undermine democratic institutions and interests in regions throughout the world.[5]

Soviet President Mikhail Gorbachev's rhetoric indicates that this force philosophy is a thing of the past. Gorbachev seems to be moving in new directions, but Secretary Cheney and other analysts feel that this change is temporary until the Soviet economy is fully recovered. Besides the force

philosophy, Cheney argues, the Bush administration and military planners should not forget the Soviet military realities.

The Soviets are continuing to modernize and strengthen their military. Since World War II, they have set records in their peacetime military buildup. Gorbachev's regime spent over 15 percent of the Soviet gross national product on the military, and some analysts believe that this number may be even higher. This percentage is three times the percentage we spend.[6]

Paul D. Wolfowitz, under secretary of defense for policy, cautions us to look at specific realities when we analyze Soviet military capabilities. According to Wolfowitz, the Soviets will remain a military superpower for the foreseeable future. Wolfowitz further states that while the US considers deep military cuts, the Soviets show very little restraint in defense buildup. While total US military forces have been targeted for a full 25 percent reduction, the Soviets continue to produce SS-18, SS-24, and SS-25 intercontinental ballistic missiles (ICBM); Blackjack, Backfire, and Bear H bombers; and Delta IV nuclear missile submarines. In 1989 the US produced only 12 ICBMs while the Soviets produced 140.[7]

Some members of Congress still argue that the Soviets are maintaining this buildup for defensive purposes. These same congressmen point out that the Soviets are making drastic reductions in the conventional arena. Wolfowitz does not agree and presents the following evidence:

> Even in the conventional area, where we welcome the recent decline in Soviet tank production, it is well to remember that just in the time since Gorbachev came to power in 1985, the Soviet Union has produced more tanks and artillery pieces than exist in the combined arsenals of France, Great Britain and the Federal Republic of Germany. Moreover, continued high levels of military production, despite crushing economic problems, suggest that highly modern conventional forces are still a Soviet national priority.[8]

Future Soviet Changes

While the executive branch, Congress, and military analysts debate the changing environment, we can expect some positive fundamental changes in the Soviet Union defense posture and political system in the next few years. Paul Wolfowitz in *Defense 90* predicts the following changes:

- Completion of publicly-announced Soviet unilateral force withdrawals . . . ;
- Implementation of the conventional forces agreement . . . ;
- Soviet withdrawal from Eastern Europe; and
- The emergence of democratic and pluralist political and economic systems in most of Eastern Europe.[9]

These changes are good news to the US and its allies. Nevertheless, the US should consider past Soviet military actions before making security changes.

An Uncertain Threat

As military planners and congressmen contemplate this reduced Soviet threat, they may want to proceed cautiously. US intelligence does not predict a short-warning attack in Europe on three fronts, but once the Soviets address their economic and social problems, this threat could reemerge.

Together with the military threat, the Soviet Union has a great potential for internal instability as changes take place. Paul Wolfowitz again reminds us that, "The economic and political transformations from totalitarian Marxism-Leninism to a free society has never before been attempted. . . . The dramatic pace of change, combined with ethnic rivalries and long-simmering territorial disputes, are all potential sources of instability."[10]

Have the Soviets really changed, and are they still a threat to US security? The answer to this question is still uncertain. At present, the Soviet threat is not glowering or self-evident. Nevertheless, we soon forget the lessons of history—the Soviets have pursued their ultimate goal of expanding Soviet influence and control around the world for over 40 years.[11] Under these circumstances, caution may be in order.

The Third World—The Security Challenge of the Future

The cold war may or may not be on hold—many questions remain unanswered as to whether the Soviet threat will reemerge. What is certain is that the fighting goes on in the third world and if present trends continue, the incidence of conflicts in the third world will probably increase in the next 10 years.

This analysis focuses on the increasing potential of conflicts in the rapidly arming third world. Such conflicts may be the most likely scenario for conventional bomber use in the years ahead.

Has the Fighting Really Stopped?

The Allies celebrated victory and the end of war in 1945, but the fighting only escalated in the third world. Patrick Brogan, a respected political analyst, says that the wars have never ceased:

> In 1988, foreign powers declared that they would withdraw from the wars in Afghanistan, Angola and Cambodia, to leave the native peoples of those countries to continue their civil wars on their own; there was no hope for peace in any of them. Iran and Iraq agreed to a cease-fire, to end the largest conflict since the Korean war.[12]

As the Berlin Wall came down, complacent thinking was the order of the day until Saddam Hussein invaded Kuwait. As a result of that invasion, the United States and Iraq fought a large-scale war in 1991 in which the US and its allies liberated Kuwait. Before the Iraq-US conflict in 1991, about 40 countries were involved at some time in rebellion, foreign infiltration, terrorism, or endemic banditry.[13]

The purpose here is not to examine every war since 1945, but to generally indicate the instability that has existed in the last 45 years. Two recent large-scale wars have been those between Iran and Iraq and between the Soviet Union and Afghanistan. The Iran-Iraq War lasted eight years, and the Soviet intervention lasted nine. Nothing was decisively settled in either of these costly wars—political and military considerations ended them.[14]

The Iran-Iraq and the Soviet-Afghanistan wars were on the high end of the conflict spectrum. At the same time, conflicts have occurred in several places on the low end of the conflict spectrum. In an interview with the author, Dr Karl Magyar, a political analyst, summarized four areas of conflict.

First, in Northern Ireland, Cyprus, and the Basque area in Spain, problems were caused by discontent among minority populations. Second, the insurgencies in Central America (El Salvador, Guatemala, and Nicaragua) were the results of struggles between ideologically opposed factions. In some cases these insurgencies were precipitated by outside influence. Third, the communist rebellion in the Philippines was a political struggle as well as a "have-not" conflict.[15] Fourth, numerous conflicts in Africa reflected in essence the problems of state building.

These are a few examples of wars that have occurred since 1945. Patrick Brogan in his book, *The Fighting Never Stopped*, summarizes the fragile world security:

> There have been at least 80 wars since 1945, resulting in the deaths of between 15 and 30 million people. Millions more have been driven from their homes. There are well over 30 million refugees in the world today - probably as many as there were during the mass movements of people after World War II.[16]

The Rapidly Arming Third World

These past conflicts have been numerous, and since the potential for continued conflict is so great, the future appears even worse. One of the primary reasons for predicting a distressing future is the buildup of weapons in the third world.

As the United States slashes its defense budget, the attempts at nuclear weapons acquisition continue unabated in the third world. What may be even more dangerous is the proliferation of high-tech conventional, biological, and chemical weapons.[17]

For a while, the United States and the Soviet Union were the only two nations with nuclear weapons. Since that time, the "nuclear club" has added several new members. As of 1991, eight nations either have or are thought to have nuclear weapons. The eight are the US, Soviet Union, China, United Kingdom, France, India, Israel, and South Africa.

Fourteen other nations could very likely have nuclear weapons by the year 2010. These nations are Saudi Arabia, Iraq, Argentina, Chile, Pakistan, Egypt, Iran, Libya, Japan, Republic of Korea, Federal Republic of Germany, Republic of China, Vietnam, and North Korea. These 14 added to the present eight will give the "nuclear club" 22 members.[18] Some

analysts predict that the number could even be higher by 2010—possibly 40.

This proliferation has caused the world to be uneasy, but what is even more threatening is the spread of chemical weapons. There were only five nations capable of using chemical weapons in 1950. By 1988 that number had grown to 15.[19] The threat of chemical weapons is very real; they were most recently used by Iraq, for "defensive" purposes, in the Iran-Iraq War.

In addition to chemical weapons, the third world is arming itself with ballistic missiles. By 1989, 19 third-world countries possessed ballistic missiles. These missiles are capable of firing conventional warheads of up to 1,100 pounds out to ranges from 75 to 1,600 miles.[20]

The world is arming itself well, and the future looks bleak. Donald Rice, secretary of the Air Force, described the growing arsenal of weapons around the world:

> Many developing nations around the world possess formidable arsenals of growing sophistication: Syria fields more main battle tanks than any European NATO nation save the Federal Republic of Germany; Iraq maintains a larger tank force than *any* European NATO state; the North Koreans possess more artillery pieces and multiple rocket launchers than any NATO nation including the United States. The continued spread of sophisticated weapons—nuclear and chemical weapons, ballistic missiles, advanced tactical aircraft, modern tanks, and cruise missiles—pose a wide variety of potential threats to U.S. security.[21]

From the above facts it is easy to discern that there is a great potential for conflict among the heavily armed and belligerent countries. Iraq's invasion of Kuwait is a prime example.

The Threat and the Conventional Bomber

Having evaluated the Soviet threat and the rapidly arming third world, this author believes that the most likely future scenario for using conventional bomber air power is in the third world. This is not to say that we should not be prepared to use the conventional bomber for higher level conflicts like a NATO war or the recent Gulf war of 1991.

At present the risk of war between the US and the Soviets is probably low, but the situation in the Soviet Union is far from clear. With this in mind, we need to evaluate whether the current conventional bomber force is trained and structured for likely conflicts in the 1990s and beyond.

Notes

1. Dick Cheney, secretary of defense, narrative from Air Force accounting and finance pay statement, September 1990.
2. Dick Cheney, secretary of defense, "The Heart of the Soviet Threat," *Defense 90*, May/June 1990, 2.
3. Ibid.
4. Ibid., 3.
5. The author extracted this entire section from Cheney, "Heart," 4.
6. Ibid., 3.

7. Paul D. Wolfowitz, under secretary of defense for policy, "NATO and a Europe Whole and Free," *Defense 90*, July/August 1990, 2–3.

8. Ibid.

9. Ibid., 3.

10. Ibid., 4.

11. Thomas Boyd Carpenter, *Conventional Deterrence into the 1990's* (New York: Saint Martin's Press, 1989), ix.

12. Patrick Brogan, *The Fighting Never Stopped* (New York: Vintage Books, 1990), vii.

13. Ibid.

14. Ibid.

15. Dr Karl Magyar, Air University, Maxwell AFB, Ala., interview with author, April 1991. Dr Magyar is associate professor of African studies and a senior research fellow in the Airpower Research Institute, AUCADRE, Maxwell AFB, Ala.

16. Brogan, vii.

17. David MacIsaac, "New Dimensions in Air Strategy," in *U.S. Army in a New Security Era*, ed. Sam C. Sarkesian and John Allen Williams (Boulder, Colo.: Lynne Rienner Publishers, 1990), 237.

18. Rod Paschal', *LIC 2010: Special Operations and Unconventional Warfare in the Next Century* (Washington, D.C.: Brassey's, 1990), 35–36.

19. Ibid., 35.

20. Michael R. Gordon, "C.I.A. Sees a Developing World with Developed Arms," *New York Times*, 10 February 1989, A3.

21. Secretary of the Air Force Donald B. Rice, *The Air Force and U.S. National Security: Global Reach—Global Power*, white paper (Washington, D.C.: Department of the Air Force, June 1990), 1.

Chapter 3

Is the Present Conventional Bomber Force Appropriately Structured for the Changing Security Environment?

This chapter considers the uncertainty of the Soviet threat in the future and the real threat of conflicts in the third world, and concentrates on the present capability of the conventional bomber force. The central question should be: Is the conventional force adequately trained and structured for conflicts in the 1990s and beyond?

Since the end of World War II, this nation has focused its defense posture and military training on the potential requirements of a major conflict in Europe. In the last eight to 10 years, Strategic Air Command (SAC) likewise has been training its conventional bomber force for a Soviet conflict. The Mighty Warrior exercise presented in chapter 1 is one example of time, money, and effort devoted to the training and preparedness for a North Atlantic Treaty Organization (NATO) war. The effort has not been wasted—NATO has not been at war since its inception. Since the Warsaw Pact threat is over, the Soviet threat is uncertain, and third-world conflicts continue, we need to examine the role of the present conventional bomber force. Is this force adequately organized to meet basic security needs in the rapidly changing political environment?

This chapter evaluates the present conventional bomber force, scrutinizing these issues:

(1) Is the conventional bomber force prepared for expected future wars in terms of capabilities, structure, and training?

(2) As the B-52G is retired, what is the future role of the B-52H?

Present Capabilities and Structure of the Conventional Bomber Force—Are We Prepared for the Right War?

Before evaluating the conventional bomber, it is essential to become generally informed about bomber capabilities and how SAC structures and trains its nonnuclear bomber force. The B-52 is the backbone of the existing conventional bomber force. The conventional role of SAC's B-1 and B-2 bomber force is still under development.

Capabilities

The USAF initially tasked and designed the B-52 force as a high-altitude nuclear bomber. Its primary purpose was to deliver nuclear gravity weapons deep in enemy territory. As the enemy developed sophisticated defenses (surface-to-air missiles [SAM]), this tactic became impractical except in lightly defended areas. As a result, SAC developed the low-altitude terrain avoidance tactic. To make this tactic work, SAC modified the bomber to enhance its capabilities. The major modifications are: (1) terrain avoidance radar, (2) forward looking infrared radar (FLIR) television, and (3) a low-light camera system. These improvements enable the B-52 to fly at altitudes of 400 feet above the ground or less, even in adverse weather conditions and day or night.

The B-52 force consists of two models, the B-52G and the B-52H—both are intercontinental in range. The G model has an unrefueled range of 5,200 miles at high altitude. The H model—the newer of the two models equipped with the more fuel-efficient turbofan engines—has an unrefueled range of 5,900 miles at high altitude. Flight at low altitude would greatly reduce these ranges.[1] When compared to fighter aircraft, these ranges are impressive, and the B-52's capability is further enhanced by air refueling. When the bomber is air refueled, history has shown that the aircraft and crews can endure long operational missions. In a readiness exercise called Bright Star 82, six B-52s flew for 15 hours to a simulated airfield in Egypt and successfully released their loads of 500-pound, gravity conventional bombs. These B-52s bombed and cratered the simulated runway within four seconds of their planned time over target and then returned to their home base. The 32-hour flight was the longest bombing mission ever flown.[2] There is no other aircraft in the US inventory that comes close to this power projection capability. Maj James Thomits described this bomber advantage.

> In 1957, a B-52 flew an around the world mission of over 45 hours duration. In the early eighties, operating out of Andersen AFB, Guam, B-52s were routinely flying 30 hour Sea Reconnaissance/Surveillance missions against Soviet ships in the Indian Ocean. These missions provide clear evidence of some of the capabilities which the range of the strategic bomber provides over other platforms in a wide variety of mission scenarios.[3]

This range advantage and power projection capability would be vital in a scenario where the US forces did not have basing rights. Even though basing rights may be obtained after the conflict begins, it could take days before supply lines are established. Once these lines are established, deploying teams from the Army, Navy, and Tactical Air Forces (TAF) could take months. The 1991 Gulf war is an example of an excellent deployment, but it still took four to five months before necessary forces were in place.

While the US is waiting for forces to be deployed, the conventional bomber operating out of Diego Garcia in the Indian Ocean, or even in the continental United States (CONUS), could respond with massive firepower in the early stages of the conflict. Even after other forces are in place, the bomber is

the only platform which could strike deep into enemy territory. In this scenario the bomber could operate from CONUS bases and would not have to rely on already overcrowded and vulnerable forward bases.[4]

Conventional bombers possess another unique capability—loiter functions. In the above scenario, bombers could fly from the CONUS and loiter for hours at high altitude until the theater commander needs them to strike targets.

Former Secretary of Defense Caspar W. Weinberger further highlighted the capabilities of the B-52 and bombers in general in his annual report to Congress.

> The flexibility of the manned bomber force will continue to make it an essential element of the triad. Bombers can seek out and attack mobile targets; and be rearmed for subsequent missions. Armed with conventional munitions, strategic bombers can project power to distant points on the globe, sometimes before the arrival of other conventional forces. They can also conduct surveillance, mine-laying, and anti-ship warfare in support of general purpose naval forces.[5]

Along with the range and flexibility of the B-52 comes another advantage, that of payload. The primary payload of the B-52 is the iron bomb. The B-52 is also capable of carrying other weapons, which adds to its flexibility. Table 2 shows the present and programmed capability of the B-52.

Table 2

Representative Bomber Conventional Weapons Carriage Capability (Present and Programmed)

	Maximum Number of Weapons for B-52G Aircraft*
General Purpose Bombs	
Mk 82 (500 lb.)	51
M 117 (750 lb.)	51
Mk 84 (2,000 lb.)	18
Cluster Bomb Units (CBU)	
CBU 52	51
CBU 87 (combined effects munition)	30
CBU 89 (anti-armor mine)	30
Naval Sea Mines	
Mk 36	51
Mk 52	30
Mk 60 Captor	18
Mk 64, 65 Quickstrike	18
Standoff Missiles	
AGM-84 Harpoon	8
AGM-136 Tacit Rainbow	30
Have Nap	3

*B-52Gs with heavy storage adapter beams have less carriage capability.

Source: Gen John T. Chain, Jr., "Strategic Bombers in Conventional Warfare," *Strategic Review*, Spring 1988, 28.

Most of the weapons in table 2 are World War II–vintage gravity weapons. These "dumb" weapons are dependent on the accuracy of the B-52 bombing system and the ballistics of the bomb itself. The AGM-84 Harpoon and the Have Nap standoff missiles are exceptions. Only a limited number are available however, and the AGM-136 Tacit Rainbow is still under development.

Capability Limitations

The bomber force is equipped with a limited number of standoff weapons and no guided bombs, and most of the weapons are not capable of destroying hardened targets such as runways and transport facilities.[6] Since the bomber has a longer range than fighter aircraft, these targets are the type that the theater commander would probably select. These targets deep in enemy territory need to be destroyed with accurate weapons because they support the enemies' ability to rapidly reinforce and support their forward forces.

The Vietnam conflict also provided a valid argument for using smart weapons. During Vietnam, the US attempted to destroy the Thanh Hoi Bridge with dumb bombs. After 800 unsuccessful sorties and a dozen aircrew losses, the US introduced a smart bomb called Paveway I. With Paveway I, the US destroyed the bridge on the first try with no losses.[7]

Another limitation associated with these dumb gravity weapons is that these weapons require overflight of the target. As the B-52 overflies the target, the aircraft depends on low-level terrain avoidance as its primary defense tactic. This means the B-52s would fly at low level to avoid detection by enemy radars and defenses.

While the aircraft is using this tactic, the B-52 must also rely on modern, state-of-the-art, electronic countermeasures (ECM). Both the B-52G and B-52H are equipped with the phase VI ECM avionics package, which is updated as new Soviet defenses become operational. This is a very effective ECM suite, but there are areas where the ECM would not be effective against recent Soviet defensive radars. These B-52 aircraft are also limited in their active defense. The B-52G has four 50 caliber remotely operated guns in the tail, and the B-52H has a remotely operated 20-mm cannon in the tail. Both of these fire control systems are extremely limited—both have a limited range, a small cone of fire, and difficulty in discriminating between friendly and enemy forces. Readiness exercises like Red Flag in the Nevada desert have shown that the B-52 gunner on numerous occasions would have shot down friendly aircraft in a real war.[8]

Even with the limitations, the conventional B-52 is a valuable asset to the theater commander. With the relatively new offensive avionics system (OAS), today's bomber is over twice as accurate as the Vietnam-era B-52. However, the B-52's enormous weapons payload capability is underutilized because planners have not emphasized smart weapons to enhance the B-52's capability.

The B-52's unique capabilities cannot be realized without realistic force structure. The next section is an overview of how SAC structures its force for conventional war fighting.

Strategic Air Command Force Structure: Is It Tailored for the Political Situation in the 1990s?

Two questions are paramount: (1) Is the force structured for a diminished Warsaw Pact threat and a more likely third-world conflict? and (2) Is the force operating in the best possible configuration?

SAC has made great strides in its conventional bomber capability, but the present force may not be configured to respond to future security encroachments. Before making judgments about the future, consider the achievements made in the last few years.

