Project AIR FORCE

PREPARING THE U.S. AIR FORCE FOR MILITARY OPERATIONS OTHER THAN WAR

Alan Vick
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RAND

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PREFACE

No longer perceived as military "sideshows," peace operations, humanitarian relief, and similar military operations other than war (MOOTW) now occupy center stage. Ongoing peace operations in Iraq and Bosnia, in particular, are producing an operations tempo unprecedented in peacetime. This optempo is stressing people and equipment, making it difficult for the United States Air Force (USAF) to prepare fully for potential combat operations in major regional conflicts. Beyond these current challenges, it is also likely that the USAF will be called upon to take on new MOOTW tasks over the next decade or so.

The objectives of this study were threefold: (1) to help the USAF better understand the effects of current MOOTW on training and readiness, (2) to explore some options to reduce those effects, and (3) to propose new concepts of operation to enhance USAF capabilities to accomplish future MOOTW tasks.

This report should be of interest to USAF planners and operators in the Air Staff, Major Command, and Numbered Air Force Headquarters and operational units, as well as to students of air and space power in the other services and the broader defense community.

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Project AIR FORCE, a division of RAND, is the Air Force federally funded research and development center for studies and analysis. It provides the Air Force with independent analyses of policy alterna-

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A HISTORY OF INVOLVEMENT

Jet aircraft do not typically come to mind when the subject of military operations other than war (MOOTW) is discussed. Instead, images of Marines slogging through tropical rice paddies or soldiers patrolling Mogadishu's dusty backstreets better exemplify small-scale conflict for most people. These popular images notwithstanding, the USAF and its predecessors[1] have been heavily involved in MOOTW for 80 years, flying in over 800 such operations since 1916.[2] From the Berlin Airlift to more-recent operations such as Operation Joint Endeavor in Bosnia, the USAF has been deeply involved in all types of lesser conflicts and noncombat operations. In particular, recent peace operations have dramatically increased the "peacetime" demands on the USAF.

THE EFFECT OF MOOTW ON USAF COMBAT READINESS

Most USAF MOOTW have been relatively short-lived, small-scale disaster-relief or humanitarian-aid missions that do not significantly increase the peacetime operations tempo. Since 1990, however, peace operations have proved to be more of a problem, owing to their larger size, longer duration, overlapping nature, and the demands they place on specialized assets (e.g., Airborne Warning

[1]The Army Air Service, Army Air Corps, and Army Air Force.

[2]See Appendix A for more information on these operations.

and Control System [AWACS], intelligence platforms, and Special Operations Forces [SOF] aircraft), as well as on the fighter force. Indeed, although they represent only 9 percent of USAF MOOTW since 1989, peace operations account for 90 percent of the USAF sorties flown in MOOTW since 1990.

As the USAF force structure has been reduced, the remaining forces and personnel have been stretched thinner and thinner across these peace operations, combat training, and exercises. As a result, many units are experiencing annual temporary duties (TDYs) greatly exceeding the USAF 120-day goal, and some fighter units have found that peace operations cut significantly into time and sorties available for combat training. Thus, if the current pace of peace operations continues, particularly in the face of additional force-structure reductions, the USAF is likely to encounter a growing training, readiness, and morale problem. *In short, peace operations are the cause of the USAF's optempo problem: Solve this problem, and the "MOOTW problem" will go away.*

A NEW APPROACH TO PEACE OPERATIONS

The USAF and the Department of Defense (DoD) have three options for dealing with this challenge.[3] First, they might determine that a somewhat lower combat readiness for some units or the USAF at large is acceptable, given expected threats and warning times. Second, they might determine that a greater percentage of USAF force structure needs to be in the active component, where it can assist more readily with peace operations. Third, they might attempt to influence the demand side of the equation by seeking to limit the number or size of DoD commitments to peace operations.

The first option does not appear to be feasible in the near term, given the short-warning threats predicted in Southwest Asia and Korea. It may be worth reconsidering in the future if the threat situation changes fundamentally. The second option is likely to be problematic because of the increased costs associated with moving forces from the Reserves to the active force, but it nevertheless deserves a

[3]We assume that increasing force size is not an option in the near term.

closer look. At the least, the USAF should explore ways that Reserve forces might contribute more to ongoing peace operations.

In our judgment, the greatest near-term leverage on this problem is found on the demand side. What we have in mind is not so much that DoD question the wisdom of participating in peace operations, although there is value in asking tough questions prior to sending forces to those operations. Rather, we suggest that the Joint Staff, theater commands, and the services look very hard at the putative requirements for these operations. Current deployments, plans, and concepts for air peace operations reflect an operational orientation more appropriate for high-intensity combat than for peacekeeping. This situation suggests that a new approach to peace operations is called for: employing military forces in a manner consistent with the unique political and military objectives of peacekeeping. We propose that the USAF take the lead in developing this new approach to air peace operations.

The Office of the Secretary of Defense (OSD), Joint Staff, USAF, and theater planners need to look hard at U.S. objectives in a particular operation to ensure that the deployed forces are sized to those objectives. For example, it is appropriate to ask what U.S. (and allied or U.N.) leaders hope to accomplish when they create and enforce a no-fly zone. In many cases, the objective is likely to be to deny the adversary routine use of some specified airspace. It is not necessary to hermetically seal the no-fly zone to accomplish this mission, especially if the rules of engagement permit a wider range of responses than merely engaging enemy aircraft caught violating the no-fly zone. Thus, under these circumstances, combat air patrols need not be flown 24 hours a day. Good surveillance, combined with random patrols, should be sufficient to deter most flights. This approach could significantly reduce the number of aircraft needed to enforce no-fly zones, easing optempo for all affected units.

Technology also can make a major contribution by reducing the number of expensive manned platforms that need to be deployed to such contingencies. Unmanned aerial vehicles (UAVs) and air-implanted ground sensors can meet many surveillance requirements at lower cost and with fewer deployed personnel than can manned platforms. Investing in these systems may, ironically, be the most cost-effective way of enhancing USAF capabilities for major regional

conflicts (MRCs). By freeing expensive manned systems to focus on their MRC tasks, relatively cheap UAVs and ground sensors contribute to both the MOOTW *and* MRC missions.

LOOKING TO THE FUTURE

In this report, we identify ten existing and four new operational-level tasks that the USAF is currently doing, is expected to be prepared to accomplish, or could plausibly be assigned in the next 10 to 20 years. In our judgment, such taskings are going to come to the USAF whether or not the institution finds MOOTW an attractive mission. Even if the USAF makes no special effort to develop MOOTW capabilities, the inherent characteristics of air and space power—particularly global situational awareness, responsiveness, long range, precision strike, and potential to minimize friendly casualties—will make it the force of choice in many situations. If the USAF chooses to embrace MOOTW and develop some of the technologies described in this report, air and space power could become the most versatile military instrument of the twenty-first century, able to decisively influence the outcome of events spanning the spectrum from peace operations to major conflicts.

For this vision to be realized will require more than the development of new technologies. It will require that air-and-space-power theorists think more expansively and creatively about the application of that power in unconventional settings, and develop new doctrine, tactics, organizations, and procedures to meet the messy challenges of the early twenty-first century.

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Chapter One

INTRODUCTION

BACKGROUND

It has been seven years since the massive military threat posed by the Soviet Union and Warsaw Pact evaporated. After 40 years of cold war and the occasional hot war, the United States is at peace. Yet despite this state of peace, the U.S. military in general and the U.S. Air Force (USAF) in particular find themselves remarkably busy. From enforcing no-fly zones in Iraq to supporting peacekeeping efforts in Bosnia, the USAF is maintaining an unprecedented peacetime operations tempo.

USAF assets are proving invaluable for responding to a multitude of peacetime challenges. Airlifters carry relief supplies, rescue personnel, peacekeepers, or combat forces. Surveillance platforms track fighter aircraft, airborne drug smugglers, and mechanized ground forces. Reconnaissance platforms, both manned and unmanned, provide theater commanders with high-quality imagery and signals intelligence. Finally, fighter aircraft enforce no-fly zones, support ground forces and—along with bombers and gunships—make punitive strikes. For these reasons, USAF aircraft, from the Airborne Warning and Control System (AWACS) to AC-130 gunships, are in constant demand by theater and joint task force commanders conducting various military operations other than war (MOOTW).[1]

[1]MOOTW is the Joint Staff's term for a diverse collection of military activities below the level of major regional conflicts. MOOTW includes disaster relief, humanitarian aid, search and rescue, peace operations, arms control, military support to civil au-

Indeed, these peacetime demands, *driven primarily by multiple ongoing peace operations,* are so great that they are disrupting routine training and exercises necessary to prepare for major conflicts, thereby producing excessive overseas deployments for many personnel and undermining morale. This situation is producing a dilemma for the USAF as it struggles to fulfill today's commitments without degrading either its capability to fight future wars or the quality of life of its personnel.

Although it is impossible to precisely predict future MOOTW demands, our review of the evidence suggests that MOOTW demands on the USAF are likely to be enduring. Even if peace operations were to become less frequent, other MOOTW demands would take their place. These other demands may not produce the optempo associated with current peace operations, but they are likely to present unique challenges of their own, possibly requiring new tactics and technologies.

Politically, MOOTW are likely to be conducted under more-restrictive rules of engagement (ROE) than war. There is likely to be a much greater sensitivity to casualties—both of U.S. citizens and of others. Since peacekeeping and other MOOTW activities may be going on in the midst of a civilian population, ROE will likely be a prime determinant of every action. Only rarely will it be possible to take action based on military considerations alone. In this regard, MOOTW may come to resemble police work, requiring that those involved receive specialized training.

Technically, MOOTW may pose challenges that are different from those of war and that are, to some extent, derived from the political context and the ROE. For example, countersniper operations in an urban environment would require much more discriminate use of force than in war, presenting, in turn, a major technical challenge because U.S. forces would be required to detect, positively identify, and neutralize snipers without harming friendly forces or noncombatants. Advanced sensors, low-flying unmanned sensor plat-

thorities, strikes, raids, enforcement of sanctions, counterdrug operations, foreign internal defense, support to insurgencies, evacuation of noncombatants, and hostage rescue. See U.S. Department of Defense, *Joint Doctrine for Military Operations Other Than War,* Washington, D.C.: The Joint Staff, Joint Publications 3-07, 1995.

forms, precision low-yield lethal weapons, nonlethal weapons, and other new technologies will likely be required for air power to be effective against these and similar targets.

PURPOSE

The objective of this report is to help delineate the challenges facing the USAF below the level of major conflict and to offer some new concepts to both minimize the disruption MOOTW are having on training, combat readiness, and morale and to enhance USAF MOOTW capabilities. The report is organized around the following questions:

- What types of MOOTW has the USAF participated in previously?
- Which operations have been most stressful?
- Have MOOTW hindered training and lowered readiness?
- If so, how can these effects be minimized?
- What tasks will the USAF be assigned in future MOOTW?
- How can USAF capabilities be enhanced to accomplish these tasks?

ORGANIZATION

This report is divided into two parts. Part I, Chapters Two and Three, gives background information on MOOTW and describes the current MOOTW situation. Chapter Two presents an overview and analysis of those MOOTW the USAF and its predecessors have participated in since 1916. Chapter Three analyzes how MOOTW optempo is affecting force training, readiness, and morale, and explores several options for addressing these problems. Chapter Four begins Part II of the report, which deals with the future needs for MOOTW. It discusses the reasons MOOTW have taken on greater importance in the post–Cold War environment. Chapter Five identifies current and future MOOTW tasks that the USAF could be assigned and presents some new concepts of operation to accomplish these tasks. Chapter Six presents study conclusions. Appendix A contains the database of 869 USAF MOOTW operations from 1916 through 1996 that was de-

veloped by our study. Appendix B presents additional information on two peace operations (Joint Endeavor and Uphold Democracy) for which unclassified historical data were available. Appendix C provides supporting data for the discussion in Chapter Three.

PART I

PAST AND CURRENT MOOTW INVOLVEMENT

Chapter Two

A HISTORY OF INVOLVEMENT IN MOOTW

Jet aircraft do not typically come to mind when the subject of MOOTW is discussed. Instead, images of Marines slogging through rice paddies or soldiers patrolling dusty backstreets better exemplify small-scale conflict for most people. This image notwithstanding, the USAF or its predecessors[1] have been heavily involved in MOOTW for 80 years, flying in over 800 such operations since 1916.[2] From the Berlin Airlift to more-recent operations such as Operation Joint Endeavor in Bosnia (see Appendix B), the USAF has been deeply involved in all types of lesser conflicts and noncombat operations. In particular, recent peace operations have dramatically increased the "peacetime" demands on the USAF.

This chapter reviews and analyzes past and current USAF involvement in MOOTW, by mission type.

OVERVIEW OF PAST OPERATIONS

Although MOOTW are not new to the USAF, the USAF has been doing more of them since the Cold War ended. Indeed, during the first five years of the post–Cold War period (1991–1995), the USAF participated in 194 MOOTW, nearly double the 100 operations of the preceding five years of the Cold War (1986–1990), as Figure 2.1 indicates. (The annual number of USAF MOOTW operations is

[1]The Army Air Service, Army Air Corps, and Army Air Force.

[2]See Appendix A for more information on these operations.

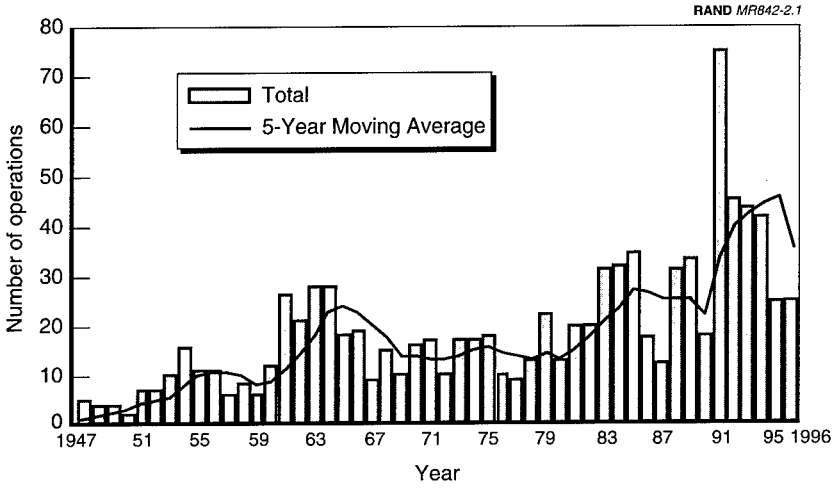

Figure 2.1—USAF Involvement in MOOTW, 1947–1996

shown as a vertical bar; the curve indicates a 5-year moving average (MA).[3] Figure 2.1 also shows that, in 1995 and 1996, the number of MOOTW dropped back down to the levels experienced in the 1980s, although, as we describe in Chapter Four, the demands of these current operations are much greater.

Figure 2.2 breaks out USAF participation in MOOTW by major mission categories for the period 1916–1996. The majority (65 percent) of these operations have been disaster-relief or humanitarian-aid missions. Medevac, search and rescue, hostage rescue, logistics support, strikes and raids, and a variety of special missions make up the remaining 20 percent of "miscellaneous" operations. Table 2.1 lists 11 operations to give the reader some sense of the breadth of the missions in which USAF forces have participated.

The following pages describe the major types of MOOTW in which the USAF participated between 1916 and 1996. In addition to these major categories, the USAF conducted logistics support, search and rescue, and assorted other missions, all of which are listed in Appendix A.

[3]A 5-year moving average gives additional information on trends by adding the data from the present year and previous four years, then dividing by 5.

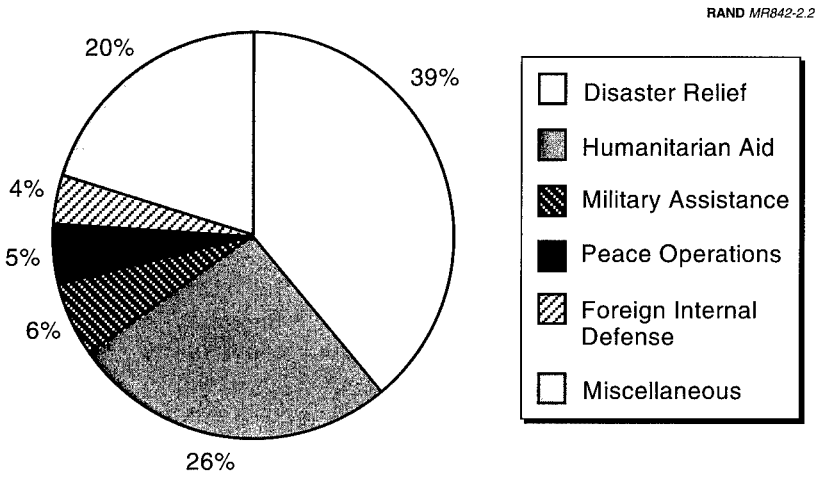

Figure 2.2—USAF Involvement in MOOTW, by Type of Operation: 1916–1996

Table 2.1

Examples of USAF Involvement in MOOTW

Operation	Purpose	Location	Date
Border patrols	Civil support	Mexican border	1919–1921
First Air Mail	Civil support	United States	February–June 1934
Cholera outbreak	Disaster relief	Egypt	October 1947
Kinderlift I	Humanitarian aid	Germany	August 1953
Farmgate	Foreign internal defense	Vietnam	November 1961
Sinking ship	Search & rescue	Philippines	October 1971
Mayaguez rescue	Hostage rescue	Cambodia	May 1975
Hostage return	Medevac	Iran	January 1981
Elf One	Military aid	Saudi Arabia	1981–1989
Deliberate Force	Peace operation	Bosnia	August 1995
Assured Response	Noncombatant evacuation operations	Liberia	April 1996

Disaster Relief

Since 1916, the USAF or its predecessors have participated in 338 disaster-relief missions in Latin America, Africa, Asia, Europe, and the United States following floods, hurricanes, typhoons, droughts, earthquakes, snowstorms, volcano eruptions, and insect infestations. We distinguish *disaster-relief* operations from *humanitarian aid* for two reasons. First, they often occur with no warning, so it is difficult to do detailed planning and preparation. Second, the victims are often in situations of urgent need, requiring the USAF to respond very quickly if it is to arrive in time.

The average disaster-relief operation was quite small, involving ten aircraft flying 80 sorties. Typical loads included food, blankets, tents, medicine, water-purification equipment, construction materials, vehicles, heavy equipment, and relief workers. Most operations entailed air-landing the cargo, although a few required parachute delivery of supplies. Some also required supplies to be reloaded onto helicopters for delivery to more-isolated areas.