After Linebacker II in Vietnam, the conventional role of the bomber was not emphasized until Gen John T. Chain assumed command of SAC in 1985. Since that time, General Chain has done much to upgrade the conventional capability of the SAC bomber. As commander in chief SAC (CINCSAC), General Chain emphasized several programs to change the mind-set of the command from a single integrated operational plan (SIOP) force to a mixed and flexible conventional and SIOP force.

One of General Chain's most important programs was the dual-tasking philosophy. Under this concept, all B-52 units train in both conventional and SIOP war fighting. Before dual tasking, only those units which actually supported theater commander operational plans were trained in conventional operations.[9] The other units trained solely for the SIOP with no conventional training. As a result of dual tasking, units who had no experience in conventional bombing and operations became familiar with both.[10]

The specifics of SAC's conventional force structure are outlined in the classified "SAC Conventional Roadmap." This document clarifies the dual-tasking concept and how it pertains to operational plans and taskings.[11]

In addition to dual tasking, General Chain also developed a conventional planning program for each unit. In this program, crews are brought to SAC headquarters or the numbered Air Force (NAF) headquarters and are directed to plan a mission from scratch. The only firm guidance is a SAC-selected target complex. General Chain wanted the crews to start this procedure fresh and not be encumbered by previously learned structured, SIOP procedures. He urged the crews to rid themselves of the Vietnam mentality and be as creative as possible. This program provides planning expertise at the unit level and develops new and innovative tactics through dynamic mission planning.[12] The end result is a mission folder which the crews and wing staff have developed without the usual bureaucratic and strict regulation guidance. Major Thomits described the program in a staff study.

> From this program, new tactics have been developed for the command, new hardware developed and procured to support the requirements, and certification of weapons and equipment for carriage on the aircraft has been accelerated. Crews are now routinely training for tactics and tolerances previously never considered feasible for strategic aircraft.[13]

General Chain has also reorganized the headquarters to support crew conventional priorities. SAC created a new division (SAC Tactics) to meet the increased emphasis on conventional tactics and to consolidate conventional plans and operations for more effective coordination. In the past, plans and operations operated as two separate organizations. Under General Chain's reorganization, the divisions were combined to make communication and coordination easier. The command also made major improvements in intelligence as conventional operations became a priority, and SAC decentralized the targeting and attrition functions to the units so that units can perform these functions at the unit level or at a deployed base. Prior to this, SAC headquarters had performed these major functions for all units. Further decentralization occurred when SAC gave each unit its own sensitive compartmentalized information facility. This allows the unit to process intelligence faster and provide information to the unit in minutes. This expensive endeavor shows that SAC is definitely committed to conventional planning.[14]

The CINCSAC also established an entire complex for SAC war-fighting training at Ellsworth AFB, South Dakota. This will be the focal point for the receipt and analysis of tactics intelligence and for the development of tactics training. This center, called the Strategic Warfare Center, will provide a focused organization to develop and train war-fighting skills.[15]

The command also emphasizes mobility. Before General Chain was CINCSAC, SAC units rarely deployed from their home station. They now deploy to Europe and Asia to support worldwide readiness exercises. Units are also tasked by SAC to pick up and move on a no-notice basis at least twice a year. The units deploy to an austere base and operate in this environment for weeks. This is not as simple as it appears on the surface. The unit must deploy 10 to 12 aircraft along with maintenance, spare parts, ordnance, weather forecasting, communications, food, billeting, and much more.

In one of the deployments, nicknamed Mighty Force, a unit deployed and flew sorties at a wartime rate from a base near Burns Flat, Oklahoma. The only facilities available were a runway, a tower, and some empty buildings on a base that had not operated since the late 1960s.[16] The lessons learned from these realistic mobility deployments have been invaluable.

Perhaps the most valuable achievement of the command has been its realistic exercises. The exercise described in chapter 1 was the largest exercise in the history of the command. These exercises, according to General Shuler, the Eighth Air Force commander, vividly demonstrate to friend and foe alike that SAC is capable of wielding its conventional sword with devastating effect.[17]

From these innovations and improvements, it is easy to conclude that the SAC conventional bomber force is a more formidable force than ever before. Nevertheless, the force must correct its limitations if it is to remain effective in the future. In general terms, the political environment presented in chapter 2 and the anticipated reductions in numbers of bombers in future years precipitate these limitations.

Limitations of the Present Force Structure

The first limitation is the philosophy of dual tasking. This force structure may be outdated because of three reasons: (1) the bomber force is smaller and we may be spreading ourselves too thin, (2) it is unreasonable to expect nuclear-qualified wings to be as proficient as wings which are only qualified for conventional missions, and (3) studies and experience have shown that the most valuable use of the bomber is in power projection in the very early stages of a conflict.

The conventional bomber force structure is small and getting smaller. In 1991, the conventional bomber force was composed of only 33 dedicated B-52G aircraft. Perhaps this force is spread too thin with numerous taskings, and in reality may not be totally effective in any of these taskings. Under the dual-tasking force, a small number of aircraft are tasked to support several operations plans (OPLAN) and provide theater commanders with the capability to effectively strike a broad range of targets.[18]

All independent studies have shown the need for a large bomber force for effective conventional employment. Our present force of conventional bombers is not even close to the required amount. To put this even more into perspective, the senior US leadership felt we needed over 200 B-52 conventional bombers in Vietnam. If a future war is close in scope to Vietnam, or even larger, our own conventional bomber force would be severely limited by numbers. Therefore, with a small force we may need to consider new options in the force structure. A recent study at Air University described the situation:

> Thus, it becomes obvious that the number of B-52s available for conventional operations is a serious limiting factor—how serious is very difficult to anticipate. It will depend on what type of conflict the United States becomes engaged in, where the conflict is, what weapons B-52s carry, how many other aircraft are available, what the attrition rate is, and many other considerations. What is also obvious is that **the number of B-52Gs retained for conventional operations becomes more significant as the total number is decreased.** Since our B-52 conventional force will be limited in number, the Air Force must employ each B-52 more intelligently and organize, equip, and train the B-52 force to be efficient and more survivable despite improved enemy defenses.[19]

Another reason why the SAC conventional bomber force may be overextending itself is in the method of dual tasking. Having served in a dual-tasked wing for over five years and based on personal experience, I believe that dual-mission tasking is not as effective as devoting a certain amount of the force to one mission (conventional) and allowing the rest of the force

to concentrate on the SIOP tasking. When I was the chief of the Bombing and Navigation Division in the largest bomb wing in SAC, my division was responsible for the bombing training for over 40 crews. This division planned and executed the dual-tasking training concept for five years. In general terms, the staff did not feel that dual-mission tasking was the most effective use of conventional bombers. Several other studies agree with this analysis. For example, an extensive Rand study concluded that the United States should dedicate a force of 75 to 100 heavy bombers solely as conventional-tasked bombers. The study went on to say that these bombers should not be used for the SIOP. This force should be committed only to conventional taskings to ensure that (1) the bombers will be available for conventional missions at the time of the crisis, (2) SIOP forces would not be subjected to attrition during the conventional conflict, and (3) the force will be organized, trained, and equipped for conventional war fighting.[20]

Another experienced staff officer, Lt Col Gregory J. Berlan, who is assigned to Headquarters SAC, agrees that the dual tasking may not be as effective as conventional-only wings. Colonel Berlan conducted a year-long study on the B-52 conventional bomber and found that it is unreasonable to expect nuclear-qualified wings to be as proficient in conventional operations as are wings not tasked with the nuclear mission.[21]

Colonel Berlan further argues that a dual-tasked wing does not have conventional operations as its number one priority—its priority is the SIOP. In addition, the dual wing is limited in conventional training because crews spend one-third of their time on alert. This reduces the amount of time available for conventional training.[22]

Other independent studies also do not agree with the dual-tasking concept. A Boeing study contends that some countries which have forces structured primarily for nuclear war (SIOP) have experienced difficulties when adapting to the unique demands of conventional war fighting. The Boeing study cites the US-Vietnam, Soviet-Afghanistan, and British-Argentine conflicts as examples. However, the author points out that Israel is an example of a country which has been successful in conventional war fighting because its forces are trained and structured for the conventional mission.[23] A General Research Corporation study agrees with the Boeing assessment.

> Although all heavy bombers are multi-role and could more or less effectively support conventional operations, it is not likely that conventional warfare bomber requirements can be met by tasking primarily nuclear bombers for conventional operations. That is true because only under the most unusual conditions would the nuclear bomber force be drawn down to support conventional operations to the degree required to effectively support the operations. Confrontations with the Soviet Union, Soviet BLOC, or Soviet client states would almost certainly entail increased possibility of escalation to nuclear war with the result that few nuclear bombers could be released for conventional operations, and more than a few are required to support these operations.[24]

These studies along with several others point to a need for a dedicated conventional bomber force separate from our nuclear forces. In retrospect,

chapter 2 described an uncertain world characterized by increased turbulence within the third world and a Soviet threat in uncertain transition. The US is a world economic and military leader and will find itself drawn into these conflicts just as it was involved in the liberation of Kuwait in 1991. As a reduction in the bomber force is imminent, it becomes apparent that we must structure this small and valuable force effectively. By the year 2000, the B-52 force will probably consist of only 33 B-52G aircraft and 84 B-52H aircraft. In addition, if the B-2 bomber is not funded, the rest of the bomber force will consist of only about 84 B-1Bs. As a result, the dual-tasked force structure may not be in our best interest when you consider its disadvantages and the advantages of a dedicated force. The following section lists dual-tasking disadvantages.

Dual-Tasking Disadvantages. A force that is tasked with both a SIOP and a conventional mission may not be effective for strategic deterrence. In the Vietnam conflict, for example, the USAF leadership, especially SAC, was concerned about taking away the SIOP bombers and converting them to a conventional role—thus degrading SIOP capabilities.

Dual-mission tasking can overestimate true capability. This occurs in the bomb wing's inspector general (IG) evaluation when a single force is counted against two missions—it is difficult to evaluate both with only one IG team.

Simultaneous force tasking can greatly complicate the tasking process and decision making at all levels, especially at the NCA level. An example would be the NCA and SAC decision whether to transfer a certain number of bombers from their primary mission (SIOP) to a third-world conventional conflict.

In the last 10 years the bomber force has been upgraded significantly with new avionics and weapons designed to correct the strategic-nuclear imbalance. Dual tasking could send the wrong message, and our enemies could perceive this upgrade as being diluted if that same force is assigned an additional tasking of conventional operations.

Based on these disadvantages a dual-tasked conventional bomber force may not be as efficient as a single-tasked force. Advantages of single tasking are presented below.

Advantages of Single Tasking. Single tasking provides the NCA a greater degree of flexibility. It would eliminate confusion over which force to devote to a certain conflict. The greatest benefit of this advantage is in low-intensity conflicts.

Single tasking offers a more timely response. Bombers would not have to be reconfigured from the nuclear to the conventional mission. The time saved may be extremely valuable because the true value of the long-range bomber is in providing massive firepower in the critical early stages of conflict.

Having a dedicated conventional force already in place can deter potential future conflicts. The mere presence of this force sends a resolute message and may discourage adventurism, terrorism, and conflict. The deterrence

value of the Libya Raid is a prime example of where our resolve discouraged Libya from continuing terrorism against the United States.

A dedicated force of conventional bombers can work with other forces to act as a total force multiplier. The bomber force would complement naval actions by laying mines, destroying ships, or providing sea surveillance. In addition, the force would complement the TAF by hitting targets deep in enemy territory. It could also complement TAF close air support by providing large doses of firepower. The close air support by B-52s in Iraq in 1991 is an excellent recent example. Four or five bombers working in harmony with the TAF can provide as much firepower as an entire squadron of fighters, and bombers have a greater range than fighter aircraft.[25]

Training the Force—Are Present Methods Outdated?

This study, along with other independent studies, has revealed limitations and shortfalls in the present SAC structure of the conventional bomber force (dual tasking). When a force is not effectively structured, it is probably not trained productively either. We need to examine these problems in terms of: (1) dual-tasking training, (2) exercise training, (3) TAF coordination, and (4) special mission training.

Dual-Tasking Training

The purpose and scope of this section is not to identify every specific training shortfall in the dual-tasking system. Instead, the evaluation of dual tasking will focus on the general philosophy and "big picture" features of the concept.

Initially, SAC created dual tasking to expose and train the entire bomber crew force to conventional operations. In its initial stages, the planners felt that the major threat to US security was an invasion of NATO countries. These same planners believed that most of the B-52Gs (166 at the time) could be involved in that conflict—therefore, the entire force should be trained and ready.

This reasoning may no longer be valid because the B-52G force is going to be reduced and the political situation is changing.[26] The realities are: (1) We probably won't have a large enough force to support a large-scale conflict, and (2) if this small force is going to be effective, then we must train it with the conventional mission in mind and not spread it too thin. At present, even under dual tasking, SIOP is still the primary mission of the wing and this fact is reflected in the way units train.

The SAC training manual, SAC Regulation (SACR) 51-52, *B-52 Aircrew Training*, governs training for a dual-tasked wing. The manual was designed for the SIOP force with the secondary tasking of conventional operations. Because the SIOP is the priority, wings sometimes will complete the SIOP training first and fail to meet all conventional requirements.

The bottom line is that in a SIOP and conventional wing, the training priority is for crew members to complete all required training to be qualified for SIOP B-52 alert duties. In this type of wing, a bomber crew member must complete all these requirements—if he doesn't, then the training problem is complicated. Basically, some other crew member will have to assume alert duties for the deficient crew member while he flies again to complete the SACR 51-52 requirements. This creates a scheduling nightmare as the schedulers juggle this situation among 40 crews.

Consequently, conventional requirements take a backseat to SIOP requirements because there is no conventional training requirement which prevents the crew member from participating in an alert. The SAC training manual explains it this way:

CONVENTIONAL EVENTS

Conventional training is required for all B-52 units. Conventional training requirements are based on specific unit conventional DOC [designed operational capabilities] statements. Units are only required to accomplish specific training requirements that relate to their missions as outlined in their DOC statement. Failure to accomplish any of these events does not preclude alert participation for SIOP tasked units.[27]

When the bomber crew member does not complete conventional requirements, the wing commander has the option to waive these requirements in accordance with the training regulation.

4.11 FAILURE TO COMPLETE TRAINING REQUIREMENTS

a. Individuals who fail to complete their mission ready ground and flight [combat capable events] requirements will be declared [non-mission ready] and have their training history reviewed by the wing commander. The wing commander will determine what training, if any, is necessary for the crew members to regain mission ready status. This make-up training is creditable towards the new training period. If this review indicates a proportionate/realistic volume of the mission ready events [sic] were recently accomplished that would ensure combat capability, then the wing commander may declare the individual mission ready. This option to declare individuals mission ready without make-up training must be used judiciously.[28]

Is this waiver used judiciously? While wings usually follow these rules religiously for SIOP requirements, the rules are sometimes bent for conventional training. Realistically, there may not be time and assets to complete both. As a result, the wing may waive the conventional requirements. When this happens conventional readiness suffers. Two scheduling officers confirmed these facts at two separate dual-tasking wings. A training expert at Headquarters Eighth Air Force Directorate of Training also agrees that dual tasking is not as efficient as single tasking.*

Those who favor the dual-tasking system argue that a dual wing is very close in conventional capability to a single-tasked wing. The major argument is that many readiness items in the SIOP and in conventional roles are similar. For example, if a crew member can meet the demanding training of SIOP bombing, then he can also meet the requirements of conventional bombing because of similarities. However, since the sig-

*Interviewees choose to remain anonymous.

nificant difference between SIOP training readiness and conventional training readiness is attrition, this may not be the case.

A Headquarters SAC planner states that the SIOP is distinctly different from conventional operations.

> The mission [SIOP] itself is so critical that attrition is not a factor (except during the initial planning of the sortie). Since conventional war is different from nuclear war, conventional B-52 missions do not need to operate under the same constraints. Depending on the value of the particular sortie/targets, conventional B-52s can attack at a time of their own choice and when conditions favor their success. In some cases, the sorties can be delayed until night or until friendly forces have reduced the enemy's air defenses. At other times, sorties can be aborted or recalled if the situation changes, if the enemy response is too strong, or if aircraft equipment failure reduces the probability of mission success. On certain occasions this flexibility will not be possible; but in general, attrition will be much more of a consideration during conventional operations.[29]

Attrition, although important, is not as vital in SIOP operations as it is in conventional warfare. Therefore, crews preparing for conventional missions must train differently. The conventional bomber force can contribute most to a theater commander in chief (CINC) if it can survive and fly numerous sorties—a SIOP war may only require one day of bomber sorties. In contrast to SIOP, the bombers in the Linebacker II operation in Vietnam flew 729 sorties in just 11 days. The attrition rate was only 4 percent. Conventional bomber attrition becomes even more important as the war is prolonged. The realities of attrition are alarming, and need to be emphasized to all planners. Even a low attrition rate can be devastating to the force—at a 5 percent attrition rate and with one sortie per day per aircraft, a force of 100 bombers would be reduced to 16 after a 30-day war.

To survive, the conventional bomber force must be trained with attrition as one of the highest priorities. Meeting these demands may require specialization (single tasking).

A specialized wing could emphasize conventional training and thereby reduce attrition. For example, bombers could practice more often a tactic called multiple axis of attack. In this tactic, several bombers would bomb a single complex from different directions and achieve the element of surprise—the enemy may not have time to react while tons of bombs are dropped in less than one minute. This tactic requires precision and specialized training. This is but one of the many training tactics that we need to emphasize. There just aren't enough time and resources in a dual-tasked wing to accomplish this specialized training. Consequently, if we send dual-tasked crews to a war zone, attrition may be high.

The Planning and Execution of Exercises: Where Is the Tactical Air Force?

If planners agree that the primary value of the conventional bomber is to augment the theater commander and Tactical Air Forces, then why wasn't the TAF present for the largest conventional exercise in the history of the command? In 1988 and 1989 SAC conducted two of the largest conven-

tional exercises ever held. As previously summarized, the exercises accomplished four major objectives: (1) Mighty Warrior demonstrated to our NATO allies that we are ready to respond to any infringement on their countries, (2) the exercise demonstrated our capabilities to strike unfamiliar targets on very short warning (18 to 24 hours), (3) USAF also confirmed that bomber units can deploy and successfully operate from austere forward operating bases, and (4) units certified their war readiness for theater war fighting.

SAC achieved these objectives, and Mighty Warrior was a valuable conventional learning experience. However, it could have been more effective if the right forces and planners had been involved.

One of the major purposes of the exercise was to practice integrating with NATO and TAF forces. SAC did this, but only to a limited degree. In the early stages of Mighty Warrior SAC worked closely with United States Air Forces in Europe (USAFE) and United States European Command (USEUCOM). After initial planning, the interaction diminished and there was very little integration between SAC and the TAF during the execution phase.

This is the manner in which SAC and the TAF have operated since the Vietnam conflict. Traditions and intercommand rivalries are difficult to change. Maj Gen Howell Estes, the SAC director of operations, observed this about SAC and TAF: "In Vietnam, we were divided up. The tactical guys fought their war, and the strategic bomber people fought their war."[30]

This relationship improved in the Gulf war of 1991, but the SAC-TAF disconnect may still exist. The reason for the excellent execution of the TAF and SAC forces in the Gulf war was that SAC and the TAF coordinated and trained jointly for four months just prior to the war. Brig Gen Patrick Caruana, the officer in charge of integrating SAC's conventional bomber force into the Gulf air war, said that exercises and simulations including one computer simulation of a Gulf war, code named Internal Look, helped integrate the SAC and tactical forces.[31] Nevertheless, the US may not have months to prepare for the next war—we may need to integrate and include the TAF in all future Mighty Warrior–type exercises.

Mighty Warrior provided a great opportunity for the USAF to integrate TAF and SAC forces because this was not only the largest exercise in the history of SAC, but it was a rare live-fly exercise combined with a command post exercise (CPX). In most cases the CPX and live-fly exercises are not combined. A group of 34 people from Eighth Air Force and Seventh Air Division ran the exercise from a bunker at NATO headquarters in Mons, Belgium. This group simulated NATO's Air Apportionment Group. Although NATO staff and NATO commanders were briefed throughout the exercise, there were no TAF air component commanders on the execution staff.

Besides the Mighty Warrior exercises, SAC participated in about 25 exercises in 1989 worldwide. This number will probably be less in the

1990s due to funding cuts. In these other exercises, there also is limited TAF participation. In some European exercises like Busy Warrior, a NATO readiness exercise, SAC and the TAF coordinate closely during the planning stages, but there is not enough close interface during the execution. As a result, TAF planners and SAC planners are not totally familiar with each other's capabilities. A group of planners from SAC headquarters learned from face-to-face discussions with planners in USAFE that USAFE is not familiar with the capabilities of the B-52. Planners felt that the B-52 needs fighter escort to be effective in the European theater in all missions. Exercises and the Gulf war have shown that this is not true except in heavily defended areas. This is only one of many misconceptions that exist between the TAF and SAC. Because the TAF is not familiar with the bomber and its uses, it is reluctant to use them.

The only exercises in which we effectively train from start to finish are the large CPXs like WINTEX/CIMEX. This exercise is a procedural general war CPX, sponsored by the Joint Chiefs of Staff. WINTEX/CIMEX exercises, tests, and evaluates command and control procedures, planning, and communications systems in the European theater.[32] All real wartime players are present for coordination and interface throughout. The only major limitation is that WINTEX/CIMEX is not a combined CPX and live-fly exercise like Mighty Warrior.

Since SAC has decided to dedicate a force of conventional bombers to the theater CINCs, we need to train the way we would fight. The first step is to invite the TAF wartime players to participate in exercises from start to finish.

Exercises in the 1990s:
Are We Training for the Right War?

While SAC may not be training its conventional bomber force with all the right personnel, it is also highly possible that SAC's planning and execution of exercises is outdated. USAF leaders and planners all agree that exercises like Mighty Warrior '89 are the most valuable type of training available, next to war. These exercises are important because they are realistic command and control exercises combined with actual flying missions at a wartime rate.

Mighty Warrior, Busy Warrior, and the large-scale command post exercises are tailored to prepare our force for a NATO or Asian theater large-scale war. The exercises and their scenarios may have to be changed in the future because our most likely conflict could be in the third world.

The previous section on structure offered a brief description of the SAC special mission training program. This training exposed the conventional force to a demanding scenario and difficult tactics. An example of this special mission training could be a scenario similar to the F-111 raid on Libya.

A very small number of crews is actually qualified and certified for this type of mission. Considering the political environment discussed in chapter

2, the third-world conflict is probably where we need to direct our training. These special mission training tactics would prepare the force. Given that exercises are our most valuable form of training, it seems prudent that we play future exercises with the TAF, and that we tailor exercises for special missions as well.

To emphasize a point made earlier by this analysis, the conventional force is going to be small and we must tailor this force wisely. The initial plan was to retain all of the current inventory of B-52Gs (approximately 166 in 1989) for conventional war fighting. But fiscal realities have tempered this plan, and the force in the 1990s could be less than 50 B-52s. As the USAF looks for ways to improve its force of conventional bombers, planners should consider a conflict in which British conventional forces were not trained or structured efficiently.

The Falklands: A Case of Unsatisfactory Readiness

The Falklands conflict in 1982 is a relevant example of a conflict that required quick response and long-range firepower. The United Kingdom could not deliver this because it had not prepared, equipped, or trained to rapidly project offensive power. The review here reveals the shortfalls in British conventional capabilities and suggests that US conventional bombers would be invaluable in future similar conflicts.

When the Falklands conflict erupted, the British forces were equipped and structured primarily for a conflict in Europe. The British were not ready to project a large combat force 8,000 miles to the South Atlantic.

The Argentineans were a formidable force as evidenced by British losses—255 dead, 777 wounded, six ships sunk and 10 others damaged.[33] The British had a narrow margin of victory and suffered significant casualties.[34] Because they were seriously limited in their conventional power projection, it was 10 days after the eruption of the conflict before any military force—the submarine Spartan—arrived in the Falklands. It took 27 days for the first fleet elements to reach the station.[35] Long-range air power took more time—one month after the invasion, a single British Vulcan bomber struck the Port Stanley airfield.[36] These limitations occurred because the British forces were structured for a nuclear war in the European theater.

Having noted that Great Britain was not properly configured for rapid power projection, let's concentrate on how this conflict could have been terminated earlier with less lives and military assets lost. To reemphasize a point, it takes time to deploy military forces over great distances such as from the United Kingdom to the Falklands. One researcher described a method for projecting air power in future conflicts:

> In the days and weeks required to deploy major theater naval, air and ground units, the enemy is gaining ground, reinforcing his position and developing a supply base—all of which make it more difficult to dislodge him once proper forces arrive.
>
> The ability to apply direct force in a matter of hours (24 to 48) in situations like these can be invaluable. While adequate long-range nonnuclear air power such as the B-52

> in all probability could not have by itself forced the Argentines to withdraw from the Falklands, it could have made consolidation and reinforcement during those very crucial first days a very difficult and unpleasant task for the Argentines and would certainly have demonstrated resolve early on.[37]

As previously noted, the first hours of a conflict may be the most critical. The long-range bomber is the only force available which can project massive firepower in the early stages (48 to 72 hours).

The British, unfortunately did not have this capability because they were prepared primarily for a NATO war. The United Kingdom did prove the value of a bomber developed for nuclear war, but it was a month before they could use Vulcan bombers for air strikes in the Falklands. It required a month to reconfigure the aircraft, train the crew, and establish the necessary logistics. Even though successful, the Vulcan was little more than a show of force because of hardships and limited assets.[38]

According to Maj Grover E. Myers, tomorrow's planners should consider three lessons learned in the Falklands.

> (1) Even an emerging third world military power, with enough nerve and a few advanced weapons can be a deadly foe; (2) a nation that neglects its ability to project military power over long distances in a timely manner cannot retain claim to global power status; and (3) aerospace power is crucial to such an endeavor.[39]

A dedicated conventional force properly equipped and trained in special missions could possibly have greatly impacted this conflict. This is not to say that the bomber could have solved all the crisis requirements. It could not have landed troops and occupied the island. Another study points out, "As a central force it [the bomber] can deliver the crucial blows [in the early stages of the conflict]; and then upon arrival of theater forces, it can act as a deployed central force under the direction of the theater commander."[40]

These same long-range bombers also could have begun some maritime operations well before the fleet arrived. The bombers could have conducted mine-laying operations, Harpoon attacks (antisurface warfare), and sea surveillance, and then supported the fleet once it arrived. This is not to say that conventional bombers would be competing with theater naval forces, but rather complementing them.[41]

Retirement of the B-52G and the Future Employment of the B-52H—An Alternate Plan

Even with the proven advantages of conventional bombers, fiscal realities and firm decisions have already dictated a smaller force of B-52Gs. The retirement of the B-52G and the future of the B-52H needs to be examined. The present force of conventionally dedicated bombers consists of 33 B-52Gs. This is the backbone of the SAC conventional bomber force. The stark reality is that these 33 B-52Gs along with all other B-52Gs may be retired within the next 10 years or less. This presents a dilemma for

restructuring the conventional bomber force. If SAC retires all B-52Gs, then the only B-52 remaining for conventional operations is the H model.

With all B-52Gs retired, SAC will have only 84 B-52Hs available for both conventional and SIOP commitments. With a small force of 84 B-52Hs, the command has two options.

Option One: Single Tasking

This chapter previously presented several arguments for single tasking. These same arguments apply to the B-52H force. If SAC elects the single-tasking philosophy, then a specified number (e.g., 42 B-52Hs) would be devoted to the conventional role and the rest would be responsible for the SIOP role.

The next point may sound contradictory to the conclusions presented above. However, with only the B-52H force remaining, SAC may need to pursue new issues. One issue is that the single-tasking option may not be the most efficient use of the B-52H force because of limitations in flexibility. For example, a B-52H force of only 42 bombers offers only a limited number of bombers for large conflicts. In the Gulf war of 1991, SAC used 64 B-52Gs; they flew approximately 50 sorties a day at the height of the war. Even this was not enough, as the theater commander requested more B-52s to strike more targets. If they had been available, the theater commander could have used the entire force of B-52s.

Option Two: Dual Tasking

Even though this study argued against this concept before, dual tasking may be the only choice if all B-52Gs are retired. Dual tasking could work if the force is properly structured and trained.

The only way that dual-tasking operations will work efficiently is for the command to elevate the conventional mission to an equal status with the SIOP. If SAC chooses this option, then conventional training and SIOP training must be completely revised. Presently, the dual-tasked wings operate with SIOP as the priority mission; therefore, conventional training suffers.

To change this concept and make the conventional bomber force potent, the command needs to train its entire B-52H crew force with conventional requirements elevated to the same priority as SIOP training requirements. This means that SAC training manuals will have to be revised totally. To implement this program and not spread the force too thin, the command may have to use fewer bombers for SIOP alert. Because B-52 crew members in dual-tasked wings spend approximately one-third of their time on alert, there simply isn't enough time to train for both SIOP and conventional operations. Another way to organize the force would be to establish a program where crews are trained and prepared for both SIOP and conventional commitments. Again, this may appear contradictory to the arguments against dual tasking presented in the first part of the chapter.

Nevertheless, this philosophy might be effective if a smaller amount of bombers is committed to SIOP alert. This plan would alleviate some of the problems associated with alert training requirements versus conventional training requirements.

Besides restructuring the force, SAC should establish an innovative training program for its bomber crews. The training should emphasize conventional procedures over SIOP procedures. This does not mean SIOP training will be degraded; the program would operate as described in the following paragraphs.

The planners agree that conventional training is more demanding than SIOP training. Therefore, if the command emphasized conventional training, then SIOP training would benefit, since the crew member can apply conventional training to SIOP missions. The majority of bomb runs for both conventional and SIOP use similar procedures. In other words, a bomb run is a bomb run, whether it's conventional bombing or SIOP bombing.

To change the present system of training, the command needs to look at all training events that are duplications of effort. With a force of B-52Hs only, there would be very little room for mismanagement of assets.

This option is not the most desirable of the two, but the command may be forced to adjust to the dual-tasked option or else be very limited in conventional capability. Force and budget cuts are driving SAC to this alternative.

In the final analysis, single tasking is the ideal situation. On the other hand, if SAC retires all B-52Gs, the command must remain flexible by adopting the B-52H concept of dual tasking. At the same time, the command should modify the entire B-52H bomber force to match the capabilities of the present B-52G conventional force.[42]

The Present Conventional Bomber Force—Conclusions

The fundamental question addressed in this chapter on structure and capabilities is whether the conventional bomber force is correctly trained and structured for the political climate of the 1990s. The force may not be trained and organized to provide security in a changing political environment. Therefore, the force should be adjusted and updated in accordance with the following issues.

The bomber force's greatest strength may be its capability to project massive firepower worldwide from CONUS bases, sometimes even before the arrival of other conventional forces. Planners of future force structure should consider this capability when making adjustments. As planners contemplate changes, another issue emerges concerning weapons. Bombers are not equipped or structured, and bomber crews are not trained, for standoff weapons. It has been noted that most of our "dumb" weapons are not capable of destroying hardened targets such as runways and transport facilities.

While the command may have been negligent in developing standoff weapons, SAC has significantly improved its conventional bomber force. But SAC based these improvements on preparation for a large-scale NATO theater war. Realistic training exercises like Mighty Warrior have prepared the force well for NATO conflicts. Many of these lessons learned can be applied to the restructured force of the future. As SAC restructures its bombers for the 1990s and beyond, the purse strings will definitely impact plans.

Budget realities will cut the conventional bomber force to less than 50 B-52Gs in the 1990s. Consequently, the force cannot handle all the present taskings under the various operational plans. In addition, considering the small number of bombers in the force, dual tasking may not be an effective war-fighting concept. Dual tasking causes the USAF to spread its forces too thin, and attrition may be high, especially in the early stages, because dual-tasked crews would not be as proficient as single-tasked crews.

Conversely, a single-tasked (dedicated) force offers several advantages: (1) it provides greater flexibility, (2) it allows more timely response, (3) it provides deterrence, and (4) it can act with other forces to provide a total force multiplier.

While dual-tasking structure may not be efficient, dual-tasking training could also be outdated. Dual tasking was created for a NATO war, a threat that has diminished. Conventional training also suffers under dual tasking because a dual-tasked wing's emphasis is on SIOP training or meeting requirements to be alert-capable for the SIOP. A wing that emphasizes the SIOP training over conventional training could be neglecting a vital part of conventional training—attrition emphasis.

When dual-tasked wings train for bomber missions, attrition is not as critical in SIOP as it is in conventional operations. A SIOP war may only require one day of bomber sorties while a conventional war could require 30 or more days. Even a relatively low attrition rate can be devastating to the force—at a 5 percent attrition rate and with one sortie per day per aircraft, a force of 100 bombers would be reduced to 16 after a 30-day war. Yet, SAC neglects attrition. And beyond that SAC does not train with the correct forces.

SAC and the TAF do not plan and execute enough exercises jointly. Given that exercises are one of the most valuable forms of training and that the primary value of the force is to augment the theater commander and the TAF, then most exercises should involve SAC and TAF from start to finish. This has not been the case, as Mighty Warrior and other readiness exercises have shown. Besides this, NATO-type exercises have become outdated because of the reduced Warsaw Pact threat. Future exercises should be structured for special missions that would emphasize third-world conflicts. These issues mostly concern future plans for restructuring—the command should also remember a past conflict where a country was not prepared for conventional power projection.

The Falklands conflict analysis outlined a clash in which conventional forces were not trained or structured properly—future planners should consider these lessons and apply them. The Falklands example applies to conventional bomber force structure because a formidable force of bombers could have impacted this conflict and saved lives and equipment. This could very well be the most likely scenario for future third-world conflicts.

In addition, this study supports the single-tasked concept, but SAC may have to change to dual tasking if the B-52G is retired. To work efficiently under the dual-tasking system, conventional operations will have to be elevated to a higher priority and alert commitments will have to be reduced.

Notes

1. *Jane's All the World's Aircraft 1986–1987* (London: Jane's Publishing Company Limited, 1986), 379–80.
2. Maj James R. Thomits, "Capabilities and Application of a Dedicated Conventional Bomber Force in 1993," Research Study (Maxwell AFB, Ala.: Air Command and Staff College, 1988), 13–14.
3. Ibid., 14.
4. Ibid.
5. Caspar W. Weinberger, *Report of the Secretary of Defense to the Congress on the FY 1987 Budget* (Washington, D.C.: Government Printing Office, 5 February 1986), 218.
6. Edward H. Kolcum, "Air Force Programs Will Upgrade Conventional Weapons Inventory," *Aviation Week & Space Technology*, 28 January 1985, 86.
7. Michael A. Dornheins, "Improved Air Defenses Driving Upgrades in Tactical Weapons," *Aviation Week & Space Technology*, 18 March 1985, 85–88.
8. Thomits, 16–17.
9. Strategic Air Command, "SAC Conventional Bomber Roadmap" (U), 1989, 2, 4. (Secret) Information extracted is unclassified.
10. Ibid., 19.
11. Strategic Air Command, "SAC Conventional Bomber Roadmap" (U), 1 November 1986. (Secret) Information extracted is unclassified.
12. Gen John T. Chain, Jr., interview with Maj James Thomits at Headquarters SAC prior to classified planning for Exercise Bugle Quest in 1987 as reported in Thomits' research study.
13. Thomits, 20.
14. Ibid.
15. Capt Robby W. Morris, "SAC's Strategic Warfare Center," *Combat Crew*, May 1989, 14.
16. Jeffrey P. Rhodes, "SAC Extends Its Wings," *Air Force Magazine*, August 1988, 45.
17. Lt Gen E. G. Shuler, Jr., "Mighty Warrior 89," *Combat Crew*, November 1989, 3.
18. "SAC Conventional Bomber Roadmap," 1989, 2. (Secret) Information extracted is unclassified.
19. Maj Gregory J. Berlan, *Forward Offense: Preparing the B-52 for Conventional Warfare* (Maxwell AFB, Ala.: Air University Press, February 1989), 41.
20. Stephen T. Hosmer and Glen A. Kent, *The Military and Political Potential of Conventionally Armed Heavy Bombers*, Rand Study R-3508-AF (Santa Monica, Calif.: Rand Corp., August 1987), vii.
21. Berlan, 82.
22. Ibid.

23. C. Lipscomb, "A Dedicated Conventional Aircraft Force," Boeing Study, Document No. D500-10400-1 (Wichita, Kans.: Boeing Military Airplane Co., 20 July 1983), 1.

24. Ronald E. Sawyer, "Bombers in the Conventional Role," General Research Corporation Study 1538-02-88-TR (McLean, Va.: General Research Corp., February 1988), 169–70.

25. Lipscomb, 2–4.

26. "SAC Conventional Bomber Roadmap," 1989. (Secret) Information extracted is unclassified.

27. SACR 51-52, *B-52 Aircrew Training*, 30 June 1990, 4-10.

28. Ibid., 4-3, 4-4.

29. Berlan, 82.

30. Casey Anderson, "The Power of One," *Air Force Times*, 6 May 1991, 26.

31. Ibid.

32. Strategic Air Command, "WINTEX/CIMEX 89 Analysis/Feedback Cell Report," 30 May 1989, report documentation page.

33. Max Hastings and Simon Jenkins, *The Battle for the Falklands* (New York: W. W. Norton and Co., 1983), 318.

34. Maj Grover E. Myers, *Aerospace Power: The Case for Indivisible Application* (Maxwell AFB, Ala.: Air University Press, 1986), 64.

35. Hastings and Jenkins, 342–46.

36. M. J. Armitage and R. A. Mason, *Air Power in the Nuclear Age* (Chicago: University of Illinois Press, 1983), 208.

37. Myers, 65.

38. Hastings and Jenkins, 342–46.

39. Myers, 64.

40. Ibid., 65.

41. Ibid., 66.

42. The details and issues of modifications are outlined in "SAC Conventional Bomber Roadmap," 1989. (Secret) Information extracted is unclassified.

Chapter 4

The Seagoing Bomber Complements the Navy

When this study outlined the capabilities of the conventional B-52 in the preceding chapter, one important capability was not included—the maritime role of the conventional bomber. This chapter is devoted to bomber maritime capabilities and force structure. Even with a small force of less than 50 conventional bombers, it is important to examine whether the maritime role is still a viable mission.

This chapter begins with a brief historical background and then evaluates force structure. The next sections focus on capabilities and roles of three maritime bomber missions.

Bombers Supporting the Navy—Historical Perspective

Even though some cooperation between Army Air Forces (AAF) bombers and the Navy began earlier, the most important example of Navy and AAF cooperation was in World War II. In World War II, long-range bombers made significant impacts in antisubmarine warfare (ASW) and aerial mining.

During World War II, long-range conventional bombers destroyed more enemy submarines than any forces except carrier aircraft. The conventional bombers also mined Japan's home islands. Japanese military analysts rated the missions as effective as the B-29 raids on Japan.[1]

After World War II, maritime missions for the bomber were limited as the Air Force became a separate service. In 1950 the Navy asked for maritime mining support from the 307th Bomb Group at MacDill AFB, Florida. At that time the 307th Group was the only SAC organization with a maritime mission. SAC was concerned about degrading its strategic bombing capability by diverting its bombers to maritime missions. SAC stated, "bombers for maritime roles could not be counted on in the initial stages of a war, only later."[2] As another example of the declining role of maritime bomber cooperation, it should be noted that the B-29 had the capability of aerial mining, but this role wasn't actively pursued and died with that aircraft in 1954. After WWII, there was no active cooperation between the Navy and the Air Force until 1975.[3]

This cooperation began because the US was concerned with the rapid growth of the Soviet navy into a global force. This growing force gave the

US Navy its first competition since World War II. A senior military officer and researcher, Col Thomas A. Keaney, characterized the Soviet navy growth.