Humanitarian Aid

We define *humanitarian-aid operations* as those providing any type of nonmilitary assistance to people in situations of chronic need, unrelated to a specific disaster. Examples include aid to refugees, medical evacuations of foreign nationals, and a host of projects to help poor nations with medical, food, construction, and other aid. The USAF participated in 230 humanitarian-aid operations between 1916 and 1996, delivering close to 3 million tons of relief supplies and equipment.[4] Operation Provide Relief was one of the larger recent operations, flying 3,100 sorties to Somalia in 1992 to avert the imminent starvation of close to 1 million people.[5] This emergency situation was caused by the combination of a severe famine and the disruption of distribution networks by an ongoing civil war.

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[4]Of the 3-million-ton total, 77 percent was delivered in the 16-month-long Berlin Airlift.

[5]See USAF, *The Air Mobility Command, June 1992–June 1993: Highlights of the First Year,* Scott Air Force Base (AFB), Ill.: Headquarters, Air Mobility Command, Office of History, 1993b, p. 2.

Noncombatant Evacuation Operations

The USAF was involved in 31 noncombatant evacuation operations (NEOs) in this period, moving by air a total of almost 160,000 people. The largest USAF NEOs were Operations Frequent Wind and Fiery Vigil. Operation Frequent Wind, the evacuation of Vietnam in April 1975, moved over 50,000 people. Operation Fiery Vigil, the evacuation of U.S. personnel from the Philippines following the eruption of Mount Pinatubo, also required the USAF to lift over 50,000 personnel.[6] More recently, the USAF participated in NEOs in Liberia and the Central African Republic in April and May of 1996, lifting out 2,000 and 60 personnel, respectively.

Strikes/Raids

Strikes are both the most visible USAF MOOTW and the most similar to major wars. They also are the least-common MOOTW, occurring only eight times since 1947. Examples of past strikes include Operations Urgent Fury (Grenada, 1983) and Just Cause (Panama, 1989). In these operations, USAF aircraft transported large intervention forces, conducted surveillance and reconnaissance missions, and provided close support for friendly ground forces. Operation Eldorado Canyon, the 1986 airstrike against Libya, is an example of a raid.

Medevac

The USAF conducted 37 MOOTW medical-evacuation (medevac) missions of U.S. nationals between 1971 and 1996.[7] Examples include transporting victims of the 1977 Canary Island airliner collision, the 1983 Beirut Marine barracks bombing, the 1987 attack on

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[6]See Thomas Tobin, *Last Flight from Saigon,* Washington, D.C.: U.S. Air Force, Office of History, 1978; Urey Patrick, *U.S. Marine Corps Participation in the Emergency Evacuations of Phnom Penh and Saigon: Operations Eagle Pull and Frequent Wind,* Arlington, Va.: Center for Naval Analyses, June 1977b; and USAF, *Toward the Air Mobility Command: A Chronology of Tanker and Airlift Events,* Scott AFB, Ill.: Headquarters, Air Mobility Command, Office of History, 1993a, pp. 33–34.

[7]We do not include the thousands of medevac missions flown during the Vietnam War, because it was not a MOOTW. In the sources we examined, we were unable to find examples or statistics of medevacs occurring before 1971.

the USS *Stark*, as well as returning released hostages from Lebanon. In this category, we also include the return of U.S. citizens' remains. Many such missions have been flown to return the remains of persons missing in action (MIAs) from the Vietnam War. More recently, C-17 airlifters carried the remains of Commerce Secretary Ron Brown and 32 other victims of the April 1996 crash of a USAF transport in Croatia.

Hostage Rescue

The USAF supported four hostage-rescue missions between 1965 and 1985: the 1965 rescue of American hostages held in Ethiopia, which employed airlifting helicopters; reconnaissance, strike, and transport missions flown during the 1975 Mayaguez rescue; transport missions flown during the aborted 1980 attempt to rescue hostages from Iran; and the 1985 deployment of U.S. special forces to Italy during the *Achille Lauro* hijacking. We also think it is highly likely—given the sensitivity of counter-terrorist operations—that the USAF has participated in additional missions not documented in the public record.

Foreign Internal Defense

In this period, the USAF undertook 31 foreign internal defense (FID) operations, providing assistance to friendly governments facing armed internal threats. The first such operation provided maintenance support to French forces in Vietnam between 1952 and 1954. We also included in this category several early U.S. operations in Vietnam (e.g., Operation Farmgate in 1961) that preceded the deployment of U.S. ground forces in 1965. Other examples include providing aid to the El Salvadoran government against the Farabundo Martí-National Liberation Front (FMLN) guerrillas in the 1980s and, most recently, supplying Israel with explosive-detection devices in March 1996.

Military Assistance

There were 55 military-assistance operations. In most of these operations, the USAF deployed forces, delivered equipment, and advised

or otherwise aided friendly governments facing external threats. Examples include aid to Taiwan during the 1958 Quemoy crisis, deployment of forces to Germany during the 1961 Berlin Crisis, and assistance to various Persian Gulf nations during the 1980s.

Counterdrug

The USAF participated in 11 large counterdrug operations between 1983 and 1996. Between 1983 and 1989, USAF involvement was fairly limited. In 1989, counterdrug operations were greatly expanded when President George Bush directed DoD to provide surveillance and intelligence support to U.S. law enforcement agency drug-interdiction efforts. Since then, the USAF has been a full member of the interagency task force that conducts counterdrug operations in Latin America and the Caribbean, participating in some aspect of these operations on a daily basis. Specifically, the USAF provides airlift support, operates several ground-based radars in Latin America, and flies surveillance and reconnaissance missions in search of drug-processing facilities and aircraft smuggling drugs. The information collected during the surveillance missions is used to better understand smuggling tactics and is also handed off to law enforcement and other agencies that attempt to intercept the drug traffickers once the aircraft have landed. In cases of airdrops of drugs to waiting boats, the U.S. Navy and Coast Guard use the surveillance data to intercept the boats. Currently, the USAF is flying approximately 20 AWACS sorties per month in support of counterdrug operations.[8]

Peace Operations

The USAF flew its first peace-operation missions during the Suez Crisis in 1956. Since then, it has supported another 46 peace operations. In most of these operations, the USAF role was limited to the transport of U.N. peacekeepers. More recently, the USAF has been involved in more-demanding peace operations.

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[8]See Steven Watkins, "The Air War on Drugs," *Air Force Times*, July 15, 1996, pp. 12–14.

For example, after the Gulf War ended in 1991, the USAF was assigned a number of tasks associated with the enforcement of the cease-fire agreement. In the north, Operation Provide Comfort was both a peace operation and a humanitarian-aid effort. Its purpose was to protect, provide shelter for, and feed Iraqi Kurdish refugees along the Turkish border. Almost 9,000 sorties were flown as part of the relief effort. An additional 34,000 sorties were flown to enforce the northern no-fly zone. In the south, Operation Southern Watch has enforced a similar no-fly zone to protect Iraqi Shiites from air attack, flying 68,000 sorties to date. Both operations are ongoing, and no end date has been projected.

In 1992, the USAF participated in Operation Restore Hope in Somalia, flying over 1,000 sorties deploying and resupplying U.S. forces.[9] Additionally, USAF AC-130s flew a small number of strike and close-support sorties. Finally, in Bosnia, USAF aircraft helped enforce a no-fly zone in Operation Deny Flight, conducted punitive strikes against Serb targets in Operation Deliberate Force, and supported the NATO Implementation Force in Operation Joint Endeavor. The USAF is now conducting Operation Decisive Edge. To date, the USAF has flown over 30,000 sorties over Bosnia.

THE CHANGING CHARACTER OF MOOTW

With the end of the Cold War, the relative mix of USAF MOOTW activities has changed, as shown in Table 2.2. Disaster relief and humanitarian aid still make up the bulk of operations, but their relative proportions have reversed. Military-assistance operations and FID operations are both down; peace operations have more than doubled.

Although only 9 percent of total operations, peace operations represent 90 percent of all MOOTW sorties flown since the end of the Cold War. Thus, peace operations are driving the currently high USAF optempo.

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[9]USAF, *The Air Mobility Command, June 1992–June 1993: Highlights of the First Year,* Scott AFB, Ill.: Headquarters, Air Mobility Command, Office of History, 1993b, p. 4.

Table 2.2

Percentage of Operations: Cold War Versus Post–Cold War MOOTW

Type of Operation	1916–1988	1989–1996
Disaster relief	48	16
Humanitarian aid	17	50
Military assistance	8	2
Peace operations	4	9
FID	5	1
Miscellaneous	18	22

Since 1991, the USAF has flown over 130,000 sorties in the five largest peace operations (Deny Flight, Deliberate Force, Joint Endeavor, Provide Comfort, Southern Watch). This optempo has proven to be a challenge for the USAF, requiring long temporary duties (TDYs) and forcing deployed crews to forgo the training they would have received if they had remained at home station. Thus, to the extent that the USAF has an optempo problem caused by MOOTW, these data suggest that the problem is caused primarily by peace operations. Recent peace operations are also lasting much longer than those previously. Figure 2.3 shows the tremendous growth in the number of USAF MOOTW lasting longer than 180 days.