> The Soviet buildup has included all classes of ships, submarines, guided-missiles cruisers and destroyers, and four aircraft carriers, and the growing number of Soviet naval shipyards suggests even further fleet expansion. This fleet expansion challenge to the US Navy is a critical development, for although the United States remains a superior naval force, the prospect of Soviet naval parity has dire consequences for US strategy. If parity means that neither can use the sea lanes in the face of opposition from the other, then the United States is the comparative loser because the Soviet Union does not depend on this access.[4]

With this emerging threat, the Navy and Air Force signed a formal memorandum of agreement (MOA) in 1975. This agreement gave the Air Force a secondary or collateral role in maritime operations. The intent was not to establish formal rules but to set up training procedures between SAC bombers and Navy units.

The first cooperative program was the Busy Observer joint missions. This program dictated that certain B-52 units would fly four ocean reconnaissance or sea surveillance training missions every six months. This meant that B-52s would launch from a land base and search over 100,000 square miles each hour. Although this was not total integration with the Navy, it was a first step in familiarizing bomber units with Navy tactics and Navy communications.[5]

As B-52 crews trained with the Navy in the sea surveillance mission, the Navy and the USAF wanted to give the B-52 an offensive capability in addition to the reconnaissance role. James Schlesinger, secretary of defense, suggested that the B-52s should be armed for a sea interdiction (antisurface warfare) role. The USAF chose three possible weapons for sea interdiction. These were the Harpoon (AGM-84A) antiship missile, the GBU-15 glide bomb, and a laser guided Mk 84 glide bomb.[6] After various tests the USAF selected the GBU-15 glide bomb. In 1976 several B-52s were modified to test and carry this weapon.[7]

Besides the antisurface warfare tests, another capability emerged in 1978. At Pease AFB, New Hampshire, the Navy and USAF prepared and loaded mines onto a B-52D. The B-52D then dropped these mines to determine accuracy.[8] Although B-52Ds based on Guam had a mining operational plan in 1976, this test at Pease started the active involvement of the B-52 in the mine-laying mission. After the test, the B-52 participated with the Navy in several exercises, including practice mine releases in Pacific and European waters.

In the fall of 1979 the value of the B-52 in the maritime role took on a new meaning. Because of the Iranian crisis and the Afghanistan invasion, B-52 conventional bomber maritime training began a new phase. These conflicts made the US realize that it would be difficult to maintain a military capability, even a naval one, so far from the continental United States.

Therefore, the US 7th Fleet, which operated in the Indian Ocean, asked SAC for assistance. SAC responded, complementing naval forces with B-52s flying sea surveillance missions from Guam and Darwin, Australia.

These flights were long, approximately 30 hours, but the B-52s completed this tasking on a routine basis. To further demonstrate SAC's support to the Navy, two B-52s launched from K. I. Sawyer AFB, Michigan, flew to the Indian Ocean to assist the Navy in sea surveillance training. These B-52s then continued around the world and returned to K. I. Sawyer, nonstop, to demonstrate the B-52's capabilities.[9]

From this action in the Indian Ocean along with the previously mentioned exercises, large numbers of B-52 crews became familiar with sea surveillance and fleet operations. The Navy also derived another benefit from this training. As the B-52 flew reconnaissance missions, it also acted as a simulated intruder. It played the role of a Soviet bomber and attempted to penetrate the carrier battle group defenses. This provided training for both ships and Navy aircraft.[10]

In 1980, the B-52 maritime role was again strengthened. The Harpoon missile replaced the GBU-15 glide bomb. The Harpoon missile, first tested in 1975, is a Navy asset used on a variety of surface vessels, submarines, and aircraft. The Harpoon carries a 500-pound warhead and has terminal radar guidance. In 1983, the B-52G successfully test-fired the Harpoon.[11]

In 1984, the Navy and SAC signed another MOA. According to Navy Capt Laurence Bergan, this agreement was somewhat vague.

> This sensitive issue is only obliquely addressed in the 1984 agreement. The only mention of how SAC will make B-52 assets available is to say they will operate in support of theater Commanders-in-Chief (CINCs) worldwide as requested by them and approved by the JCS. Presumably while under the theater CINC, operational control would be delegated down to the Air Component Commander for coordination with CINC assets. General Chain, current CINCSAC, has stated they would be used for follow on forces attack (FOFA) or for maritime missions.[12]

After this agreement, 14 B-52Gs at Loring AFB, Maine, and 14 B-52Gs at Andersen AFB, Guam, became fully capable of launching Harpoon missiles. These were the only two bases tasked and trained to launch the Harpoon. These bases, along with others in SAC, continued to train in the Busy Observer missions and mine-laying exercises.

Bomber Maritime Force Structure in 1991

At present, budget cuts and new force structures have reduced the maritime capabilities of the B-52. First, Andersen AFB closed its B-52 unit in 1990; this closure cut the Harpoon capability in half. Now only Loring is Harpoon tasked and trained.

Before Andersen closed, B-52s could support both Atlantic and Pacific commands through conventional operation plans. Now there are not

enough Harpoon-capable B-52s to support both commands unless another base is trained on the 14 Harpoon-capable B-52s remaining after Andersen AFB closed.

The mining and sea surveillance capability is present in 1991, and training continues in the continental United States and in worldwide joint exercises among SAC, the Navy, and our allies. Nevertheless, maritime support to the Navy is reduced because the number of B-52Gs is getting smaller. (Only 33 B-52Gs are conventionally dedicated.) Force structure and reductions will become more apparent as capabilities are evaluated.

Maritime Capabilities

Aerial mine laying, Harpoon antisurface warfare, and, to a lesser degree, sea surveillance are yet the mainstays of the B-52 maritime force. The following review concentrates on all three facets separately. Aerial mine laying, the oldest role, is examined first.

Aerial Mining

This mission is unique because it is considered both a maritime mission and a bombing mission. Mining is an offensive capability, but SAC does not need to make major modifications to the aircraft to drop mines; nor do B-52 crews need significant joint coordination with the Navy. If the Navy tasked bombers to mine a certain area, they would require naval expertise to select the area and plan splash points; but beyond that, mining is both a land tactic and an overwater tactic because the procedures for mining are basically the same as dropping a 500-pound bomb.[13] Therefore, bomber crews require very little training to be fully capable of mine laying.

A demonstration of how SAC and the Navy train through exercises occurred at the B-52 base on Guam. That B-52 unit has since closed, but the exercise is typical of what other B-52 units experience today.

The mine-laying exercises conducted by the bombers from Andersen AFB, Guam, lasted up to 14 hours. The base in Guam would launch from three to nine aircraft, and these aircraft would most often fly to harbors along the Republic of Korea coastline. The B-52G would then drop unarmed practice mines and return to Guam.

This training involved flying more than 5,000 miles to drop mines in a very small area or box. The box was usually ringed with ships so that accuracy and timing were important. After the mines were laid, Navy minesweepers cleared the harbor. Both services practiced and benefited from the exercise.[14]

According to a study at the National Defense University, of all maritime USAF areas mining is the one area most favorable for continued pursuit. The study argues this point because: (1) mine warfare in the Navy has been treated as an orphan—the Navy does not have enough ships or aircraft to deliver all required mines (these aircraft and vessels are needed for antisub-

marine or strike warfare); and (2) as previously discussed, the Air Force is already trained for mining and few modifications to aircraft are necessary.[15] As a result, mine training is relatively easy, and the Navy welcomes complementary forces. Bomber maritime mining could be the most important maritime role of the conventional bomber force in the future.

Aerial mine laying is important to contain the Soviet fleet, but the effects of mining are also major in a low-intensity war. Mining is less controversial than bombing, but it can have decisive results. In 1972, the mining of the Haiphong harbor closed it for 300 days, although no ship was sunk by the mining.

B-52s and B-1Bs are both excellent delivery vehicles for mines. Both aircraft could deliver a large load of mines worldwide on short notice. Some of the areas to be mined are less defended than land areas, and therefore the aircraft is not as likely to be shot down over water as it is over land.[16]

In this era of military reductions and changing political environments, the mining capability of the conventional bomber may be the best "bang for the bucks." Secretary of the Air Force Donald Rice said, "B-52s possess a mine delivery capability unmatched by any other system."[17] B-52s are capable of carrying most of the mines in the Navy inventory. Bombers can carry the new Quickstrike series, the Destructor 36 (DST 36) 500-pound mine for shallow harbors, the Mk 55 2,000-pound mine, the Mk 60 Captor antisubmarine deep-water mine, and several other Navy mines.

With these mines, conventional bombers could mine harbors, strategic outlets to the open sea, or major choke points in or leading to the sea-lanes. In world geography, this translates into mining strategic sea-lanes such as the Greenland-Iceland-United Kingdom (GIUK) Gap, enemy harbors like those around the Kola Peninsula, and critical outlets to the open seas like the Baltic Straits.[18] Adm Wesley McDonald pointed out that the naval ship and air assets are presently only about 50 percent of those required to perform the above missions.[19]

Mine laying is an area where the B-52 conventional bomber could greatly contribute to the maritime mission with very little cost, training, or modification of aircraft. It is also an area where competition or service rivalry between Navy and USAF aircraft is minimal. Also, Air Force bombers complementing the Navy in the mining role free up already overcommitted naval assets to perform their antisubmarine warfare and strike mission warfare.[20]

Attacking Ships

As noted previously, only one squadron of approximately 14 B-52Gs is operational today in the Harpoon antisurface warfare role. Each aircraft is capable of launching up to eight Harpoon (AGM-84) missiles per sortie. Even with this limited number of B-52s, the antisurface warfare mission is still an important mission for complementing Navy forces and acting as a force multiplier.

This is true because of the distinctive and exclusive capabilities of the conventional long-range bomber. These qualities are:

1. The B-52 global operating range. This range is 5,900 nautical miles at high altitude (over one and one-half times that of the Navy's P-3 Orion). The P-3 is the Navy's longest range Harpoon air carrier. This range of the B-52 is extended even further by air refueling.
2. The capability to deliver a heavy weapons load day or night over long distances. In the section on B-52s in Vietnam, this study described B-52s flying from Guam to Vietnam with a load of over 50,000 pounds of bombs. The B-52 could also carry a similar load of mines. Maritime antisurface load capability is also impressive. The B-52 is presently capable of carrying eight externally mounted Harpoon missiles.
3. Unlike ship cruise missiles, the B-52 provides an instantly renewable asset. A B-52 that has fired all of its missiles can be relieved by another fully loaded B-52. This capability allows the ships of the task force to conserve their own supply of antiship missiles, which are less easily replenished.
4. A combination of B-52 Harpoon and Navy cruise missiles provides a formidable force and acts as a force multiplier. A study conducted by three senior Navy planners concluded that in most engagements with Soviet naval forces, a coordinated joint attack would be essential. This attack should consist of a combination of Harpoon and Tomahawk cruise missiles fired from several launch platforms.[21]
5. B-52s can offer assistance to overcome limitations in cruise missile employment. If a naval force is to achieve standoff success, then it must employ a salvo of cruise missiles to overcome the enemy's antimissile defenses. To overcome the defenses, one must launch a salvo of missiles against the nondiscriminating seeker systems to overload the system.[22] The Navy is limited in this role because there is only a finite number of missiles available for use by a battle force. The B-52Gs with the salvo capability of eight missiles and an instant renewability by relief aircraft can greatly reduce this limitation.

From this assessment, the bomber appears to be a valuable asset to the Navy. However, there are critics who express concern and see limitations to the antisurface warfare role. One skeptic, Colonel Keaney, expressed his concerns at the National Defense University.

> Even carrying the Harpoon, the B-52 has only the start of an antiship capability. While the missile has a 50-mile range, the B-52 cannot positively identify what the target is at 50 miles. Effective targeting in this environment requires a positive identification of a target; for a B-52 this identification must be visual. In essence, the standoff capability is largely negated. Such a limitation applies not only to the B-52, of course; any true standoff missile carrier needs a radar capable of discriminating the identity of a target to be effective in naval warfare.[23]

This problem is frustrating to the B-52 crews. They are sometimes unable to determine whether the ship is enemy, neutral, allied, or their own force.

The onboard B-52 radar is of little help—the image is not clear enough to identify a ship. As a result, the B-52 could attack the wrong ship. The identification problem is further heightened by the mobility of naval forces. Forces are constantly moving at speeds up to 30 knots. At times the movements are not predictable—movements could be away from or toward theater operations.[24]

The limitation described above does not severely limit the effectiveness of the B-52 with Harpoons. It does limit the effectiveness of the B-52 as a totally autonomous targeter and shooter.

The Navy also suffers from the same problem. Surface ships under ideal conditions can identify a vessel only at 20–30 nautical mile ranges or less. This is not an ideal situation to optimize the range of the Harpoon or the longer range Tomahawk antiship missile.[25]

Navy aircraft which carry the Harpoon also are faced with this problem. The search radars on the P-3C and P-3B were not designed to classify or identify ships. To overcome this targeting problem, the Navy has modified some of its P-3Cs with a new state-of-the-art high-resolution radar called inverse synthetic aperture radar (ISAR). ISAR allows the P-3C to perform autonomous targeting at or beyond the range of the Harpoon missile.[26] Various studies have highlighted the need for ISAR on bombers, but this funding has taken a backseat to other priorities.

It appears that ISAR will not be a reality for the bomber in the near future, but the USAF and Navy have found ways to work around this limitation. USAF and Navy planners used integrating procedures to overcome the weakness.

As mentioned above, the B-52 does not possess the sensors to positively identify its ship target. However, the B-52's range and payload make it an extremely potent asset in naval warfare.

To maximize the capability of the B-52, the two-party (over-the-horizon) tactic has evolved. This involves the coordination of two or more sensor/weapons platforms. In this scenario, a naval E-3A airborne warning and control system (AWACS) aircraft would provide detection, classification, position, and track information. As the AWACS relays this information to the bomber, the B-52 then shoots the Harpoon antiship missile. This solution worked well in the initial B-52 Harpoon test firings.[27]

This procedure will work with the Navy's version of the AWACS (E-2C) and the USAF AWACS. The two-party system is similar to a ground controlled intercept (GCI). The AWACS-type platform remains outside the lethal sphere of the targeted vessel while it paints both the B-52 and the target. The AWACS then directs the B-52 to a Harpoon launch point. This enables the bomber to close the target at a very low altitude (under the enemy's radar coverage). Harpoon tasked bombers routinely practice this procedure in worldwide and local exercises.

Sea Surveillance

Sea surveillance started as a familiarizing function to train both the Navy and the Air Force in joint communications and fleet operations. From the late 1970s to today, this has been a successful venture. The mission has been useful to the Navy because it provided ship locations, and it trained their air intercept crews as the bomber acted as an intruder. It was a mission that was easily mastered by bomber crews, but today it may be limited in its usefulness. Two B-52s can search 154,000 square miles of ocean per hour, but is this a waste of a valuable asset when you consider an operating force of less than 50 conventional bombers. The B-52 may be more valuable as a bomber, standoff weapon carrier, or mine-laying platform.

In addition, with the technology of satellite reconnaissance and other intelligence systems, sea surveillance could very well be a limited function today. Still, there are areas of limited satellite coverage where sea surveillance would be valuable.[28]

Maritime Role Analysis

The conventional bomber, even with smaller numbers, has great potential to complement Navy forces during times of hostilities—the bombers could even be the force multiplier to determine the outcome. Of the three maritime missions, mining is perhaps the most valuable because it is simply bombing over the oceans, and the crews are already trained for this. Antisurface warfare is also an important function, but as the bomber force is reduced, we may not have enough bombers to conduct all missions.

Sea surveillance, a successful venture in the past, may have outlived its usefulness because of new satellite technology. The analyst may also want to consider whether it is wasteful, considering the small force of the future.

Maritime capabilities and force structures were evaluated in this chapter. Chapter 5 looks to the future and proposes a flexible force in the years ahead.

Notes

1. Col Thomas A. Keaney, *Strategic Bombers and Conventional Weapons* (Washington, D.C.: National Defense University Press, 1984), 26.
2. Maurice A. Miller, *The Collateral Mission of the Strategic Air Command* (Offutt AFB, Nebr.: Office of the Historian, Headquarters Strategic Air Command, 1980), 2.
3. Keaney, 27.
4. Ibid., 31–32.
5. Lt Comdr John R. Thompson, "USN-USAF Interaction for Ocean Surface Surveillance Using Land-Based Aircraft," Research Report (Newport, R.I.: Naval War College Center for Advanced Research, 1979), 16.
6. Keaney, 34.
7. Ibid.

8. Miller, 176.
9. Keaney, 35.
10. Ibid.
11. Ibid.
12. Capt Laurence M. Bergan, Jr., US Navy, "Shotgun Wedding: The Marriage of Old B-52s and the New Maritime Strategy," Naval War College Report (Newport, R.I.: Naval War College, 1988), 10.
13. Keaney, 42.
14. Senior Master Sergeant Doug Gillert, "Those Seagoing B-52s," *Airman*, January 1989, 30.
15. Keaney, 43.
16. Ibid.
17. Secretary of the Air Force Donald B. Rice, *The Air Force and U.S. National Security: Global Reach—Global Power*, white paper (Washington, D.C.: Department of the Air Force, June 1990), 10.
18. Maj James R. Thomits, "Capabilities and Application of a Dedicated Conventional Bomber Force in 1993," Research Study (Maxwell AFB, Ala.: Air Command and Staff College, 1988), 22.
19. Adm Wesley McDonald, "Mine Warfare: A Pillar of Maritime Strategy," US Naval Institute *Proceedings*, October 1985, 48.
20. Rear Adm C. F. Horne, "New Role for Mine Warfare," US Naval Institute *Proceedings*, November 1982, 34–40.
21. Lt Col Donald G. Cook, USAF; Comdr Charles Horne, USN; and Comdr Walter Manning, USN, "B-52 Maritime Operations," Research Report (Maxwell AFB, Ala.: Air War College, 1987), 19–22.
22. Ibid., 23.
23. Keaney, 37.
24. Cook, Horne, and Manning, 29.
25. Ibid., 33.
26. L. A. McClelland, "Versatile P-3C Orion Meets Growing ASW Challenge," *Defense Electronics*, April 1985, 132.
27. Cook, Horne, and Manning, 34–35.
28. Keaney, 43–44.

Chapter 5

B-1s and B-2s, A Flexible Force of Conventional Bombers

To compensate for forces growing smaller, the US traditionally has depended on advanced technology as a force multiplier. High-tech weapons along with quality people have given us great war-fighting advantages. The brilliant execution of military forces and weaponry in Iraq is one recent example. High-tech weapons gave the US an overwhelming victory in Iraq, and considering the size of the operation, the casualties were lower than in any war in history.

To maintain the technology edge, our conventional bomber force may require modernization along with the other conventional forces. The B-52, even though capable, can't last forever. Before this study looks to the future, we must first examine our two most modern bombers—the B-1 and the B-2. They are both shrouded in controversy. The B-1B is still assaulted daily by politicians and the news media, and the same skeptics question whether the B-2 should be fully deployed.