Peace operations are a problem for several reasons. All five of the peace operations mentioned above involved enforcing no-fly zones. The current concept of operation (CONOP) for these missions requires fighters and AWACS to fly long sorties patrolling the controlled airspace. These aircraft must be supported, in turn, by tankers, electronic warfare, and other support assets. As a result, most peace-operations sorties are flown to patrol or support patrols of these zones. A second reason that peace operations are a problem is their prolonged and overlapping nature. USAF squadrons have been rotating through Turkey and Saudi Arabia[10] since 1991 to fly Provide Comfort and Southern Watch sorties, and through Italy since

[10]As of April 1996, one USAF squadron is flying Southern Watch sorties out of Jordan also.

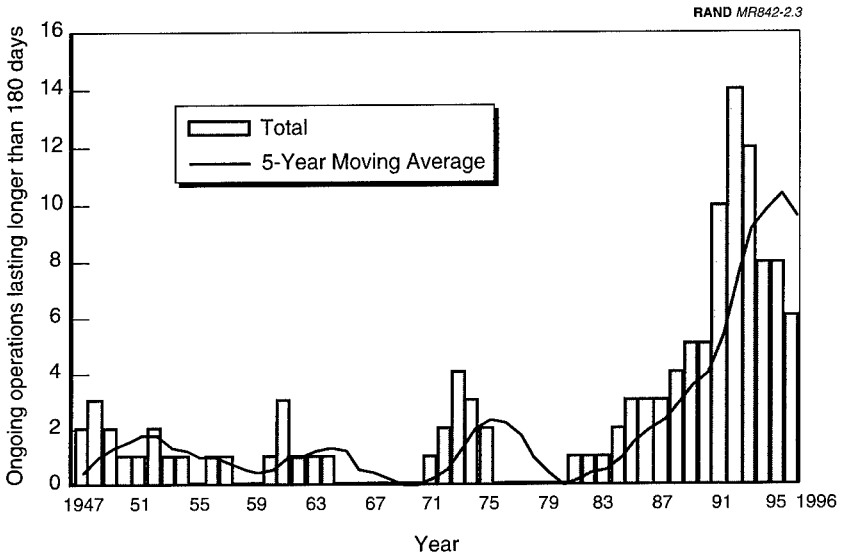

Figure 2.3—USAF Involvement in MOOTW Exceeding 180 Days, 1947–1996

1993 to fly Deny Flight, Deliberate Force, Joint Endeavor, and Decisive Edge sorties over Bosnia.

The next chapter explores the effect those peace operations are having on USAF optempo, training, and readiness.

Chapter Three

EFFECT OF PEACE OPERATIONS ON AIR FORCE COMBAT READINESS

The amount of time, effort, and energy the Air Force devotes to peace operations has exploded from almost zero during the last few years of the Cold War to consume about 10 percent of Air Force flight hours (much more for active-duty fighter, electronic combat, tanker, and surveillance aircraft) and has placed unanticipated heavy demands on certain support personnel and equipment (especially in the medical, security police, and civil engineering career fields). If current peace-operations commitments ended tomorrow, the problems many have come to associate with MOOTW—high TDY rates, reduced combat readiness, lowered morale—would largely end as well.

The dramatic increase in peace-operations tempo in the early 1990s has affected the Air Force's ability to conduct MRC combat operations in both the short and long run. In the short run, peace operations provide little opportunity for fighter pilots to practice combat skills, such as dropping bombs and engaging in air-to-air combat. This decreases their proficiency and degrades their ability to accomplish MRC combat missions. Although fighter crews appear to be the most affected, crews for AWACS, SOF aircraft, and tactical airlift are also unable to practice some critical combat skills during typical peace operations.

Peace operations also increase the demand for certain equipment (e.g., transportable hospitals), which means that the equipment is often not available for rapid deployment to an MRC because it is either deployed or is undergoing extensive repair and reconstruction after a lengthy deployment. Decreased proficiency and the need to

rebuild or replace worn or damaged equipment result in immediate decreases in combat capability. However, the degradation can usually be recovered in a matter of a few weeks or months.

In the long run, peace operations can pose a different threat to Air Force combat readiness, because their open-endedness creates serious quality-of-life issues for certain Air Force personnel. As peace operations drag on for months or years, units with special skills or equipment, as well as those based nearest to the action, are repeatedly called on to participate. Regardless of the short-term effect of this participation on unit wartime mission skills, one thing is certain: The participants are away from home.

Being away from home is nothing new for Air Force personnel. However, long-term peace operations lead to situations in which the same units or parts of units are called on again and again, either because of budget constraints or small career-field size. As a result, some personnel, or even entire units, can spend more than half their time away from home station. Eventually, the separation could take a toll on family life, leading to lower retention rates and, in turn, to less-experienced and less-capable units.

In this chapter, we look at the burden peace operations place on Air Force combat readiness. We first discuss the amount of effort the Air Force is currently devoting to peace operations. We then analyze the short-term effect of peace operations on the combat skills of fighter, transport, and special-operations aircraft units, in the second section, and briefly discuss the potential long-term effects of extended TDYs on the USAF, in the third section. In the fourth section, we consider a new approach the Air Force could take to reduce the effect of peace operations on combat readiness, and, in the fifth section, we present two organizational options for improving combat readiness and reducing TDYs. In the final section, we draw conclusions.

POST–COLD WAR GROWTH IN PEACE OPERATIONS

During the Cold War, the Air Force was involved in few peace operations. With the end of the Cold War, some of the constraints on U.S. and international intervention in regional and ethnic conflict were removed. At the same time, the collapse of totalitarian regimes in the

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The original Figures 3.1 and 3.2 overstated peace-operations flight hours for 1988, 1989, and 1990. These Figures 3.1 and 3.2 reflect the correct data.

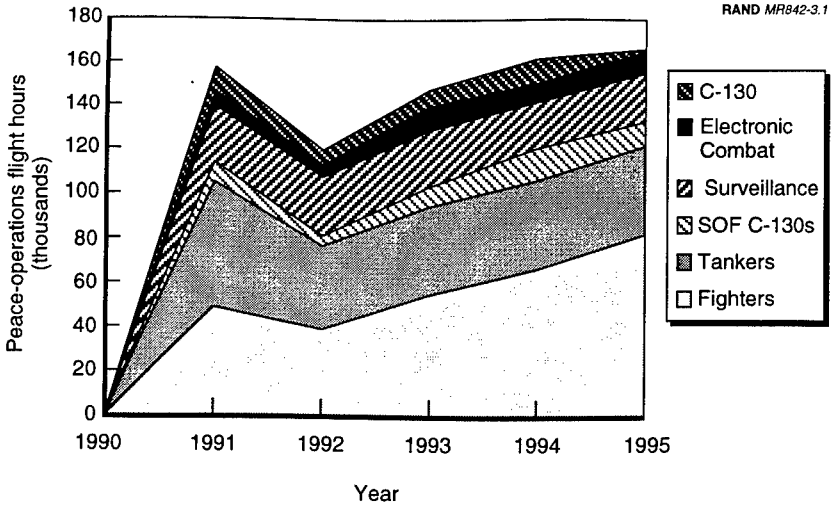

Figure 3.1—USAF Peace-Operations Flight Hours, 1990–1995

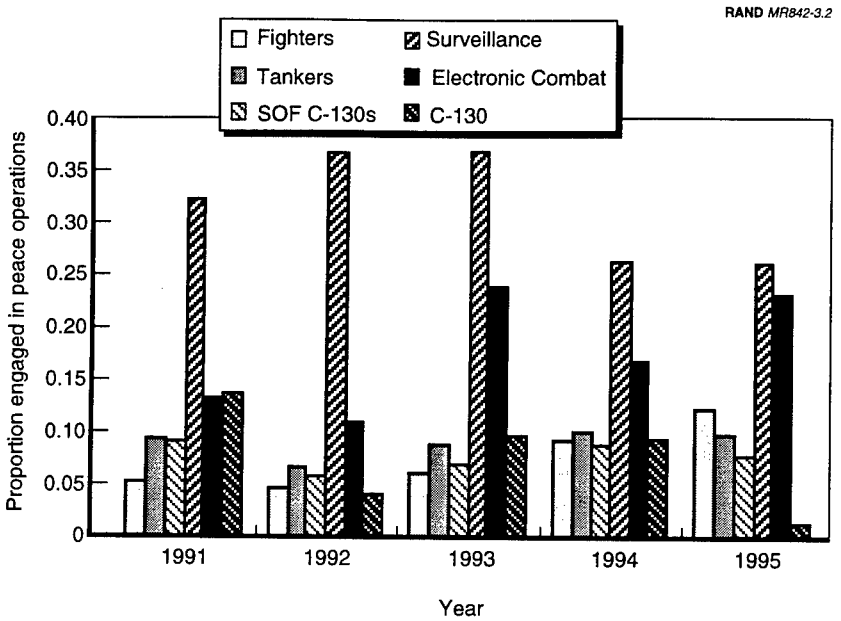

Figure 3.2—Peace-Operations Effort As a Proportion of Sorties Flown by Active-Duty USAF, 1991–1995

former communist bloc and the end of superpower sponsorship of marginal African states enabled long-simmering ethnic, religious, and tribal conflicts in both these regions to boil to the surface. The combination of these factors with the activist foreign policies of the Bush and Clinton administrations led to U.S. involvement in peace operations in Bosnia and Somalia. Also, the end of the Persian Gulf War left the United States enforcing provisions of the cease-fire agreement in both northern and southern Iraq.

The Air Force suddenly found many of its general-purpose and special-operations aircraft heavily involved in peace operations. Between 1990 and 1995, Air Force fighters, tactical airlifters, special-operations, tanker, surveillance, and electronic combat aircraft experienced a profound increase in flying hours devoted to peace operations, as Figure 3.1 shows. The vast majority of these peace-operations flight hours resulted from five long-term and ongoing operations—Operations Southern Watch and Provide Comfort in Iraq and Operations Deny Flight, Deliberate Force, and Joint Endeavor in Bosnia—all designed to deter some undesirable air- or ground-based military activity. The result is the rapid increase in the number of fighter flight hours devoted to peace-operations missions.

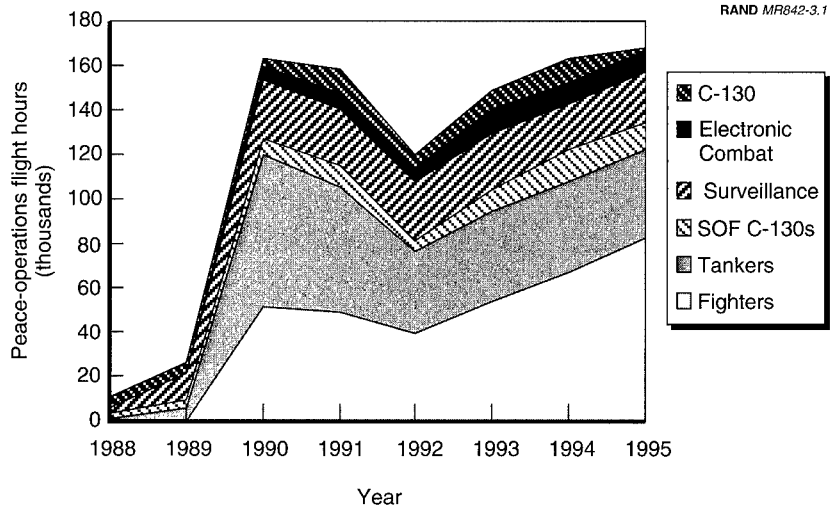

Figure 3.1—USAF Peace-Operations Flight Hours, 1988–1995

USAF aircraft expanded their peace-operations participation from almost zero at the end of the Cold War to almost 170,000 flight hours in 1995. Between 1991 and 1995, USAF aircraft flew over 800,000 hours in support of peace operations—almost all of them after 1990[1]—which represents a huge commitment of personnel, equipment, fuel, spare parts, etc., to support peace operations. Since 1991, flight hours devoted to peace operations have remained remarkably stable: Except for a post–Desert Storm dip in FY 1992 to around 120,000 flight hours, the level of effort has remained in the range of 150,000–170,000 flight hours per year. The dip was the result of the drawdown of U.S. forces in the Gulf following Desert Storm. The no-fly zone over Bosnia did not go into effect until FY 1993.

Figure 3.2 presents peace-operations tempo as a proportion of sorties flown by active-duty squadrons.[2] Translated to more-concrete

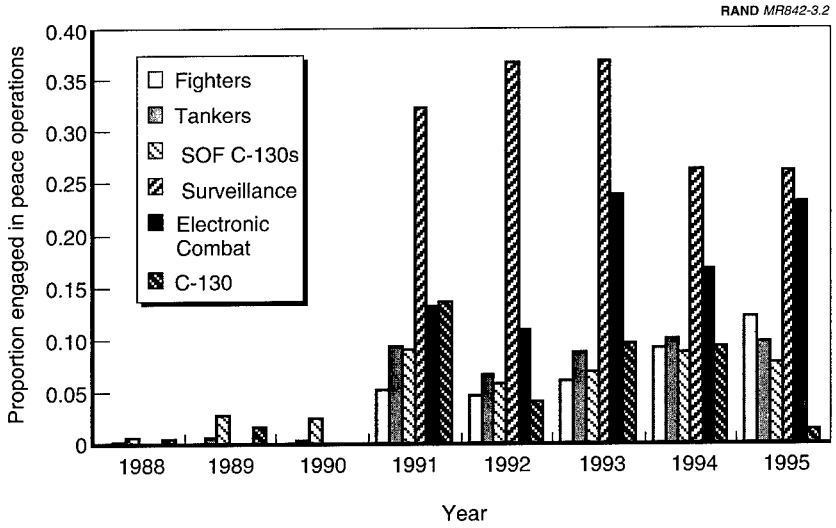

Figure 3.2—Peace-Operations Effort As a Proportion of Sorties Flown by Active-Duty USAF, 1988–1995

[1]All flight-hour and sortie data in this chapter are derived from the USAF Reliability and Maintainability Information System (REMIS).

[2]As of the end of 1995, active-duty units had flown over 90 percent of all peace-operations sorties and flight hours.

terms, this is the equivalent of over six fighter squadrons; two tanker squadrons; one squadron each of special-operations C-130s and surveillance and electronic combat aircraft; and a fraction of a C-130 squadron. In other words, on any given day between 1991 and 1995 the Air Force had the equivalent of about 2 of its 14 active fighter wings engaged in peace operations in Iraq or Bosnia, supported by 2 of its 25 tanker squadrons and a large fraction of its surveillance and electronic combat assets.

The sheer volume of flying done in support of peace operations is only part of the story. We need to know which assets are most stressed. According to Figure 3.1, fighters and tankers flew more hours in support of peace operations in 1995 than any other types of aircraft—not surprising, considering that fighters currently patrol airspace for extended periods and therefore require significant tanker support. However, this does not mean that fighters and tankers are the most "stressed" assets.

To determine which weapon systems are the most stressed, we must determine which types of aircraft spend the largest portion of their annual flight hours supporting peace operations. To do so, we divided the total number of peace-operations flight hours in Figure 3.1 by the total number of aircraft of a particular type the Air Force had in a given year. The resulting values are shown in Table 3.1 for selected aircraft.

Table 3.1 tells a different story from Figure 3.1. The most obvious difference is that fighters are much less stressed than Figure 3.1 appears to indicate. Although they fly more peace-operations flight hours per aircraft than any other aircraft types, fighters spend less time supporting peace operations than many specialized aircraft.[3] During 1995, the most heavily burdened aircraft types were E-3s, KC-10s, EF-111s, AC-130s, HC-130s, and EC-130s, spending an average of between 88 and 280 hours per aircraft conducting peace operations, versus only 21 hours for F-16s.

[3]The average number of hours flown by F-16s is shown in the table, for comparison purposes. Most other fighters (F-15, A-10, etc.) have averaged between 17 and 34 peace-operations hours per aircraft per year since 1990. The only exception is F-15Es, which have averaged almost 60 peace-operations hours per aircraft per year.

Table 3.1

USAF Peace-Operations Flight Hours per Aircraft Type, 1991–1995

Year	E-3	KC-10	AC-130	EC-130	HC-130	EF-111	F-16
1991	484.83	308.06	63.94	49.21	73.26	20.85	15.32
1992	485.34	53.79	7.68	0.35	72.88	108.45	10.64
1993	479.26	181.27	119.88	20.96	84.97	92.53	12.51
1994	326.49	114.92	162.58	64.48	110.29	83.23	16.56
1995	280.33	118.88	94.20	88.84	97.77	142.74	21.19
1991–1995 (average)	*411.25*	*155.38*	*89.66*	*44.77*	*87.83*	*89.56*	*15.24*

If peace operations are viewed as a percentage of total flight hours each of the most heavily committed aircraft types flew in 1995 (see Figure 3.3), what stands out most is that the RC-135 fleet devoted an incredible 65 percent of its 1995 flight time to conducting operational reconnaissance. While seemingly excessive, this percentage is similar to the amount of time RC-135s spent on operational reconnaissance tasks watching Soviet and Warsaw Pact forces during the Cold War. Increased peace-operations tempo has changed *where* RC-135s conduct their missions, but not *how many* they undertake. Other aircraft, such as EF-111s and E-3s, are far more heavily committed to operational missions now than during the Cold War, devoting close to 60 and 40 percent of their 1995 flight hours to peace operations, respectively.

Aside from being in demand for peace operations, the one thing these aircraft types share (with the exception of KC-135s) is that they belong to "small fleets." In 1995, the Air Force had 178 F-15Es and less than 60 of each of the other aircraft types depicted in Figure 3.3. For comparison, the Air Force had 1,548 F-16s, 568 F-15A/Cs, and 568 C-130s in 1995.[4]

The aircraft types in Figure 3.3 represent virtually all of the Air Force's specialized electronic countermeasures and surveillance aircraft. In addition, they account for all of the gunships and approxi-

[4]USAF, *United States Air Force Statistical Digest FY 1993 and 1994*, Washington, D.C.: Assistant Secretary of the Air Force (Financial Management and Comptroller of the Air Force), and *Air Force Almanac*, May 1996, pp. E-104–E-107.