A flexible force of conventional bombers in the future will probably be smaller. Secretary of the Air Force Donald B. Rice agrees that we cannot afford inefficiency in a small force structure. Rice states that while we should not tolerate inefficiency, we also cannot condone service rivalry:

> The dynamics of the future will require us to carefully craft complementary forces. That process has begun under the leadership and direction of the Secretary of Defense. Each Service provides unique capabilities to meet national security challenges. The Air Force is fully committed to orchestrating its forces and operations with those of the other Services. At the same time, air, naval, and land forces are fundamentally and necessarily different. Maximizing the contributions of each will result from exploiting individual Service strengths where each fits best in contributing to future security objectives.[1]

Knowing that the conventional bomber force must be carefully crafted, this chapter examines the force in terms of:

1. What is the potential for using the B-1B for projecting nonnuclear air power?
2. Is the B-2 the conventional bomber of the future?

The B-1B—Replacement for an Old War-Horse, Maybe

Because of the difference in the radar cross section (RCS), the B-1B is 100 times more "stealthy" than the B-52 and can carry 40 percent more

payload in conventional bombs. The B-1B flies faster than the B-52 at low level (965 knots average versus 360 knots average) and maneuvers much like a fighter while the B-52 lumbers along. It is, without a doubt, the finest penetrating bomber in the world. Outfitted as it is today, however, the B-1B is not effective in a conventional role.[2]

This B-1B analysis presents: (1) strengths, (2) limitations, (3) a cost analysis of changing the force, and (4) a summary. Before considering capabilities and the structure of the B-1B force, it is important to be generally knowledgeable of the history of conventional operations in the B-1B.

Throughout the planning and initial acquisition period, Strategic Air Command (SAC) never planned for the B-1 to have a conventional capability. The original B-1A (during the Carter administration) did not include the requirement to deliver conventional munitions.[3]

The conventional requirement came only after Sen John H. Glenn, Jr., lobbied against acquiring a nuclear-only bomber during the Reagan administration. After Glenn pushed for the conventional role, the USAF and Rockwell, the bomber's developer, agreed to "revise the B-1B aircraft requirements [and add] a conventional delivery capability."[4] This so-called conventional capability was a key factor in selling and acquiring the B-1B, an updated version of the B-1A.[5]

The USAF developed the B-1B to replace the B-52 as a penetrating bomber. The limitations of the B-52 are its age (over 40 years old) and the fact that due to improvements in Soviet air defenses, it will not be able to penetrate deep into the USSR.

Capabilities and Structure

The B-1B became operational in 1986, and the 100th and last B-1B was delivered in April 1988. Currently there are 97 B-1Bs in four bomb wings and one test facility. Three B-1Bs were lost in crashes. These four wings are at Dyess AFB, Texas; Grand Forks AFB, North Dakota; Ellsworth AFB, South Dakota; and McConnell AFB, Kansas.[6] In addition, two B-1Bs are assigned to Edwards AFB, California, for flight testing.

The USAF envisioned and designed the B-1B as a low-altitude penetrator and as standoff air launched cruise missile (ALCM) carrier—the emphasis was on nuclear weapons. Lt Col Paul Frichtl in his Air War College analysis on the B-1B summarized these unique features, and also argued for an additional conventional role:

> While unable the sleek, ungainly, and large B-52s, the speed, low radar cross section and other unique characteristics of the B-1Bs make it the most capable bomber for high threat missions. Additionally, many of the in place threats a conventional bomber force would face today in protection of our country's vital national interests are formidable and are of increasing sophistication. Thus the B-1B may be the weapon system of choice available to defeat the threat.

Even in these comments it is apparent that the B-1B was developed by the USAF to penetrate a formidable Soviet defense. This Soviet air defense

network has become "the best in the world," and it is important to understand what a penetrating bomber would encounter.

The Soviet Air Defense. The Soviet Union's sophisticated air defenses are composed of thousands of fixed line-of-sight radars that find and track enemy aircraft. Once the fixed radars detect a penetrating aircraft, the data from many ground-based radars is communicated to a common control facility. This system allows the radars to operate in coordination, acting as a single radar with an increased range. Since the aircraft is detected early, this capability gives the Soviets more time to "scramble" fighters to intercept a penetrating bomber or cruise missile.[8]

This type of ground radar also has limitations. Once intelligence sources determine the radar locations, a penetrating bomber can fly outside their effective range by changing its flight path. Even connecting radars, as described above, do not solve this problem unless the radars are close enough for overlap in coverage.

The Soviets have attempted to correct these limitations by deploying mobile radars. A mobile radar is effective because the penetrating bomber or cruise missile may not be able to avoid its coverage—the radars are moved constantly so that the US cannot positively determine their location. However, these mobile radars have the same coverage limitations as the fixed units. As a result, there are many "holes and gaps" in the system. Plugging them with mobile radars would require massive numbers of radars and operators.[9]

To overcome the gaps, the Soviets use large radars on aircraft. These systems are known as airborne warning and control systems (AWACS), and are capable of monitoring penetrating aircraft over a large area and coordinating fighter intercept once a penetrator is detected. The AWACS is capable of detecting a low-flying aircraft at a range of approximately 200 miles. If the penetrating aircraft is at a high altitude (30,000 feet or higher), the AWACS can detect it at 400 miles or more. In addition, the AWACS is hard to detect and destroy because it is difficult to locate.

The AWACS is effective, and as a result, this system has had a great impact on the way a bomber would penetrate. According to the 1988 edition of *Soviet Military Power*:

> The Mainstays [Soviet AWACS] may patrol near the Soviet/Warsaw Pact borders to track approaching U.S. bombers, providing the greatest possible time to direct fighters to intercept them. Such patrols would force U.S. bombers to start flying at low altitudes earlier than planned in their flight, perhaps at distances of 300–400 miles from Soviet territory. The bombers would have to do this to minimize the distance at which the AWACS can detect them, most likely decreasing the bombers' range (low-altitude flight is less fuel efficient than high-altitude flight). The Soviet Union has so far deployed approximately a dozen Mainstay AWACS, and production is continuing.[10]

Coupled with the AWACS and the ground-based systems are the extremely sophisticated and lethal surface-to-air missile (SAM) systems. Experience in Vietnam, Egypt, and Syria has helped the Soviets to develop

effective systems. These systems are the kinds of threats a nuclear or conventional bomber could face in the Soviet Union or even a third-world country.

The *International Defense Review* states that "the Soviets have deployed an entire family of SAM/AAAs [antiaircraft artillery] that are predominately mobile and are intended to offset what is seen to be the West's air superiority."[11] The Soviets use these systems not only in the Soviet Union but in other third-world countries as well. In the 1973 Arab-Israeli War, the Israelis suffered their greatest losses to date as the result of the Soviet SAM/AAA "mix-and-match" philosophy, supplied to the Arabs. The Soviet "mix and match" is the combined coverage of many weapons of different types. For example, missiles and guns are combined with rapidly moving ground forces.[12]

Nevertheless, the Soviet defense network is vulnerable in these areas: (1) the pressure of combat could cause the centralized control to lack coordination, (2) capability could be diminished as the US targets their command and control infrastructure, and (3) the problem inherent in any fast-moving offensive war of supplying air defense units with ammunition, missiles, and spare parts. Perhaps the greatest weakness of the system is its vulnerability to standoff weapons (either nuclear or conventional).[13]

B-1B Capabilities. USAF planners developed the B-1B to penetrate enemy territory to successfully deliver its weapons on target. The superb penetrating ability of the B-1B results from its carefully designed features. Some of the unique capabilities and strengths of the B-1B are: (1) the ability to fly at high speed at low altitude—this minimizes exposure and reaction time for enemy air defenses, (2) the automatic terrain-following system which allows low-altitude flight to avoid enemy radar detection, (3) the stealthy radar characteristics—the B-1B has a RCS one one-hundredth that of the B-52, and (4) the B-1B is highly maneuverable for a large aircraft. The maneuverability coupled with a precise navigation system allows the bomber to better avoid threats.[14] Each characteristic has its own unique advantages.

One of the major advantages of the B-1B is its ability to fly at high speed at low altitude. Because the B-1B flies at a higher speed than the B-52, the B-1B crosses the lethal range of a ground-based threat much faster. The B-52 flies at low altitude at an average of 360 knots ground speed (360 nautical ground miles traveled in one hour). At this speed, the hulking bomber would have an exposure time to enemy lethal defenses of 14 minutes 50 seconds at 1,000 feet above the ground and an exposure time of 7 minutes 40 seconds at 200 feet above the ground. In comparison, the B-1B cruises at an average of 565 knots of ground speed at low altitude. This significantly higher speed would give the B-1B an exposure time of only 9 minutes 28 seconds at 1,000 feet above the ground and 4 minutes

52 seconds at 200 feet above the ground. Even though reduced exposure time is considered an advantage, this is not a panacea for Soviet defenses. We must not forget that the aircraft is being tracked by Soviet radars, and it takes about two seconds for the systems to lock on to the bomber once it is detected.

These time estimates are based on the enemy defenses being able to detect a bomber at 44.4 nautical miles (NM) flying at 1,000 feet above the ground and at 22.9 NM at 200 feet above the ground.[15] Obviously, low-altitude flight is of great benefit, and this is where the B-1B outshines the B-52. The B-1B is able to fly at 200 feet above the ground day or night because of its state-of-the-art terrain-following system. The B-1B's system is automatic, while the B-52's terrain-avoidance system is manual.

The B-1B's system allows the bomber to fly at low altitude for hours without the pilot fatigue associated with flying the B-52. With its wings swept back, the B-1B can fly at 565 knots at 200 feet above the ground, with turbulence dampened by the structural mode control system. Col Walter Boyne, a former B-52 pilot, described the sensation of low-altitude flight in the B-1B.

> By now I was caught up in the visceral thrill of low-level flight at [565] plus knots over some of the most beautiful country in the world, enjoying the feel of the Structural Mode Control System, the canard surfaces that dampened the turbulence of the northwest wind spilling over the ridges. In a B-52, the ride would have shaken us around like dice in a cup. In the shadow of the hills, I realized for the first time that the B-1B is really an active stealth bomber, gathering high terrain around it like a cape to conceal it from "the bad guys," darting through ravines and valleys at a speed that would simply run a pursuing fighter out of fuel.[16]

Today's planner often overlooks the stealth characteristics of the B-1B. The planner may tout the stealthiness of the B-2 and F-117 and forget the stealth technology designed in the B-1B. What makes the B-1B difficult to detect by enemy radars is its small RCS. The major factors that influence RCS are size, shape, radar reflectivity, and radar absorbency. The B-1B, according to the USAF, has a RCS one one-hundredth that of the B-52. The B-1B achieves this low RCS by rounded or blended surfaces (not angular), curved inlet ducts with radar-absorbent baffles, being painted with radar-absorbent paint, and radar-absorbent materials placed throughout the aircraft. This low RCS reduces the range at which enemy radar can detect the B-1B by approximately two-thirds. For example, a B-1B flying at 565 knots ground speed at 200 feet has a total exposure time of only 1 minute 36 seconds. In this case the B-1B isn't detected until 7.6 NM from the threat.[17]

Besides its speed, superb terrain-following system, and low RCS, the B-1B is highly maneuverable. Colonel Boyne was impressed with the B-1B's "fighter-like" performance and maneuverability.

> Flying the B-1B at Mach 0.95 at low altitude is addictive. We were going so fast that my B-52-style banks were slowing us down and running us near the precisely defined edges of the corridors. At Riggleman's [the instructor pilot] gentle urging, I began

tracking the B-1B up into 45-degree banks and pulling some gentle Gs to hurtle around the course.[18]

Because the B-1B maneuvers and flies like a fighter, it can easily maneuver to avoid threats. When the defensive systems officer identifies a threat, the pilot can easily and swiftly maneuver the aircraft to the best route of flight to avoid detection by the ground-based threat.[19] This scenario will be fully utilized when the electronic countermeasures (ECM) problems of the B-1B are corrected. These limitations are discussed in the next section.

Limitations of the B-1B as a Conventional Bomber

The B-1B has been bombarded with harsh criticism from Congress and the press because of numerous problems and limitations. Some of the criticism is warranted and some is unjust. The following section addresses those limitations which could affect the potential of the B-1B as a conventional bomber.

The Electronic Countermeasures Problem. The ECM limitation continues to detract from the overall capability of the B-1B. The heart of the ECM system is the ALQ-161, built by Eaton Corporation, AIL Division. AIL's goal was to look at ECM history and design a system that would serve the USAF well into the 1990s. This was an ambitious goal since AIL attempted to design a system that would search across the entire spectrum of enemy detection and active defenses and counter what it found. The system is complicated beyond belief—the ECM in the B-1B consists of 108 "black boxes," consisting of receivers, several antennas, and numerous jamming transmitters; and it weighs approximately 5,000 pounds. And yet, the system is limited in its threat detection and jamming ability.[20]

Even though the USAF is disappointed by the ALQ-161, it is not a total failure. According to AIL, the cost to correct its limitations will be $520 million for the entire fleet of B-1Bs.[21] SAC has proposed a less costly solution. SAC's proposal is a contingency response program (CORE)—in this program AIL would only correct the most critical deficiencies. With this solution the B-1B should be able to counter threats through the 1990s.[22] The cost of CORE is $300 million in 1990 dollars, and the USAF has successfully flight-tested the upgraded system. Whether or not Congress will fund this requested upgrade is still unknown.

Range Limitations. The unrefueled combat range of the B-52G is 5,200 miles, and that of the B-52H is 5,900 miles. These range capabilities are based on B-52G and B-52H aircraft loaded with 51 500-pound conventional bombs and flying at high altitude only. The B-1B's range at high altitude is less than the B-52H. A B-1B loaded with 84 500-pound conventional bombs has an unrefueled range of 5,700 miles. When considering force projection from the CONUS, this deficiency can only be overcome by more air refuelings for the B-1B than is required for a B-52H.

On the other hand, the B-1B outdistances the B-52G in low-level efficiency and range. While flying a low-level profile, the B-1B burns 36,000 pounds of fuel per hour while the B-52G burns approximately 38,000 pounds per hour, giving the B-1B a greater low-level combat range. The B-1B has a longer range at low level because it flies faster. The combat unrefueled range of a B-1B fully loaded with conventional bombs flying a high-low profile (high-level flight with 1,000 miles of low-level flight) is 3,250 miles. A B-52G fully loaded with conventional bombs has a combat range of 2,755 miles on the same profile. Conversely, the B-1B is not as fuel efficient as the B-52H. A B-52H flying the same high-low profile has an unrefueled range of 3,749 miles.[23]

Conventional Weapons Limitations. This is one area that must be addressed immediately if the B-1B is to be used effectively in a conventional role. Presently in 1991, the B-1B is only certified for the Mk 82 dumb bomb. Besides being able to accommodate only one conventional weapon, the B-1B is limited in its carriage configuration and release capabilities.

Since the B-1B was designed primarily as a nuclear bomber, its three weapons bays were originally configured with a rotary launcher, each of which can hold eight short-range attack missiles or gravity bombs. For the B-1B to drop its full potential of conventional bombs, a conventional weapons rack must be installed in each bay. With the rack installed, the B-1B is able to carry 28 Mk 82 bombs on each rack for a total of 84.[24] In addition, a bay fuel tank can be installed in any or all of the bays in place of weapons to extend the range of the aircraft.

The B-1B rotary launcher cannot carry a full load of conventional gravity weapons. In 1985, SAC and Air Force Systems Command conducted a study to evaluate all of the various types of Air Force and Navy conventional weapons that are currently carried or programmed to be carried on SAC aircraft. The study concluded that, "[many] of the various weapons addressed would [not] fit on all stations of the B-1B rotary launcher without modification to either the weapon, the aircraft, or the launcher."[25] Some of the modifications would be extensive.

Coupled with the carriage limitations are release limitations. Lt Col Paul Frichtl pointed out this problem in an Air War College study.

> High speed, the aircrew's friend when traversing enemy territory, becomes an unseen barrier to be overcome when releasing weapons from the weapons bays. The airflow beneath the blended body of the B-1B creates a lifting [effect] to "hold" a weapon in the bay. [To counter this airflow] the weapons racks are equipped with explosive driven pistons, that in effect eject the weapons out of the bay through the airflow. Therefore, any weapons to be used on the B-1B must be designed to withstand the shock of being explosively hurled from the bay.[26]

Not all conventional weapons can withstand this shock. For example, some Navy mines cannot be delivered effectively by being hurled explosively. The Mk 82 is the only conventional capability of the B-1, and there are no other conventional weapons that can be easily modified for use.[27]

Cost Analysis of Transforming the B-1B into an Effective Conventional Bomber

As noted in the limitations above, the ECM system problem on the B-1B must be corrected before the B-1B can function as an effective bomber. SAC headquarters and AIL feel that $300 million is needed to correct the ECM limitations. Whether Congress will fund this CORE Program remains to be seen.

In addition to the ECM, modifying the B-1B for the same conventional bombing capability as the B-52 would require $20 million per aircraft. Some experts predict even more costs associated with this change. The General Research Corporation conducted a study in 1988 to examine the potential of modifying the B-1B for conventional capability. The researcher, Dr Ronald E. Sawyer, concluded that making the B-1B an effective conventional bomber would require a substantial effort. Sawyer found that some items would require major development efforts and that implementation of these changes after development would take five to six years after the change is developed.[28]

In 1988 Dr Sawyer further stated that obtaining funding for the B-1B might be difficult. That point is still valid today. Some members of Congress have openly criticized the limitations of the B-1B. Since they have been disappointed with the performance of the B-1B, they are reluctant to fund improvements.

With the political mood of Congress and with military budgets being slashed, the best approach possible may be to minimize cost (use what is available or funded), and to increase the B-1B's conventional capability. The basic and most essential upgrade to B-1B conventional capability is the installation of the Mil Standard 1760 interface, a weapons interface unit. Colonel Frichtl is firmly convinced that the B-1B needs this immediately.

> Another B-1B improvement is Mil Standard 1760. This is necessary to interface with new technology weapons to provide a common electronic interface between weapons and aircraft carrying them. All new generation weapons, conventional and nuclear, are required to use this protocol by DOD directive. Therefore, it would be prudent to install the 1760 to ensure B-1B compatibility with these future weapons.[29]

According to Headquarters SAC Air Vehicle Requirements Division, the 1760 modification is already funded through 1995. The cost of the package is $352.4 million. This funding came as a result of the short range attack missile (SRAM) II program being canceled.

With the cancellation of the SRAM II program and the increased emphasis on an improved conventional capability for the B-1B, the funding line for SRAM II integration was renamed 1760/advanced stores carriage. This change will ensure that funds are available for the 1760. The 1760 modification does not correct all B-1B weapon deficiencies, but it is a positive step. The 1760 is merely an interface, and software and hardware would also have to be funded for new technology weapons. Nevertheless, the 1760 upgrade is already funded, and it can significantly increase the

B-1B's conventional capability because it allows the B-1B to interface with smart standoff weapons.

The B-1B, the "B-52 of the Future": Analysis and Recommendations

Even with its limitations, the B-1B provides a heavy-payload, all-weather, day/night, conventional, deep-strike capability that no other US bomber can match. The B-1B can operate from CONUS bases or deploy to forward bases. Like the B-52, the B-1B can respond to crises in a matter of hours with heavy payloads to thwart the enemy in the early critical stages of conflict.

Even though the B-1B is a formidable weapon system, its flexibility is limited as a conventional bomber because it is only certified for one type of conventional weapon. Future wars will probably be in third-world countries; and some of these countries, such as Syria, Libya, or Cuba, are equipped with robust Soviet defense systems.[30] As it is currently configured, the B-1B would have to overfly the target area and drop Vietnam-era 500-pound dumb bombs. This may create an unacceptable risk of losing such a high-value asset. This is not to say the B-1B would not be used in a low-threat area to "carpet bomb" with dumb bombs. This carpet bombing proved to be a valuable tactic for the B-52 in the Iraq war of 1991. To serve successfully in future conflicts, the B-1B should be able to accomplish the full spectrum of conventional activity, delivering both dumb bombs and smart conventional standoff weapons.