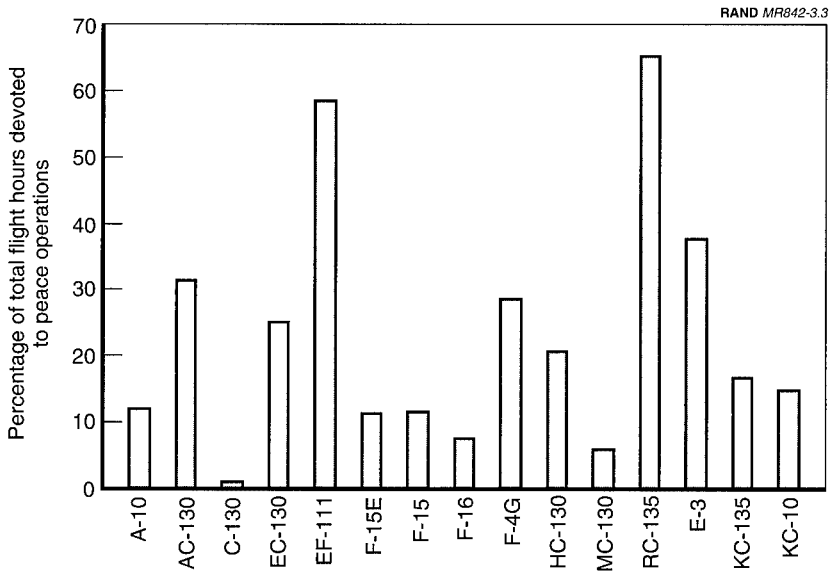

Figure 3.3—Percentage of Flight Hours Devoted to Peace Operations, 1995

mately two-thirds of its long-range night/all-weather interdiction aircraft, and all of its tankers. All these mission areas are of critical importance to any air campaign, whether part of a MOOTW or an MRC.

SHORT-TERM EFFECTS OF PEACE OPERATIONS ON USAF FLYING UNITS

Some of the types of tasks aircrew accomplish on peace-operations missions may be very similar to both the tasks they perform on peacetime training missions and the tasks they would be expected to perform during an MRC. For example, tanker crews perform essentially the same tasks on a peace-operations mission (take off, climb/cruise, rendezvous, orbit, transfer fuel, return to base, land) that they would perform on a peacetime training mission or during an MRC. Much the same can be said about strategic airlifters such as C-5s or C-17s supporting peace operations: The crews load, unload

and reconfigure cargo compartments just as they would in an MRC or peacetime training mission. In short, for some aircrews there is little or no difference in the types of tasks performed and, consequently, in the training value of, peace operations and peacetime training sorties. To determine the short-term effects of peace operations on USAF flying units, therefore, it is important to examine how peace-operations sorties differ from peacetime training sorties for different types of aircraft.

In surveillance and airlift aircraft, aircrews do roughly the same tasks in both peace operations and combat. In contrast, although E-3, E-8, AC-130, HC-130, MC-130, MH-60, and MH-53 aircraft all have some overlap between peace operations and combat missions, most miss some important dimension of combat training in typical peace operations. For example, E-3 crews use skills monitoring friendly (and sometimes hostile) aircraft, but less often and generally against a minimal air threat. Peace operations afford AC-130s crews good opportunities to polish surveillance skills, but only rarely are they called upon to fire their weapons. HC-130 and MC-130 crews conduct refueling and airdrop missions, respectively, but peace operations do not allow them to practice critical low-level flight skills. Although the effect of peace operations on aircrew combat skills varies, all these units are experiencing high to very high TDY rates. For example, HC-130 aircrew averaged 194 days TDY in 1994, U-2s averaged 148 days, and RC-135s averaged 143. These frequent and long TDYs limit aircrew availability to participate in major exercises and could, therefore, degrade combat readiness even for units (e.g., U-2s) who are able to practice all combat skills during peace operations.

Over 50 percent of the sorties and hours flown in support of peace operations are flown by fighter or attack aircraft. For these crews, there is a tremendous difference between the types of skills they practice on peace-operations missions and the combat skills (low-level navigation and weapons delivery, air-to-air combat, missile breaks, etc.) they practice on almost all peacetime training sorties.

Figure 3.4 rank-orders the difficulty of the tasks required to successfully accomplish various combat missions. The tasks listed are not all-inclusive, and some experienced practitioners of the tactical aircrew's art would probably rank some of the tasks in a slightly differ-

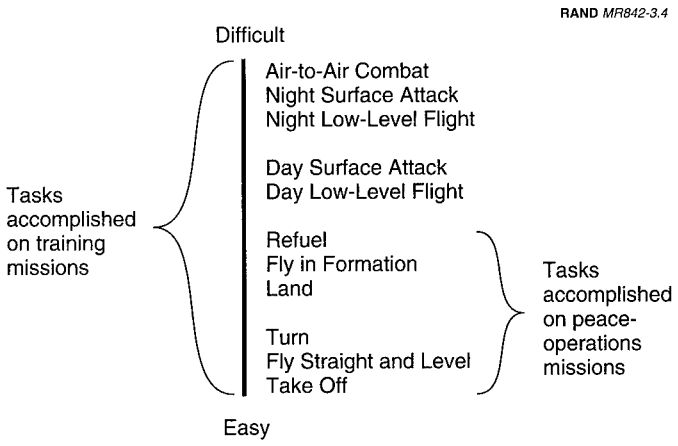

Figure 3.4—Opportunities to Train for Fighting Skills During Peace Operations

ent order. However, the list depicts the easiest, safest, and most-routine tasks near the bottom and the most-difficult, -dangerous, and -demanding tasks toward the top. What is most striking is that virtually all the combat-related tasks are toward the top of the list, and none of them is part of the typical fighter peace-operations sortie.

In sharp contrast to typical peacetime training sorties, in which crews practice low-level navigation, weapons delivery, and/or air-to-air combat skills, peace-operations missions usually offer the opportunity to practice only the most routine tasks. Calling "routine" such skills as formation flying and landing does not mean they are unimportant, or that there is not a certain level of danger or difficulty associated with them. Crews must take off, land, and often refuel and fly in formation to successfully accomplish many combat missions. They must, however, also acquire targets, employ electronic countermeasures to reach those targets and return home, outmaneuver missiles, engage in air-to-air combat, and aim and guide their weapons to impact while maintaining their situational awareness and avoiding collisions with other aircraft or the ground. Most of these skills require long practice to acquire and constant repetition

to maintain. Peace-operations sorties provide fighter crews with virtually no opportunity to maintain their proficiency in many of their most important and perishable combat skills—primarily because of the nature of peace-operations missions.

As Figure 3.4 illustrates, peace-operations sorties for fighter crews consist almost entirely of relatively simple and routine tasks. Crews take off, fly in formation to an orbit point, loiter for a specified time, perhaps rendezvous with a tanker, and then return to base. They may get to practice some combat skills, such as coordinating air-to-air radar searches, but engaging in the same routine activity day after day with no adversarial reaction quickly becomes so mind-numbing that crews resort to asking each other movie-trivia questions to pass the time while on-station.[5]

The high number of training waivers given in 1994 is one indication that a training problem existed for U.S. Air Force in Europe (USAFE) fighter crews. USAF Series-11 regulations set standards for the number and type of training events an aircrew assigned to a specific aircraft must perform to be considered combat-ready. When aircrew have other commitments (such as extended TDYs) that make them unable to accomplish these training events, commanders have the option of waiving the requirement. Thus, we would expect the number of Series-11 training waivers to rise if aircrews were deployed on frequent and long-contingency operations—as USAFE crews were in 1994.

The limited data we have support this hypothesis. In a 1995 report on the effect of peace operations on combat capabilities for all the services, the General Accounting Office presented data on the total number of training waivers and the percentage of aircrews receiving waivers for USAFE A-10s, F-15Cs, and F-15Es.[6] We divided the number of waivers for a given aircraft type by the number of aircrews assigned to it to better understand the effect these waivers had on

[5]Interviews with F-15E crewmembers who took part in numerous sorties in support of Operation Provide Comfort and Operation Deny Flight indicate this was a widespread, and popular, way to pass the time while on-station over Northern Iraq or Bosnia.

[6]See U.S. General Accounting Office, *Peace Operations: Heavy Use of Key Capabilities May Affect Response to Regional Conflicts*, Washington, D.C., GAO/NSIAD-95-51, March 1995b, p. 33.

training.[7] Table 3.2 presents the results. Of particular interest to us is the variability in average waivers per aircrew, which range from under one waiver per aircrew for F-15Cs to almost nine waivers for each F-15E crew. These figures make it clear that many USAFE fighter crews, and especially F-15E crews, were probably less proficient in some combat tasks than USAF training standards demand.

We wanted to compare training waivers by command and aircraft type over the past ten years but were unable to get the necessary data. Even if historical data had been available, the 1995 and 1996 data are likely to understate the problem, because the training-cycle length changed from 6 months to 12 months. Previously, aircrews had to accomplish a set number of training events every six months. The new 12-month cycle can hide training problems, because it masks when the events were accomplished. For example, USAFE F-15Es might have accomplished all their air-to-air training events in the first two months of 1995, then deployed on a series of peace operations that prevented them from doing any air-to-air training for months. Consequently, although the number of waivers they received for this event may have been less in 1995, the aircrew proficiency in this particular task might not have improved at all. Finally, to determine the relative importance of waived events, it would be even more helpful to look at the breakdown of waiver types, in addition to knowing the number of waivers granted.

In addition to losing proficiency in important combat skills from lack of practice, these crews may actually be engaged in "negative train-

Table 3.2

USAFE Fighter Crew Series-11 Training Waivers, January Through June 1994

Aircraft	USAFE Aircrew	Total Series-11 Waivers	Average Waivers per Aircrew	Percentage of Crews Receiving Waivers
A/OA-10	33	55	1.6667	55
F-15C	50	38	0.76	66
F-15E	86	737	8.5698	100

[7]These data were provided to us by the Air Force Personnel Center.

ing" while on peace-operations missions. Although no hard evidence exists that this is the case, it has been suggested that the routine and seemingly unending nature of peace operations tends to desensitize crews to the potential dangers of their missions and results in increased complacency and decreased situational awareness.

Even discounting the possibility of negative training, it is clear that fighter crews who spend large fractions of their flight time engaged in peace operations are probably less proficient at many combat tasks than those who do not. But how much less proficient are they? Is there a way to quantify how much their combat skills are degraded? A 1989 study by Hammon and Horowitz of the Institute for Defense Analyses (IDA) investigated the relationship between flight hours (both career total and "recent practice") and performance of some air-combat skills. It found a statistically significant relationship between total flight hours and both bombing accuracy and simulated air-to-air combat victories. Statistical analysis of over 1,200 Navy and Marine Corps fighter sorties indicated that a 10 percent reduction in total flight time led to a 2 percent increase in bomb miss distance for ground-attack crews and a 5 percent reduction in air-to-air combat victories for fighter crews.[8]

This study suggests that we can expect some degradation in the combat-skill proficiency of fighter crews engaged in peace operations. However, the study was not designed to address certain serious aspects of the current peace-operations situation. First, for modern precision-guided munitions, bomb miss distance is a clumsy and somewhat outdated metric. In the post–Cold War world, hitting the target with a weapon that will cause minimal collateral damage is of great importance. Thus, the true metrics are more binary: Either hit the target or don't; either kill civilians or don't. Other important combat tasks, such as outmaneuvering missiles and avoiding fratricide, are likely to deteriorate quickly, are difficult to quantify, and have never really been studied systematically. Finally, the IDA study was designed to assess the effect of relatively small changes (on the order of 5 to 10 percent) in monthly flight-training hours on aircrew

[8]See Colin P. Hammon and Stanley A Horowitz, "Flying Hours and Aircrew Performance," Working Paper, Institute for Defense Analyses, Washington D.C., June 1989.

performance—not the effect of reducing training in certain skill areas to zero, as often results from our current peace-operations optempo.

To assess the true short-term effect of peace operations on aircrew combat skills, we need better measures of both inputs and outcomes than those used in the Hammon and Horowitz study. For that study, flight hours were a good proxy for actual training accomplished, given that, during the late 1980s, virtually all the time U.S. military aircrews spent in the air was high-quality training time. For the reasons outlined above, this may no longer be the case. To determine the true relationships between training, experience, and task proficiency, we would like to measure the number and type of training events accomplished over a given period by USAF aircrews, and then measure proficiency at the important combat tasks mentioned above. To our knowledge, no study of this type has been undertaken in recent years. As a result, we elected to adopt a less experimentally rigorous approach that makes the most of available data on USAF aircrew flight time and allows us to draw direct comparisons between the amount of high-quality training time USAF aircrew currently log and the amount they accomplished in the late 1980s.

We used flight-hour data from REMIS and information from the Air Force Personnel Center (AFPC) on the average number of crews assigned to a given command to determine the number and type of flight hours that crews in different commands and components logged from 1988 through 1995. We then set a "Cold War Standard" number of flight hours for each command or component as the average number of operational-training flight hours flown in a specific command during 1988 and 1989. We chose to normalize by these years because we know USAF crews performed exceptionally well in Operation Desert Storm, and this performance was due in part to combat skills honed during the final years of the Cold War.[9] We excluded 1990 data when establishing our standard, because, for the aircraft types of greatest interest to us, large-scale 15–20-hour deployment flights to Southwest Asia and extensive combat support time logged during the opening months of Operation Desert Shield distort the amount of operational training accomplished during

[9]An additional, but probably less significant, factor contributing to the impressive performance of Air Force combat crews during the Gulf War was the extensive in-theater preparatory training some crews received during Operation Desert Shield.

1990. We chose to normalize by command or component in order to control for the variation in responsibilities across commands, and therefore increase the comparability of our results.[10]

For the F-16 fleet, we found that, in 1995, F-16 crews logged about the same number of operational training hours per Rated Position Indicator 1 (RPI-1) pilot as during the final two years of the Cold War. RPI-1 pilots are essentially those aircrew assigned directly to combat-ready squadrons. Although other rated personnel—such as Rated Wing Staff (RPI-6) officers, and students and instructors in basic aircrew-upgrade courses—actually flew many of the hours depicted in Figure 3.5, we chose to depict flight hours on a per–RPI-1 basis for three reasons: (1) They make up the bulk of combat-ready squadrons' rated personnel, (2) they do most of the operational training and peace-operations flying, and (3) the ratio of RPI-1 crews to the total aircraft inventory was stable across the period we are interested in. This means that our measure gives an accurate picture of the amount of operational training time that crews assigned to the same weapon system in different commands accomplished relative to the last years of the Cold War.

In addition to showing that, on average, F-16 crews flew the same number of operational training hours in 1995 as in the late 1980s, Figure 3.5 shows that—because it devoted an additional 10–15 percent of its time to accomplishing a mission that did not exist during the late 1980s—the F-16 fleet as a whole had to work harder to maintain this level of high-quality-training flight time: In other words, to maintain the Cold War training standard, over the past several years F-16 crews have had to work 10–15 percent harder.[11]

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[10]For example, the number of aircrew assigned to a given Air Combat Command (ACC) weapon system is large relative to the number of operational training hours flown, because ACC (and the Tactical Air Command [TAC] before it) were responsible, until 1993, for training all new fighter crews. For our purposes, instructors count as aircrew but log relatively few operational training flight hours. For consistency, we added the crews and hours flown by Air Education and Training Command (AETC) personnel for such aircraft as F-16s (for which the initial qualification training units changed commands after 1993) to the ACC totals.

[11]To measure peace operations flown, look at the difference between "operational training" and "ops training plus peace ops." The wider the gap between the latter and the former, the more training is being degraded.

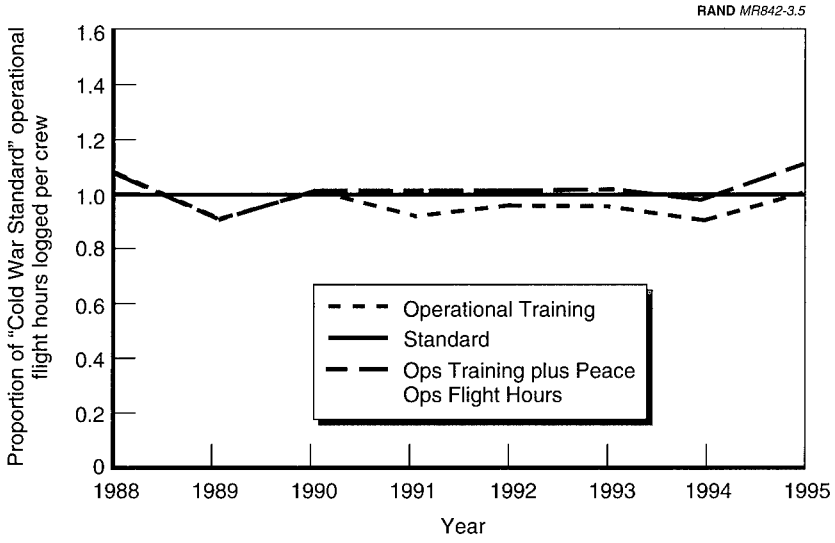


Figure 3.5—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard, All F-16s: 1988–1995

However, the peace-operations burden was not evenly distributed across the entire fleet, as Figure 3.6 shows for the flight hours per crew for F-16 units assigned to USAFE. Between 1991 and 1995, Europe-based F-16 pilots spent about 30 percent more time in the air, but accomplished about 20 percent less high-quality training than their counterparts did at the end of the Cold War.

Another important dimension of this problem is the unequal burden that these operations placed on some commands, as Figures 3.6 through 3.9 illustrate. Through the end of FY 1995, the burden was not shared equally across either the active and Reserve Components or across active-duty commands. Figure 3.7 shows that Air Combat Command F-16 crews spent a far smaller proportion of their time flying peace-operations missions than did their counterparts in Europe. What is even more striking is that the F-16s assigned to Pacific Air Forces flew virtually no peace operations sorties at all

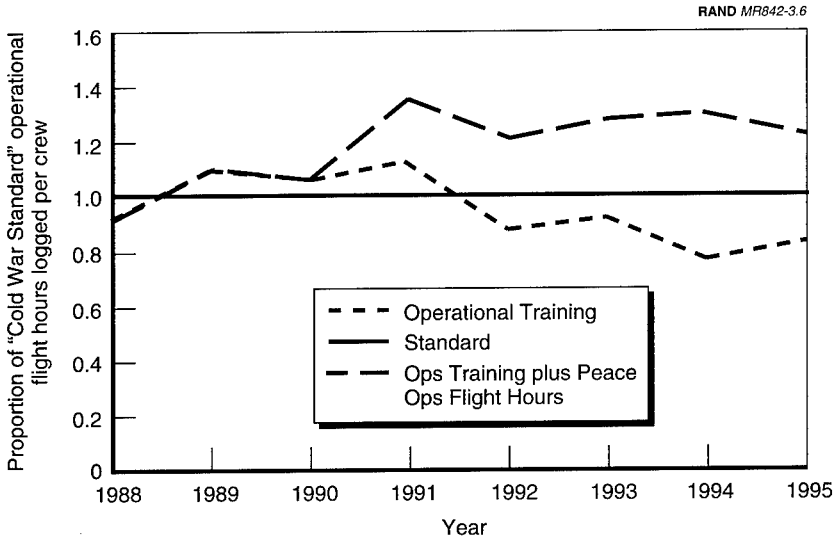


Figure 3.6—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard, USAFE F-16 Crew: 1988–1995