The limitations of the B-1B must be corrected or compensated for if it is to emerge as the "B-52 of the future." The ECM problem must be funded in the CORE Program in order for the B-1B to counter threats through the 1990s.

The Mil Standard 1760 interface will be a positive step toward correcting the B-1B's weapons limitations. The 1760 will give the B-1B several options for conventional standoff weapons.

Another limitation addressed earlier is range limitations. This is a critical limitation, but additional refuelings can make up the deficiency if tanker assets are available. Another alternative is to load additional fuel in one or more of the bomb bays when a full conventional weapons load is not required. Besides these steps, another way of increasing range is changing the wing sweep of the B-1B. This tactic requires flight testing before it is implemented, and flight testing is expensive. In addition, if the B-1B would fly at a lower cruise airspeed when feasible (over undefended areas), it would burn much less fuel.

Future wars may be "come as you are" because of fiscal realities—we cannot afford costly modifications. The old workhorse B-52 will be around a while longer, but it can't last forever. If its limitations are corrected, the

B-1B can replace the B-52 and deliver global conventional firepower better than the aging B-52. Colonel Frichtl summarizes the future of the B-1B.

> The B-1's potential nonnuclear applications ought to command as much attention in weighing the real value of the plane as its strategic attributes. Much like its predecessor the B 52, it is highly improbable that this plane will ever be used in nuclear anger against the Soviet Union. The nuclear stalemate that has deterred war between the superpowers for over a quarter century is likely to persist. In all likelihood there will only be the need to employ the B-1B in a conventional role. Will SAC be ready?[31]

Is the B-2 the Conventional Bomber of the Future?

Since the B-2 is one of the most controversial weapon systems in the history of the USAF, it has generated considerable discussion. Arguments against the B-2 are: (1) it is too costly, (2) it has no mission because cruise missiles, both conventional and nuclear, can do the same job, (3) the B-52 and B-1B are sufficient for deterrence, (4) the world climate is such that the threat of confrontation with the Soviets is reduced to its lowest level in 40 years, and (5) the US would be reluctant to use this expensive bomber in a conventional role and risk its loss in low-intensity conflicts. These are the primary arguments against the B-2, and there are others as well—the debate goes on.

The intent of this section is not to prove or disprove whether we need the B-2 for both nuclear and conventional security. Instead this section concentrates on the conventional capabilities and potential of the B-2. It discusses (1) the politics of the B-2 in future conflicts, (2) conventional capabilities, and (3) cost limitations of the B-2.

The B-2 and Conventional Operations in a World of Instability

In an earlier part of this evaluation, the reader was introduced to the political changes occurring in an evolving security environment. A USAF-published fact book also refers to the emergence of hot spots:

> Rapid changes in the global security environment have added unprecedented uncertainty to our security planning, and while U.S. defense forces are shrinking, U.S. worldwide responsibilities and interests are not. As the current Middle East crisis amply demonstrates, "hot spots" all over the globe offer the potential for crisis/conflict involving critical U.S. interests at any time. As our overseas forces and forward operating locations decline, flexible, multipurpose forces that can operate from fewer locations and at longer ranges become increasingly important.[32]

The long-range conventional bomber is the only national force which can respond to these "hot spots" within hours—versus days for other forces. Simply launching the bomber is a conventional deterrence. The B-52, B-1, or B-2 could provide a tailored response to hit hard or delay a possible strike

while decision makers are negotiating or mobilizing other forces. Gen Michael J. Dugan, former chief of staff of the USAF, argued that the USAF may have deterred the Iraqi invasion into Kuwait if we had struck Iraqi forces early—heavy bombers would have been the only possible means of such power projection.[33]

Critics question the need of the B-2 when we have the B-52 and B-1B for dealing with low-intensity conflicts. In the last decade, sophisticated Soviet air defenses have proliferated in third-world countries. For example, F-111 bombers encountered dense air defense networks in Libya. Suppressing these defense networks and delivering the needed amount of ordnance required 100 aircraft in that attack.

Maj Mike Walker, a USAF official at Headquarters SAC, contends that, "with precision munitions and one or two tankers, three or four B-2s could have done the same job with greater effectiveness and less risk."[34] The Libya Raid required a long preparation time, and our actions were constrained by basing problems. The B-2 could have conducted this same raid from the CONUS. Conducting the raid from the CONUS would have required less preparation and could have achieved greater tactical surprise.

A B-2 strike on Libya would not have required additional air defense suppression and electronic combat sorties (flights for electronic countermeasures). With this significantly smaller number of aircraft, the USAF places fewer lives at risk.

Critics have said we don't need a B-2 for a Libya-type raid since we could use conventional cruise missiles in high-threat areas. These same critics also proclaim that we should not buy more than 15 B-2s, and that 15 would be enough for conventional conflicts.[35] When considering this small number of B-2s, we must remember the lessons of history in Vietnam during Linebacker II and Khe Sanh. In these missions, B-52s dropped over 90,000 tons of bombs. A USAF study points out the following:

> Assuming cruise missiles could carry one ton warheads and a conservative cost estimate of one million dollars per missile, those two operations alone would have cost over $90 billion—with no reusable assets! We committed over 200 front line B-52s to the LINEBACKER II operation because the size of the bomber force at the time meant that 200 more B-52s were available for nuclear deterrence. When B-52s eventually retire, fifteen B-2s and less than one hundred B-1Bs would hardly allow that flexibility.[36]

Another political argument against the B-2 is, Would we risk the B-2s against a second-rate power? The USAF and SAC respond to the critics:

> We have always opted to use the most effective weapon system for the task at hand. That is why we committed one half of our front line nuclear B-52s in Viet Nam. That is why we routinely flew the SR-71—the most expensive aircraft of its time—into "harm's way." And that is why we committed our most advanced and most expensive fighters—F-117s—to Desert Shield.[37]

Operation Desert Storm provides us with the most recent use of heavy bombers. The lessons learned there apply to future applications of the B-2 as a conventional aircraft.

Stealth and the Conventional Bomber Validated in Iraq

Desert Storm, the conflict with Iraq in 1991, provided two important lessons concerning the B-2 and heavy bombers. The first lesson is that stealth works as advertised and the second is that heavy bombers with large payloads will continue to be important in large conventional operations—just as they were in operations like Linebacker II.

The F-117 fighter-bombers were employed against Scud missiles, hardened aircraft shelters, and command and control sites, which were critical to Iraq's Soviet-style air defense. It is impossible at this time to determine if any F-117s were detected by Iraqi radar, but we do know that all of the F-117s hit their targets and suffered no losses. The F-117 was developed with an earlier generation of stealth technology than the B-2. Gen Norman Schwarzkopf, the commander of Desert Storm, highly praised the F-117 for its stealthiness and effectiveness. General Schwarzkopf predicted that the B-2 with its more advanced stealth technology will work even better.[38]

Just like in Vietnam's Linebacker II, the heavy bomber with the large payload is still a war-winning instrument today. Because the allied air forces neutralized the Iraqi air defenses early in the war, the B-52 was able to strike against dug-in and fortified ground forces in Kuwait. Planners risked the heavy bomber early, and this fact suggests the importance of heavy firepower. The tactic was straightforward—to use the heavy firepower of the B-52 to save the lives of allied troops on the ground.[39] From all accounts, air power worked. The US lost less than 150 lives in actual combat, an unbelievable amount considering the size of the operation.

The B-2 would have been more effective than the B-52. The B-2 can carry roughly one and one-half times the payload of the B-52. Also, the B-2 would not have to rely on defense suppression and extensive electronic warfare. The B-2, much like the F-117, would be able to strike its target with little or no resistance because it would be virtually undetected by enemy defenses.

B-2 Complements Cruise Missiles. After Desert Storm, critics of the B-2 examined the success of the Tomahawk cruise missile in Iraq and declared that the B-2 could be replaced by the Tomahawk, the Navy's conventional cruise missile. The cruise missiles were no doubt valuable, but they could not perform all of the missions of bombers.

First, bombers are recallable, and this tactic was effective in Desert Storm. Many bombers and aircraft returned to their bases with bombs still on board. The fliers were instructed by their commanders not to drop bombs unless they were absolutely sure of their targets. This tactic saved sacred and other political targets and prevented unnecessary civilian casualties. The cruise missile could not have made this last-minute decision and could not have been recalled.

Besides not being recallable, cruise missiles are also not effective against mobile targets. Scud mobile missiles and their launchers proved challeng-

ing for the allied forces in Desert Storm. Because these launchers would "shoot and scoot" (launch missiles and then relocate to avoid US aircraft), the manned aircraft was the only way to destroy them.

Cruise missile warheads cannot destroy all targets. Some targets like bunkers, bridges, and aircraft shelters could not have been destroyed by the lightweight warheads of the cruise missile. These targets may require a 2,000-pound warhead (the Tomahawk carries a 1,000-pound warhead). The Tomahawk is also limited in range. If Iraq had invaded Saudi Arabia, many targets in Saudi Arabia would have been out of range for the Tomahawk.

Another limitation of the cruise missile is cost. Cruise missiles are costly at $1.0 to $1.5 million each. Some of the targets in Iraq were rebuilt or reopened, and these targets required restrikes. Not only do the iron bombs dropped from the B-52 and other aircraft cost thousands of dollars less, but there are not enough cruise missiles in the inventory to strike all of the targets.

In addition, targeting cruise missiles is complicated and expensive. The Defense Mapping Agency must create a digital map for each Tomahawk target. This map is required for the smart missile to find its target.

Therefore, replacing the bomber with cruise missiles is not a simple matter. We would have to spend millions of dollars in developing bigger warheads, new cruise missiles, and new ship designs for sea launches, as well as in making major aircraft modifications. This would be very costly overall, and missions to destroy Scuds and other mobile targets cannot be accomplished with conventional cruise missiles.[40]

B-2 Conventional Capabilities

The next discussion focuses on specific conventional capabilities of the B-2. The study first evaluates conventional capabilities in terms of stealth capabilities, payload, power projection, and high-altitude capability.

Stealth and Conventional Conflicts. To adequately examine the technical details of stealth technology would require a study of its own. It is important to generally understand the significance of stealth in a conventional application. To put this in perspective, the USAF contends that the B-1B has a radar cross section one one-hundredth that of the B-52 and that the B-2's RCS is one-tenth that of a B-1B. As a result, the B-2 would appear like a bird on the enemy's radar screen.[41]

Congressional critics who argue against buying the costly B-2 for conventional application say that a stealth bomber is not required for low-intensity conflicts. These congressmen further state that third-world countries do not have sophisticated air defense systems. However, this may not be true, according to Donald B. Rice, the secretary of the Air Force.

> Combat operations in the last decade have demonstrated the potential implications of the increasing spread of advanced technology weapons. U.S. airstrikes against Lebanon and Libya, for example, confronted dense air defense networks requiring sophisticated attack tactics and electronic countermeasures. Modern surface-to-air

> missiles, radar networks, and fighter aircraft are increasing in numbers and capabilities. For example, even when excluding the United States, the Soviet Union, China, and the nations of NATO and the Warsaw Pact, a count reveals over 9,000 tactical fighters and over 6,000 missile launchers (not to include hand held systems) deployed around the world. An increasing number of these are first-rate systems, such as the MIG-29 Fulcrum.[42]

Given that stealth technology is valid for bomber penetration in the rapidly arming third world, it is important to understand how stealth works. Stealth is a generic term applied to a group of technologies sometimes referred to as "low observables." The B-2 is the only aircraft designed with stealth features in all avenues. It utilizes stealth technology in these characteristics: RCS, infrared profile (difficult for enemy to detect by infrared sensors), visual (low-profile visually), acoustic (embedded engines to muffle noise), and electronic emissions. Out of all these technologies, RCS gives the B-2 most of its low-observable characteristics.

Stealth does not make the aircraft invisible. Even though not totally invisible, the USAF says that, "the B-2 will virtually negate the multi-million dollar investment that the Soviet Union has made in its air defense network. Now and in the forecastable future, the B-2 will be able to operate with near impunity in any conceivable threat environment."[43] Stealth technology will allow the bomber to open holes in previously impenetrable walls of air defense. Sometimes an enemy radar can momentarily detect a B-2 if it is *flown close enough to the radar.* However, field tests, extensive calculations, and computer models have shown that the bomber's penetration and survivability is not threatened by these "fleeting detections."[44] The enemy radar must lock onto the B-2 in order for the enemy to shoot it down.

The USAF's testing centers, which have taken on an active role in trying to develop a "counterstealth" technology, have failed to do so.

> The Air Force and Department of Defense have worked assiduously to identify weaknesses in the stealth approach that could be exploited by a potential foe. This has included undertaking an extensive, independent "counter-stealth" team effort, supported by highly qualified engineers and scientists investigating all means for countering stealth technologies. The goal has been to find the "Achilles' heel" which would negate the value of these technologies. Both conventional and unconventional defense systems have been explored; in the latter area, over 40 different concepts proposed to defeat stealth have been evaluated—and none have proven viable challenges to stealth.[45]

Air Force spokesmen and engineers have said that no other military technology in recent times has remained so exclusively the province of one nation. This breakthrough is significant in a conventional conflict.

The B-2 is capable of dramatically changing the nature of the battlefield. The effectiveness of stealth technology is already proven by the use of the F-117 in the war against Iraq. Just like the F-117, the B-2 can cripple the enemies' efforts to detect, identify, engage, and destroy our forces. The B-2 can do it with much more firepower than a stealth fighter.

According to Air Staff, the B-2 will provide six key elements in a conventional war. It

- provides the capability to conduct operations against the source of the enemy's strength,
- renders the enemy's investment in defense ineffective,
- prevents the enemy from reacting effectively to an attack,
- provides the key element of surprise,
- allows the US to choose time and place of attack, and
- acts as a force multiplier—the B-2 goes in early and destroys the enemy's defenses, allowing other less sophisticated aircraft like the B-52 to follow up with bombing.[46]

Gen Merrill McPeak, the Air Force chief of staff, emphasized the benefits of stealth technology in an Air Staff briefing. "There is a sense that the F-117, the ATF, and the B-2 render all other air forces obsolete."[47]

B-2 Conventional Payload. The B-2 has an impressive conventional payload capability—over one and one-half times that of the B-52. For example, a B-2 could carry 80 Mk 82 (500-pound bombs) inside the bomb bay as opposed to the B-52G/H's ability to carry 51 500-pound bombs, 27 in the bomb bay and 24 externally.

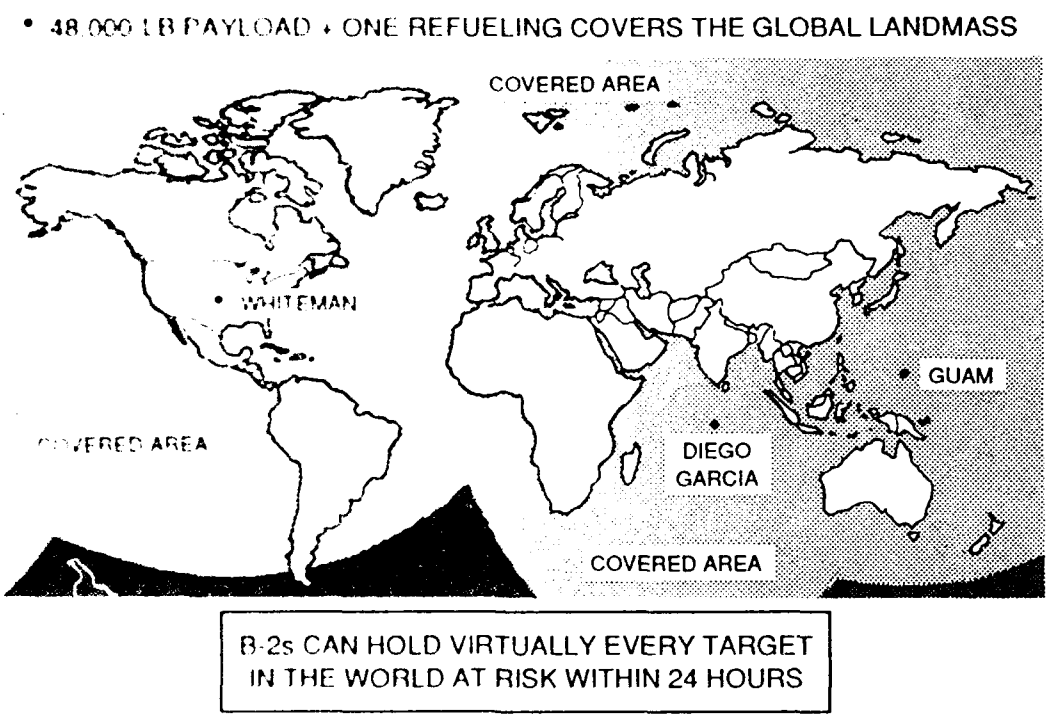
Unlike the B-1B, the B-2 will be programmed to carry a variety of both gravity and conventional standoff weapons. This means that the B-2 can bomb, mine, and launch virtually all the current B-52 weapons in the inventory. In addition, the generic conventional Mil Standard 1760 interface built-in feature allows for future growth of new weapons without costly modifications.

As a result, the B-2 will be able to accomplish everything from accurate surgical attacks to massive ordnance delivery. Because the B-2 carries a higher payload and delivers it more accurately than the B-52, the B-2 will require less than one-half the sorties and one-third fewer bombs than the B-52 to accomplish the same level of damage. The B-2 combines the survivability of the F-117 with the greater payload and range of the B-52—the best of both worlds.[48]

Power Projection Potential and Mobility. With over one and one-half times the payload of a B-52 (approximately 48,000 pounds) the B-2 can strike anywhere in the world if stationed at only three bases. This capability would require only one air refueling (fig. 3).[49]

Another capability of power projection becomes evident when we compare the B-2 to the weapons systems of other services. Eight B-2s could match the daily ordnance delivery of an entire carrier air wing. This is not to say that the B-2 would replace the carrier wing. Instead, B-2s would deliver firepower early in the conflict while the carrier air wing is still steaming to the conflict. Once the carrier air wing had arrived, the B-2 would complement naval air power.[50]

The B-2 was designed with power projection and flexibility in mind. In addition to operating from the CONUS, it can easily deploy to several



Source: "B-2 Stealth Bomber," USAF Air Staff briefing, 28 February 1991.

Figure 3. B-2 Conventional Capability: Worldwide Force Projection Capability

forward operating bases. The B-2's "track," or landing gear, is only 40 feet wide; therefore, it can take off and land at any airfield that can accommodate a 727 commercial airliner. Its short takeoff and landing characteristics allow the B-2 to access over 700 airfields in the US and even more worldwide.[51]

The B-2—Out of Harm's Way at High Altitude. Another unique feature that not all planners consider when discussing the B-2 in a conventional role is its ability to fly undetected at high altitude. Unlike the B-52 and B-1B, the B-2 would not have to fly at low level to enter enemy airspace. Rather, the B-2 could fly at a high altitude and would not be vulnerable to the surface-to-air missiles. The SAMs are the chief threat to penetrating bombers that are not stealthy. Even more important is the antiaircraft artillery threat to bombers at a low altitude. For example, a B-52 or B-1B bomber could use state-of-the-art electronic countermeasures to avoid and jam SAM systems and still be shot down by World War II–vintage AAA.

The AAA threat avoidance was one of the chief lessons learned in the Gulf war of 1991. B-52 bombers initially flew at low levels to deliver conventional bombs. In this environment, the AAA threat was very real. However, when the tactic was changed to high-level flying, there was very little threat from AAA. Nevertheless, in this scenario there could still be a possibility of being shot down by a SAM—in Iraq the SAM threat was significantly reduced by

previous defense suppression sorties by USAF fighters. This lesson is even more applicable to the B-2 because the stealth bomber would be virtually undetected by the SAMs, and it could fly high enough to avoid the AAA threat.

The B-2 Is Great but Can We Afford It: Cost Perspective

Few would argue against the B-2 as being a tremendous conventional bomber. Those who oppose the B-2 question its high cost. Skeptics believe we don't need the B-2 in the wake of a declining perception of the Soviet threat and in light of increasing pressure from deficit and domestic spending priorities.[52]

To address whether the US can afford the B-2, the Center for Security Policy convened a senior-level, roundtable discussion on 26 February 1990. The group consisted of 33 knowledgeable individuals from the government, the private sector, the press, and members of Congress who opposed the B-2 as well as Department of Defense officials who favored it. The meeting pointed out several often overlooked considerations in the budgetary impact of the B-2.

In the first place, strategic systems are a mere 13 percent of the overall defense budget. The B-2 will cost just 15 percent of this strategic account over time. This is approximately the proportion of the account that is historically allocated to the manned bomber.

Second, an MX-delivered warhead costs two times as much as one delivered by the B-2. As noted previously, missiles do not have the flexibility of the bomber force.

Further, B-2 funding analysts refer to the money already spent in the development of the B-2 as "sunk costs." This money would be wasted if the full complement of 75 B-2s are not funded. Moreover, if the program is canceled completely, taxpayers would pay large sums of money in termination and breach of contract costs.

The General Accounting Office recommends a slowdown in the B-2 production schedule. This would greatly increase unit costs because of the impact on contractors' work forces and existing contracts. This action would probably make the B-2 unaffordable.

The final overlooked consideration is maintenance and operating costs of the B-2. The B-2 is cheaper to operate than the aircraft it replaces because of low maintenance requirements and a small (two-man) crew.[53]

As the debate for the B-2 continues, we do know certain facts. First, $30 billion has already been committed to the B-2. This is almost one-half of the total program of $62.8 billion. If Congress decides to cancel the program and to complete flight testing and production of only those under contract, it would cost another $6.0 billion. As a result, the USAF would get only 15 aircraft for a total cost of $36.4 billion, a very limited combat capability. The current proposal is for the USAF to acquire a total of 75 B-2s. This

means an additional 60 aircraft for two wings, and the cost would be $25.7 billion. This may seem expensive, but there are at least seven other defense programs more expensive than the B-2.

Conclusions and Summary

The USAF and the Department of Defense strongly support the B-2, and these agencies point out that the B-2 is a cost-effective force multiplier. These agencies cite the following reasons:

- The value of a B-2 is not measured solely in dollars but in it's overall contribution to national security for the next 40 years.
- The B-2 represents up-front investment already made in stealth technology and continues the technology lead that is evident from the Gulf war.
- In an austere budget environment, the B-2 will be the centerpiece of a smaller, smarter, more capable force.[54]

The value of the B-2 and the deterrence it provides, especially in the conventional arena, are difficult to measure. It is important to assess these values when contemplating the worth of the B-2. Secretary of Defense Dick Cheney says, "We have invested a huge amount in the B-2 already, we are at the stage now where we can begin to reap the benefits of that investment and we want to go forward with the 75 planes."[55]

Notes

1. Secretary of the Air Force Donald B. Rice, *The Air Force and U.S. National Security: Global Reach—Global Power*, white paper (Washington, D.C.: Department of the Air Force, June 1990), 4.
2. Lt Col Paul J. Frichtl, "Limitations of Conventional Role of the B-1B in the European Theater," Research Study (Maxwell AFB, Ala.: Air War College, 1989), 1.
3. Nick Kotz, *Wild Blue Yonder: Money, Politics and the B-1 Bomber* (New York: Pantheon Books, 1988), 131.
4. Ibid., 132.
5. Frichtl, 1.
6. Lt Col Howard J. Mitchell, "The Strategic Bomber Force," Naval War College Research Study (Newport, R.I.: Naval War College, 1989), 5.
7. Frichtl, 2.
8. Ibid., 3.
9. Ibid., 3, 4.
10. *Soviet Military Power: An Assessment of the Threat 1988*, 7th ed. (Washington, D.C.: Government Printing Office, April 1988), 82.
11. James T. Hansen, "The Development of Soviet Tactical Air Defenses," *International Defense Review*, May 1987, 23–27.
12. Ibid., 26.
13. Ibid., 27.
14. Lt Gen John M. Loh, "B-1B Meets, Exceeds Defense Capabilities," *Dayton Daily News*, 26 November 1989, 16.
15. Frichtl, 6.
16. "Test Drive," *Air Force Times*, 26 November 1989, 16.

17. Frichtl, 7.
18. "Test Drive," 7.
19. Frichtl, 8.
20. Ibid.
21. Ibid.
22. Ibid.
23. "Strategic Bomber Combat Range," a SAC unpublished matrix, 1990.
24. SAC Technical Order 1B-1B-34-2-1, *Aircrew Weapons Delivery Manual (Nonnuclear) Description and Procedures*, 15 May 1985.
25. Staff study to provide SAC/XP additional information concerning the integration of conventional weapons on the B-1B for Colonel Graves, 30 October 1985.
26. Frichtl, 11.
27. Ibid., 13.
28. Ronald E. Sawyer, "Bombers in the Conventional Role," General Research Corporation Study 1538-02-88-TR (McLean, Va.: General Research Corp., February 1988), 141.
29. Frichtl, 17.
30. Ibid., 20.
31. Ibid., 21.
32. "USAF B-2 Bomber Fact Book," 14 September 1990, a summary of B-2 facts, tab 4.
33. Gen Michael J. Dugan, a response to Congressman Les Aspin (D-Wis.), Spring 1991.
34. "Background Paper on B-2 Bomber," unpublished facts by Headquarters SAC/XRYA, 29 June 1989, 2.
35. The actual number of usable B-2s would be 12. The USAF would use three B-2s for testing, training, and spare parts.
36. "USAF B-2 Bomber Fact Book," tab 4.
37. Ibid.
38. Bob Helm, "B-2 Update," *Northrop Corporation Newsletter* 2, no. 1 (8 February 1991): 2.
39. Ibid.
40. Ibid.
41. Tim Cole, "Irresistible Force," *Popular Mechanics*, October 1989, 61.
42. Secretary of the Air Force Donald B. Rice, "Why We Need the B-2," *Air Force Policy Letter for Commanders*, September 1990, 3.
43. "USAF B-2 Bomber Fact Book," tab 9, 12.
44. Ibid., tab 9, 13.
45. Ibid.
46. "B-2 Advanced Technology Bomber," a Northrop Corporation briefing developed for the USAF, 8 August 1989.
47. Ibid., 8.
48. Ibid.
49. Ibid.
50. "USAF B-2 Bomber Fact Book," tab 1.
51. "B-2 Advanced Technology Bomber."
52. The Center for Security Policy, "Summary of High Level Discussion of the B-2" (Washington, D.C.: n.p., 1990), 5.
53. Ibid., 5, 6.
54. "B-2 Stealth Bomber," USAF briefing to Congress, 28 February 1991.
55. Ibid., 15.

Chapter 6

Standoff Weapons and the Conventional Bomber Force

Weapons that can be delivered effectively from outside or on the fringe of the lethal envelope of ground defenses can greatly increase flexibility and significantly reduce the risk of attrition. Technology can provide us an excellent weapon to do that job—the long-range standoff weapon.

—Gen Curtis E. LeMay

Whether we will acquire the full complement of 75 planned B-2s is uncertain, and the conventional capability of the B-1 is still under development. But we are certain that standoff smart weapons will be used in future conflicts. Planners should consider smart weapons as the conventional bomber force is modified. This is not to say that all conflicts should be fought 100 percent with standoff weapons. Instead, the force of conventional bombers probably should contain elements of both gravity bombs and standoff weapons.

This chapter considers: (1) lessons learned from standoff weapons in the Gulf war, (2) advantages and disadvantages of standoff weapons, (3) present capability of the conventional bomber force, and (4) the flexibility of standoff weapons in future conflicts.

Standoff Weapons in the Gulf War

In the 1991 Gulf war, US warships in the Persian Gulf launched salvos of Tomahawk cruise missiles. This was the first time that the weapon had been used in an actual conflict. The Tomahawk worked so well that planners were pleasantly surprised—98 percent of the launched missiles hit their targets in the battle's early hours. Even though the Tomahawk missiles were launched from ships during the Gulf war, the conventional bomber could launch similar missiles from the air.

The Tomahawk cruise missile was designed to hug the ground to avoid radar and antiaircraft fire. Alan P. Capps described the capability of the Tomahawk in *Defense and Diplomacy*:

> The speeding bundles of electronics and explosives had a devastating impact against fixed Iraqi targets. Airfields, power stations, SAM and radar sites, and command and control bunkers were blasted by these warheads in the battle's first hours. Of the first 52 cruise missiles triggered, 51 struck their targets.[1]

Capps also affirms the following advantages of cruise missiles in the Gulf war:

- Before cruise missiles and other high tech "it would have been impossible to isolate targets so precisely that mosques, hospitals, schools, and civilian headquarters could be spared."
- Before the high-tech weapon and smart weapons like the cruise missile, "such a strike would have destroyed much of Baghdad." Even in Vietnam, "the Rolling Thunder campaign killed an estimated 52,000 untargeted Vietnamese civilians."
- In Iraq the enemy claimed "two score dead." If high-tech weapons and Tomahawks had not been used, thousands of Iraq's people, both civilian and military, would have perished.
- "The chief benefit [of standoff weapons is that] expensive aircraft, and more importantly pilots need not be risked against tough targets. A cruise missile costs $1 million but a warplane can cost 100 times that, [and] the life of a pilot is beyond price."[2]

As easily discerned from the Gulf war, the development of cruise missiles has significantly changed our conventional war-fighting tactics. Cruise missiles can now hit precise targets up to 700 miles away.[3] The missiles can be launched from ships, bombers, submarines, and even from ground-based units.

Advantages of Standoff Weapons in the Conventional Bomber Force

In the same manner that Tomahawks were used by the Navy in the Gulf war, standoff weapons on conventional bombers offer unique advantages. This study addresses these benefits in the areas of political, military, cost-effectiveness, and multiservice advantages.

Political Advantages

Cruise missiles launched from bombers could avoid the killing of thousands of people, both civilian and military. Yet the missiles could inflict assured destruction on military, industrial, and transportation assets.[4]

While the standoff weapon is striking enemy targets, it is also preventing loss of lives. For example, bombers equipped with standoff missiles can execute retaliatory attacks against state-sponsored terrorism with little risk of aircrew losses or downed US aircrews becoming hostages. Standoff weapons could be used to attack military targets and not cause civilian casualties or collateral damage. This scenario would help to prevent international condemnation.[5]

Besides a response to terrorism, the standoff weapon also saves lives in other US services. Since the American public is reluctant to accept high US casualties, the standoff weapon offers a way to deliver large doses of

conventional firepower without subjecting the US soldier to the "killing fields."

Another political benefit occurs when bombers equipped with standoff weapons act as a show of force. If hostilities were expected, the National Command Authorities could launch the conventional long-range bomber force on a reconnaisance-strike mission. The US could warn the aggressor that if forces pursued hostile activity, then the bomber force would intervene. The bombers could monitor assembly areas, choke points, border lines, and shipping lanes while remaining outside enemy territory. If the enemy violates the ultimatum, the bomber force could hold the enemy at bay until other forces arrive.[6]

Military Advantages

To add to the political benefits, standoff weapons also offer several military advantages. A bomber can carry a large payload—approximately 12 to 20 standoff weapons. The bomber could deliver them to almost any place on earth within 24–48 hours.[7] In addition, when a bomber has cruise missiles or standoff weapons, the fighter's accuracy advantage over the bomber disappears. Also, the bomber can carry several times the payload of the fighter, and can loiter in the area and select multiple targets.[8]

Further, standoff weapons are very effective against mobile targets such as light vehicles, mobile missile sites, and mobile command posts. In the Gulf war the US used standoff weapons to destroy mobile Scud missiles and launchers. Since gravity weapons have inherent errors, they are not consistently accurate enough for mobile targets which require zero margins of error.[9]

To add to the mobile missile capability, standoff missiles are important in the early stages of war. They could be targeted against fixed transportation nodes (bridges, railways, etc.) used by advancing forces. This early "choke-point" war could slow down rapidly advancing forces. Robert R. Bowie of the Central Intelligence Agency points out that such weapons "would frustrate the rapid movement implicit to Soviet Doctrine."[10]

Standoff weapons have proven themselves in recent and past conflicts. In the Gulf war, a small force of about 50 B-52s dropped over 25,000 tons of bombs, about one-half of the total USAF bombs dropped. This large carrying capacity also applies to bombers carrying standoff weapons.[11]

Standoff precision weapons also proved themselves in Vietnam. The USAF attempted to destroy the Thanh Hoa Bridge with 871 sorties using dumb bombs—11 aircraft went down from enemy fire. In May 1972, four flights (approximately 16 sorties) of F-4s destroyed one span of the bridge and caused other critical damage with guided standoff munitions.[12]

Standoff weapons are advantageous in the military training environment as well. In many cases, aircrew training for standoff weapons is not nearly as demanding as training aircrews for the penetrating gravity bomb role. For example, the checklists for launching an air-to-ground missile like the

short-range attack missile is relatively simple compared to the numerous checklists of low- and high-level bombing procedures.

Cost-Effectiveness and Force Multiplier Advantages

Advanced high-tech standoff weapons can act as a force multiplier to provide the maximum war-fighting potential from the smaller forces of the future.[13] If we attack a target today with dumb bombs, we can generally expect one "target kill" per pass. To achieve more kills, you need to overfly the target more times. Point bombing without standoff or smart weapons is probably wasteful. Sometimes a B-52 will drop 51 bombs to kill a point target. This is wasting the other 50 bombs and the area bombing ability of the B-52. If a bomber is equipped with several standoff weapons, the bomber can achieve multiple kills—as opposed to one kill with gravity dumb bombs.[14]

Some critics oppose the standoff missile because of its price tag. For example, Tomahawk missiles cost $1 million each. However, if you commit an aircraft to strike a target, you are risking a more valuable asset—a new F-15 fighter costs about $50 million and a B-1 bomber costs even more.[15]

Proliferation of sophisticated weapons like the Sidewinder air-to-air missiles have made several third-world countries a threat to a penetrating bomber. The standoff missile saves us from putting the bomber in harms way.[16]

Furthermore, standoff weapons add new life to old systems. The B-52 is considered to be on the verge of obsolescence, but the standoff missile or weapon gives it new life. These standoff weapons can outmaneuver even the most advanced fighter and strike targets hundreds of miles away with an accuracy of 30 feet or less.[17] At the same time that a standoff weapon adds life to old systems, it also allows the bomber to conserve great amounts of fuel. A penetrating bomber is fuel-thirsty. If the bomber only has to remain at a low altitude for a short time to launch standoff weapons, then it needs less air refueling, and its range and power projection is increased.

Complementing Other Services: An Advantage

Bombers equipped with standoff weapons could provide close air support (CAS) for the army. A bomber could orbit behind the front line and deliver laser guided munitions. The unit on the ground could identify and illuminate the target, and the bomber would deliver the precise weapon.[18] The bomber could loiter for an extended period of time with a large payload. A single bomber could attack several targets, and a relay system of employment could allow the bomber to provide CAS for days.[19] A Boeing study further demonstrated the effectiveness of standoff weapons. According to the study, if B-52s with standoff weapons were used to augment other US forces in a North Korean attack, the standoff missiles could destroy 30 percent of the second and third echelon units.[20]

Disadvantages of Standoff Weapons in the Conventional Bomber Force

Standoff weapons are not a panacea for all future conventional conflicts. Standoff weapons offer advantages, but in some cases, dumb bombs are the best weapons. Colonel Keaney is quick to point out the limitations.

> First, they are not infallible, or invulnerable, or foolproof. Second, they are efficient for only certain targets (usually point targets); for many targets, gravity high-explosive bombs ("dumb" bombs as opposed to "smart" bombs) will continue to be the optimal weapons. Finally, the relatively high cost and limited quantities available [of standoff weapons] demand a selective use of them.[21]

In the first two weeks of the Gulf war, about 260 standoff cruise missiles were launched. Some planners have suggested that these systems should replace the B-2 as well as other bombers and strike aircraft. The cruise missiles demonstrated outstanding kill capability in the Gulf war, but they cannot perform all the functions of bombers and other aircraft equipped with standoff weapons.[22] Bob Helm also does not agree with an all-standoff force, and he gives the following advice:

> [Using an all-standoff force], therefore, is more complex than just buying more existing missiles. Heavier explosives and special warheads, for example, mean new cruise missile programs with bigger engines and larger airframes. This in turn means new aircraft programs. These new initiatives are not cheap, and for some missions (e.g., searching for SCUDs) will still not replace the role of manned aircraft.[23]

The military planner should also consider other disadvantages of the standoff weapons. Standoff precise weapons and precision guided munitions (PGM) are decidedly lethal to structures and targets at the aim point; however, they cannot lay waste to large areas. In the Gulf war, sometimes a smart standoff weapon would hit the center of several Scud (mobile missile) transporters parked in a row. The standoff weapon would obliterate the center mobile launcher, but the launchers on the outside drove away, unharmed.[24] As the standoff weapon is limited against some targets, it is also costly.

High-tech standoff weapons are expensive; therefore, the planner cannot expend a million dollar missile on a mere $20,000 truck or other low-value target.[25] In a lowly defended environment, the dumb bombs can achieve the same objectives as the standoff weapons for a fraction of the cost. For example, B-52s in the Gulf war, equipped with the global positioning system, dropped dumb bombs with impressive accuracy without relying on high-tech standoff weapons.

Range limitations also present a problem. The conventional standoff missile cannot be targeted against "deep" enemy targets. At the standoff ranges where we would expect to launch missiles from bombers, not all the targets that a penetrating bomber can attack can be reached. At the same time, standoff weapons (long range) are vulnerable to mobile defensive threats. Programmers select the routes of long-range standoff missiles based on the best threat information available. This information could be

6 to 12 months old. Therefore, they may not be able to plan for mobile threats, which move every few weeks. In this scenario, only the fixed defensive installations are avoided—thus, the standoff missile is vulnerable to the mobile threats.[26]

The standoff weapon has proven its worth in the Gulf war and other conflicts. In retrospect, the standoff smart weapon is not the answer for all situations, but for some situations it should be the only choice.

Present Standoff Capability—Endless Potential but Limited Development

Various studies, as well as the recent Gulf war, have proven the value of standoff weapons, but the USAF has not stressed the development and employment of conventional bomber standoff weapons. At present the conventional bomber force has only two operational standoff weapons, the Harpoon (previously discussed in the maritime role) and the Have Nap.

Have Nap

Have Nap, an Israeli-developed standoff missile, is not yet fully operational in the B-52G force. Only a very small number of B-52s are modified for the Have Nap—the Air Force would like to modify the entire fleet of B-52Gs. The modification would not be extensive and could be accomplished in the field without depot work.

The Air Force completed initial testing of the weapon in May 1990. The test results were convincing—the standoff weapon scored seven direct hits while being launched from B-52G bombers.[27]

Israel originally produced the missile in 1983, and Rafael of Israel currently produces the missile for the USAF. Rafael's US partner, Martin Marietta, builds its airframe components. The Air Force received 14 missiles and used eight for testing. The Air Force also signed a contract with Rafael in November 1989 for another 86 missiles and four control pods at a cost of $92 million. Delivery will be from 20 October 1990 through early 1995.[28] Strategic Air Command calls for as many as 1,000 additional missiles, but this amount may not be funded due to budget constraints.

Have Nap Specifications

The Have Nap missile is 190 inches long, 20 inches in diameter, and weighs about 3,000 pounds. It is capable of both day and night launches because it can be equipped with a high resolution television for day or imaging infrared seeker for night. Have Nap was designed for precise or point targets such as mobile missiles and command, control, and communications centers. The US Air Force is also developing the I-800 warhead for penetrating hard targets. In addition, Martin Marietta is develop-

ing additional modular warheads. John D. Morrocco characterized its inertial guidance system in *Aviation Week & Space Technology*.

> The B-52's Weapon System Officer [WSO] can program up to 20 different targets employing longitude and latitude coordinates. The missile flies on inertial guidance and can be guided to the target manually over the terminal portion of flight by a stick controller. The WSO can also employ the missile's seeker to scan for targets of opportunity. Imagery is transmitted to the aircraft via a secure, jam-resistant data-link antenna mounted in a radome at the rear of the missile.[29]

A B-52G conventional bomber is capable of carrying three Have Naps on outboard pylons along with one missile control pod for a total of seven on each B-52. In addition, one aircraft could carry and launch a maximum of eight (four on each pylon) if they are controlled by another aircraft equipped with a missile control pod.[30]

Conclusion—Standoff Weapons Are Vital

It is easy to see the value of standoff weapons, and at the same time it is puzzling as to why the USAF has not placed these weapons at a higher priority for conventional bombers. It is also disheartening to know that the USAF has not pushed for interoperability with the weapons of tactical aircraft. In other words, the conventional bomber force should standardize standoff weapons with the tactical air forces. This would allow the conventional bomber to function conventionally worldwide and would delete the requirement for individual bomber specific provisioning and munition logistic support.[31]

There is a plan to standardize the AGM-130, another standoff missile, between tactical aircraft and conventional bombers. However, this concept is still under development.

To reiterate, standoff munitions should not be used in all situations, but they are the obvious choice as a force multiplier in some. As the lessons of the Gulf war are still fresh on our minds, perhaps we should not forget how well standoff weapons contributed to the US's winning effort. These weapons should definitely be a part of the conventional bomber force.

Notes

1. Alan P. Capps, "The High-Tech War," *Defense and Diplomacy*, March/April 1991, 7.
2. Ibid.
3. Ibid.
4. Carl H. Builder, *The Prospects and Implications of Non-nuclear Means for Strategic Conflict* (London: International Institute for Strategic Studies, 1985), 3.
5. Stephen T. Hosmer and Glen A. Kent, *The Military and Political Potential of Conventionally Armed Heavy Bombers*, Rand Report R-3508-AF (Santa Monica, Calif.: Rand Corp., August 1987), 15.
6. Lt Col David J. Dean, ed., *Low-Intensity Conflict and Modern Technology* (Maxwell AFB, Ala.: Air University Press, June 1986), 147.

7. Ronald E. Sawyer, "Bombers in the Conventional Role," General Research Corporation Study (McLean, Va.: General Research Corp., 1988), 73.

8. Col Thomas A. Keaney, *Strategic Bombers and Conventional Weapons* (Washington, D.C.: National Defense University Press, 1984), 53.

9. Maj David R. Honeywell, "The Role of the B-52 in Force Projection for 1980s and 1990s," Research Study (Maxwell AFB, Ala.: Air Command and Staff College, 1984), 10–11.

10. Maj James R. Thomits, "Capabilities and Applications of a Dedicated Conventional Bomber Force in 1991," Research Study (Maxwell AFB, Ala.: Air Command and Staff College, 1988), 24.

11. Speech by Gen George Butler, commander in chief, SAC, to Air Force Association in Omaha, Nebraska, 7 March 1991.

12. Kenneth P. Werrell, "Linebacker II," *Air University Review* 38, no. 2 (January-March 1987): 51.

13. Secretary of the Air Force Donald B. Rice, *The Air Force and U.S. National Security: Global Reach—Global Power*, white paper (Washington, D.C.: Department of the Air Force, June 1990), 3.

14. Lt Col James D. Harford, "B-52 Aircraft on the Central Front," US Army War College Study (Carlisle Barracks, Pa.: US Army War College, 21 March 1989), 20.

15. Maj Grover E. Myers, *Aerospace Power: The Case for Indivisible Application* (Maxwell AFB, Ala.: Air University Press, September 1986), 30.

16. Ibid.

17. Ibid., 31.

18. Maj Gregory J. Berlan, *Forward Offense: Preparing the B-52 for Conventional Warfare* (Maxwell AFB, Ala.: Air University Press, February 1989), 15.

19. Ibid.

20. Keaney, 58.

21. Ibid., 53.

22. Bob Helm, "B-2 Update," *Northrop Corporation Newsletter* 2, no. 1 (8 February 1991): 2.

23. Ibid.

24. Gregg Easterbrook, "High Tech Isn't Everything," *Newsweek*, 18 February 1991, 49.

25. Sawyer, 73.

26. Briefing, Headquarters USAF/PRPJM, subject: "A Standoff Cruise Missile Force: Tried and Failed," 21 May 1990, 2-2.

27. John D. Morrocco, "Have Nap Offers Stand-Off Capability for B-52s in Mideast," *Aviation Week & Space Technology*, 3 September 1990, 35.

28. Ibid.

29. Ibid.

30. Ibid.

31. Col Clyde E. Bodenheimer, *Impact of New Technology Weapons on SAC Conventional Air Operations* (Maxwell AFB, Ala.: Air University Press, June 1983), 67.

Chapter 7

Assessment and Recommendations

The great bomber can use weapons other than the hydrogen bomb, just as the policeman can discard his pistol for the truncheon.

—Air Vice-Marshal John C. Slessor,
Architect of British Air
Strategy in World War II

The Conventional Bomber Force

For the last 40 years this nation has focused its defense security requirements on a major conflict in Europe, between NATO and the Warsaw Pact countries. Strategic Air Command also trained and structured its conventional bomber force for the same potential conflict. The endeavor has not been in vain—NATO has not been at war since its beginning. As the Warsaw Pact threat has virtually disappeared, and the potential for third-world conflict is increasing, the purpose of this study is to examine the present conventional bomber force. As the examination unfolded, a central theme emerged: Is this force adequately organized to meet basic security needs in a rapidly changing political environment?

Past Conventional War Fighting and Exercises

The analysis began by assessing two past conflicts, Linebacker II in Vietnam and El Dorado Canyon (the Libya Raid). Linebacker II used the conventional bomber on the high end of the conflict spectrum; El Dorado used precision guided weapons.

Linebacker II. This was a definite military success as the US devastated the North Vietnamese in 729 bomber sorties. The details are in chapter two. On the other hand, some analysts argue that the operation was of limited political success.

Whether the Linebacker II bombing brought the North Vietnamese to the bargaining table is not entirely clear. The North Vietnamese did, however, have reasons to seek peace because Hanoi and Haiphong were devastated by a formidable force of conventional bombers.

El Dorado Canyon. The Libya Raid was an important example of effective conventional air power applied to the low end of the war-fighting spectrum.

Although the raid was not 100 percent effective, it was an outstanding application of "global reach" and conventional bomber air power projection.

The raid also achieved its political objective as a deterrent to terrorism. Since El Dorado Canyon, there has been a substantial decrease in Libyan terrorist activity directed at the United States.

Linebacker II and El Dorado Canyon provided examples of conventional bomber air power. Exercises like Mighty Warrior 1989 also demonstrate air power and its effective application, even if they are practice endeavors.

Mighty Warrior 1989. Because it was conducted under realistic conditions, Mighty Warrior, the largest exercise of its kind in SAC history, trained our forces well. This author confirmed the value of exercises in a Desert Storm lessons-learned conference at Eighth Air Force in April 1991. The conference attendees were intelligence specialists, operations planners, and bomber crew members who participated in Desert Storm in 1991 (the Kuwait liberation). All of the conferees agreed that Mighty Warrior exercises had prepared them well for Desert Storm. The conference attendees went on to say that out of all training experiences, the Mighty Warrior exercise was the most valuable.

The Soviet Threat and Third-World Conflicts

Chapter two evaluates the security challenges in the 1990s in terms of: (1) Are the Soviets still a significant threat?, and (2) Is the third world the most likely area of conflict in the future? Two conclusions emerged from the study of these issues.

First, Soviet policy declarations reflect changes in Soviet intentions, but the ultimate direction of Soviet change is far from clear.[1] Planners in SAC and throughout the Air Force may interpret the changes in the Soviet Union as the end of confrontation. However, the US is not yet in a position to lower its guard due to the uncertainties and should remember that the Soviets have ruled by force for 70 years. We must also consider that the Soviets continue to strengthen their military while the US is making drastic cuts.

Second, although the Soviets remain a formidable threat, the third world is probably the arena where conventional bombers would be used in the future. The Gulf war is the most recent example. Disregarding the Gulf war, 40 countries were involved in some form of low-intensity conflict in 1991. Added to this instability is the fact that the third world is continuing to arm itself with sophisticated weapons.

It is difficult to predict the exact security challenge in the years ahead, but we do know that the proliferation of chemical, biological, and nuclear weapons will continue, and threats to the interests of the US could emerge from any part of the globe. For these reasons, the long-range conventional bomber would be the only choice for projecting massive firepower in the early stages of a conflict.

Present Conventional Bomber Force

Chapter three of this study concentrates on the present capability of the conventional bomber force. That capability rests almost entirely in the B-52. The B-1B conventional capability is still under development. This chapter deals with significant issues because it addresses the question: What's wrong with the present force, considering the political changes that are taking place?

A planner weighing the conclusions must keep in mind that the conventional bomber force is going to be drastically reduced. In 1990, there were 268 bombers, and by the end of 1995, the number will be 181. A smaller force must be structured carefully and efficiently to remain a credible conventional deterrent. To maintain the edge in conventional war fighting, we must continue with present programs in some areas and adjust programs in areas that are deficient.

SAC should continue with mobility-type exercises like Mighty Force and Mighty Warrior. However, the scenario should be tailored to a high-intensity war (i.e., Gulf war) as well as a low-intensity (i.e., El Dorado Canyon) war.

Force structure also needs major changes. The dual-tasking philosophy of force structure is not efficient. A dual-tasked wing does not have the conventional mission as its number one priority; therefore, conventional readiness and training take a backseat to the SIOP. Several studies point to the need for a dedicated conventional bomber force separated from our nuclear forces.

If retirement of the B-52G requires us to pursue an alternate plan to single tasking, then dual tasking offers another plan. If all B-52Gs are retired, we are left with only one choice if we want to continue to keep the conventional capability of the B-52H. That choice is dual tasking. The dual-tasking concept may work in the remaining number of B-52Hs if the command structures the B-52H force so that conventional operations are the top priority over the SIOP. This structure will work only if alert commitments are reduced substantially so that conventional training is not degraded.

With the reduction in alert commitments, SAC should train its conventional bomber force with attrition in mind. Even a low attrition rate can be devastating to the force. At a 5 percent attrition rate and with one sortie per day per aircraft, a force of 100 bombers would be reduced to 16 after a 30-day war.

As training is modified, the conventional bomber force needs to plan and execute exercises with the Tactical Air Force. Some of the large exercises in the past have not been very well integrated with the TAF. The primary value of the conventional bomber is to augment the theater commander and the TAF. TAF forces and planners should be a part of the exercises from day one to the end. In addition, SAC should send observers to "pure" TAF exercises and vice versa. This is a much needed education process. The

Gulf war was unique in that we had six months to prepare and integrate forces—the next war may happen with only hours of preparation time.

In addition, training for special missions (Libya-type raids) should be emphasized. The low-intensity conflict is probably where bombers would be committed in the future. Along with this training, SAC should train for power projection from CONUS bases as well as forward operating locations.

As forces are trained and restructured, SAC should remember the lessons of the British in the Falklands. When the conflict erupted, the British forces were equipped and structured for a conflict in Europe. They were not ready to project a large combat force 8,000 miles. As a result, the British suffered significant casualties, and it took one month for long-range air power projection. The Falklands example applies to conventional bomber force structure because a formidable force of bombers capable of "global reach" could have impacted this conflict and saved lives and equipment.

Maritime Role of the B-52

Even with a small force of bombers devoted to conventional taskings, the maritime role is still important. This study draws the following conclusions in aerial mining, antisurface warfare, and sea surveillance.

Aerial Mining. This is the area most favorable for continued pursuit because: (1) the Navy does not have enough assets to deliver all required mines (the Navy could deliver approximately 50 percent), (2) the force is already trained for mining, and (3) no modifications to aircraft are necessary. The Navy welcomes complementary forces in this much needed area.

Antisurface Warfare. Even with only one squadron of B-52s capable of the Harpoon (antisurface) mission, the mission is still viable for complementing Navy forces. The B-52G offers unique antiship warfare advantages over the Navy: (1) the B-52 can deliver an impressive payload over long distances in a period of hours (versus days for other forces), (2) unlike a ship's cruise missiles, the B-52 is an instantly renewable asset, and (3) the B-52 acts as a force multiplier to overcome some of the Navy's limitations—complementing the Navy in launching a salvo of missiles to overcome enemy defenses.

Sea Surveillance. Sea surveillance served an important function in the past because it trained the Navy air intercept crews and located ships. Sea surveillance may have outlived most of its usefulness because of new satellite technology, but it still can serve a useful purpose in areas where satellite coverage is limited or nonexistent. The conventional bomber force should maintain this capability.

B-1B: Replacement for the B-52

The B-1B is the finest penetrating bomber in the world, but it is not effective in the conventional role because it is not outfitted properly. Bringing the B-1B up to its full potential as a conventional bomber is going to require some modifications and restructuring. Before the planner con-

siders changes, he should capitalize on the inherent capabilities of the B-1B: (1) speed, (2) low radar cross section, (3) maneuverability, (4) superb terrain following, and (5) payload. As the planner uses these superb capabilities to develop the B-1B into a conventional bomber of the future, the USAF must overcome that aircraft's limitations. The B-1B is deficient in electronic countermeasures, carriage capabilities, and range.

Conventional Limitations

The B-1B ECM system is severely limited in its threat detection and jamming ability. There is an existing CORE Program to correct these deficiencies—this program must be funded even though it may cost over $300 million.

Another limitation is the B-1B's carriage. At present, the B-1B is certified only for the Mk 82 dumb bomb. To modify the B-1 to carry other dumb bombs would be too costly in today's era of reduced defense budgets. Instead, the B-1B should maintain its present Mk 82 capability and be upgraded with the Mil Standard 1760. This relatively inexpensive upgrade allows the B-1 to interface with any new-generation weapon entering the inventory. The 1760 will give the B-1B several options for standoff smart weapons. In addition, $352.4 million is already funded. This program must continue.

Range of the B-1B is also a problem. There are several ways to overcome this deficiency without using additional funds: (1) additional refuelings, (2) load additional fuel in one or more of the bomb bays when a full conventional weapons load is not required, (3) test wing sweeps, which is currently prohibited, to save fuel, and (4) slow down the aircraft in lowly defended areas.

The B-2, the Conventional Bomber of the Future

As the command corrects the deficiencies of the B-1B, SAC must also acquire the B-2 and prepare it for its primary role, conventional operations. The B-2, even though costly, may be essential to the security of this nation in the future. The B-2 carries over one and one-half times the conventional payload of the B-52, and, with only one air refueling, the B-2s can strike anywhere in the world if they are based at only three locations. The USAF should buy at least 75 B-2s because they offer unmatched capabilities.

The B-2 is the only national asset which can respond to "hot spots" within hours virtually undetected. It can provide responses tailored to hit hard and delay the enemy strike while decision makers are negotiating or mobilizing other forces.

The US needs the B-2 because no military breakthrough in recent times has remained so exclusively the province of one nation—the stealth technology in the B-2 could even be more significant than the emergence of atomic weapons. The B-2 is capable of providing key elements and dramatically changing the conventional battlefield. The F-117 has already proven

the value of stealth (in the Gulf war). The B-2 can do the same with a much greater payload and range than a stealth fighter. This gives the theater commander four advantages: (1) the B-2 can conduct attacks against the source of the enemy's strength, (2) the stealth bomber would render the enemy's investment in defense ineffective and the enemy could not react, (3) the bomber provides the key element of surprise, and (4) the B-2 allows the US to choose the time and place of attack.

Critics argue that the B-2 should be replaced with cruise missiles, a view with which this study does not agree. The B-2 complements cruise missiles, and it possesses unique advantages that cruise missiles can't offer. For example, the cruise missile cannot make decisions just prior to hitting its target. In the Gulf war, many civilian lives were saved by last-minute "human" decisions to withhold weapons. Further, because of its range and stealthy characteristics, the B-2 may be the only aircraft capable of destroying mobile missile launchers deep in enemy territory. The B-2 also offers cost advantages over an all-cruise missile force. Cruise missiles are too costly (approximately $1 million each) to strike all targets. The B-2 with iron bombs can do it much cheaper.

The B-2: Is It Worth the Cost?

Those who oppose the B-2 argue we don't need it because the cold war is over, and there are other domestic spending priorities. This study does not agree, and chapter five explains the budgetary impact of the B-2. These figures point out that the B-2 is a cost-effective force multiplier even though expensive.

The nation must not measure the cost of the B-2 solely in dollars. The value of the B-2 and the conventional deterrence it provides will contribute to national security for the next 40 years. The US has already invested a huge amount in the B-2 and should now collect the dividends on that investment by funding 75 B-2s.

Standoff Weapons

The conventional capability development of the B-1 is uncertain, and the US may not fund the B-2. Nevertheless, standoff smart weapons will be used in future conflicts, and the conventional bomber force should be modernized with standoff weapons. This study does not recommend a force composed of all standoff weapons, but it recommends a mix of gravity and standoff weapons. The 1991 Gulf war proved the value of standoff weapons. The standoff weapons and high-tech munitions saved thousands of civilian lives with their precise accuracy. Standoff weapons are advantageous in several ways.

Through use of standoff weapons, expensive aircraft, and more importantly, human lives are out of harm's way in a tough-target scenario. Standoff weapons also save lives in other US services by delivering massive firepower without subjecting ground forces to the "killing fields." Further-

more, the standoff weapon is a force multiplier. With a highly accurate standoff weapon, the fighter's accuracy advantage over the bomber disappears. Additionally, the bomber can carry a much larger payload than the fighter.

There are also standoff disadvantages cited in this study along with the advantages. The disadvantages are:

- Standoff weapons cannot make last-minute human decisions to withhold.
- These weapons cannot search for and destroy mobile missiles.
- The standoff weapons do not possess large enough warheads to destroy some hardened targets.
- Standoff weapons are expensive, and dumb bombs can achieve the same objectives in some scenarios.

The advantages of the standoff weapon have been proven by various exercises and studies. The recent Gulf war also proved their value. Based on these lessons, it is puzzling as to why the conventional bomber force has not kept pace with the development and fielding of these much-needed assets. At present, the conventional bomber force has only two—the maritime Harpoon and a small number of Have Nap standoff missiles.

It is essential that the USAF place these weapons at a higher priority for conventional bombers. At the same time, SAC should push for standoff weapons that are interchangeable among strategic and tactical aircraft. This plan would delete the requirement for individual bomber-specific requirements and positioning.

Before we forget the lessons of the Gulf war, the US should fund immediately more Have Naps and other standoff weapons for our bomber force. We must remember how well standoff weapons contributed to our winning effort.

Epilogue

The present conventional bomber force is powerful, but it requires the above modifications to keep pace with world political changes. As previously noted, the cold war may be on hold, but we face security challenges in less predictable circumstances. The Gulf war of 1991 was a clearly visible example. The Gulf war also substantiated the value of the conventional bomber force as approximately one-half of the total USAF bombs was dropped by conventional bombers with large payloads.

To make the conventional bomber force effective is going to require additional funding. This expense is not going to be popular in the present era of fiscal restraint and military reductions. However, these changes must be funded to meet future security challenges around the globe.

Notes

1. Secretary of the Air Force Donald B. Rice, *The Air Force and U.S. National Security: Global Reach—Global Power*, white paper (Washington, D.C.: Department of the Air Force, June 1990), 1, 2.