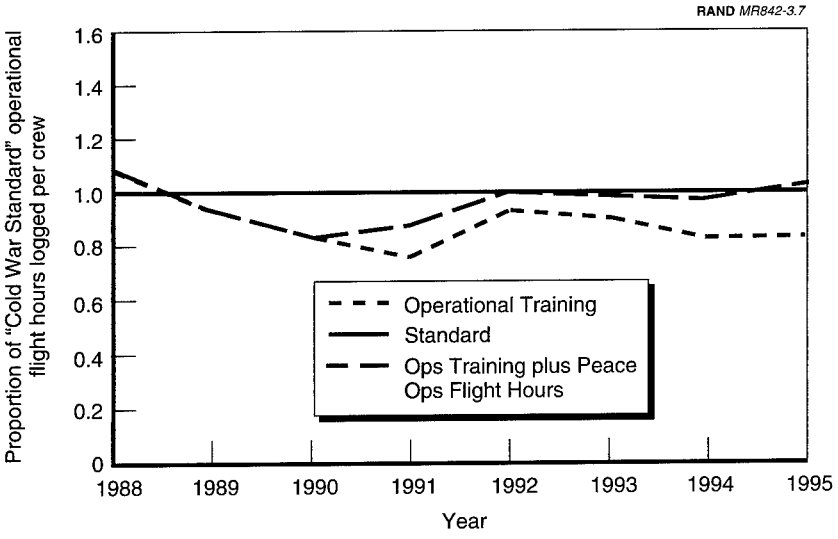


Figure 3.7—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard, ACC F-16 Crew: 1988–1995

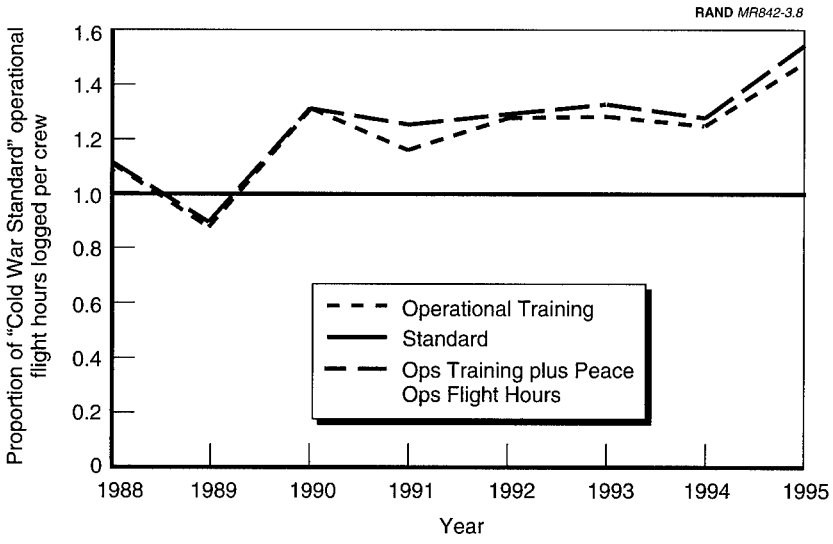
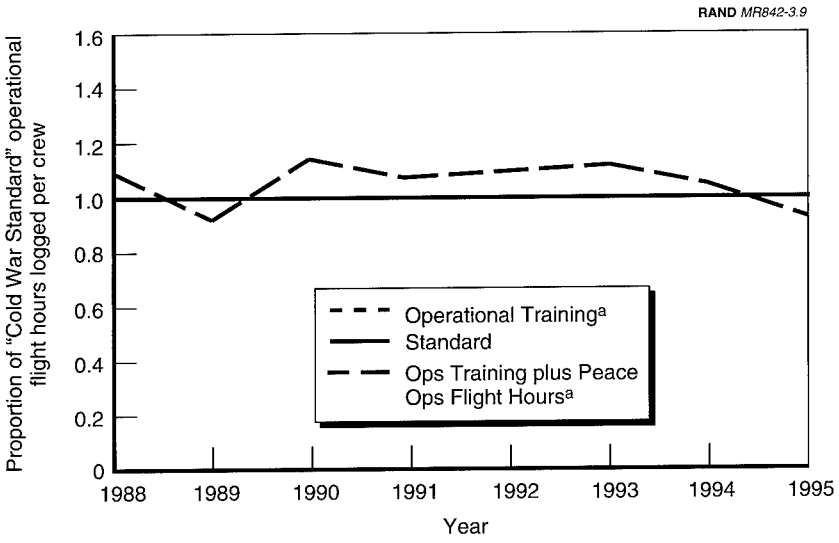


Figure 3.8—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard, ANG/AFRES F-16 Crew: 1988–1995

through the end of FY 1995.[12] F-16s assigned to the Air National Guard (ANG) and Air Force Reserve (AFRES) flew more hours in peace operations (Figure 3.8) than did Pacific Air Force (PACAF) pilots (Figure 3.9) through the end of FY 1995, but still far fewer than USAFE F-16 pilots. In addition, they flew far more operational training hours per crew than in the final stages of the Cold War. In fact, the increase in Reserve Component flight hours per crew is the only reason the F-16 fleet as a whole is maintaining the Cold War standard, since F-16 pilots in all other commands flew the same or fewer hours in 1995 than during 1988–1989.

[12]The Air Force has recently begun to spread the peace-operations burden more evenly across all force elements. In a letter dated November 26, 1996, Col Wayne K. Holum, Chief, Operational Requirements Division, HQ PACAF/DOQ, informed us that, since September 1995, PACAF has deployed 12 F-15Es, 12 F-16Cs, and 18 F-15Cs for approximately three months to Operations Deny Flight and Southern Watch. In the future, PACAF plans to have one squadron from 11th or 5th Air Force continuously deployed to either Deny Flight, Southern Watch, or Provide Comfort.



[a]Curves lie on top of each other.

Figure 3.9—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard, PACAF F-16 Crew: 1988–1995

In fact, USAFE F-16s have devoted a far larger share of their flying time to support peace operations over the past several years than have F-16s in any other active-duty command or the Reserve Components. This is not an isolated trend. The same holds for A-10s, F-15A/Cs, and F-15Es. As Figures 3.6 through 3.9 and the charts in Appendix C show, crews assigned to USAFE have consistently worked harder to maintain operational-training levels than have their counterparts in Air Combat Command and Pacific Air Forces.

Several operational commanders have recognized the destructive effect that peace operations have on the combat skills of their crews, as Lt Gen Brett Dula, Air Combat Command Vice Commander, made clear in early April 1996, when he approved a message to all ACC flying units concerning the effect of peace operations on combat readiness. The cover sheet of his message read, in part:

> It is generally agreed that aircrews are not as proficient at all required tasks when returning from Contingency Operations as they were when first deployed. Units may be fully capable in the specific mission for which they were deployed. However, most are not fully prepared for all missions required under their DOC [Design Operational Capability] taskings. ACC squadron commanders are fully justified and normally should report less than C-1 [fully combat ready] when they return from contingency operations.[13]

To restore lost currencies and proficiency as quickly and safely as possible, the 1st Fighter Wing has instituted a mandatory refresher program for all pilots returning from peace-operations deployments. ACC is considering adopting similar programs for all its units. These programs would consist of 17 to 19 sorties, depending on aircraft type, and would require 8 to 12 weeks to complete at normal flying rates.[14]

If instituted Air Force–wide, something like the 1st Fighter Wing program might return most of the lost aircrew combat-skill proficiency. However, it does not change the fact that units deployed to peace operations are not fully capable of performing their assigned MRC missions for 2 to 3 months *after* they return to home station. In addition, such remedial training measures obviously do nothing to address the morale and quality-of-life issues associated with extensive TDY necessitated by peace operations. This length of recovery time for aircrew combat skills also makes the readiness situation for USAFE fighter crews even worse than it would appear from the sheer amount of time they spend flying peace-operations sorties. For these crews, most peace-operations deployments consist of 6–9-week stints away from home station, flying sorties over Bosnia or Northern Iraq, followed by a 6–9-week stretch at home. As a result, many of

[13]Memorandum from Lt Gen Brett Dula, ACC/CV, to Maj Jeffrey Bell, ACC/DOTO, April 2, 1996. This guidance has been promulgated, but as of late September 1996 no squadron commander has reported less than C-1. We have no way of knowing if this is because recent deployments have offered unusually good training opportunities, or if squadron commanders are still somewhat reluctant to report less than C-1 status. This observation is not meant to disparage the integrity of either squadron commanders or any other USAF leaders. Rather, it is simply intended to point out that members of large organizations might be risk-averse when new policies require them to take actions that would have ended their careers under previously established, long-standing policies.

[14]Conversation with Maj Jeffrey Bell, ACC/DOTO, April 9, 1996.

these crews may never fully recover proficiency lost in the last peace-operations deployment before they are called on to begin the next.

The IDA study results discussed earlier do not apply to situations such as this. Instead of decreasing the number of bombing range passes or air-to-air engagements by 5 or 10 percent for several weeks prior to measurement, as that model assumes, aircrew engaged in peace operations often go weeks or even months without engaging in these activities at all. The amount of time USAFE F-16 crews have devoted to peace operations over the past several years is equivalent to approximately half of their Cold War training standard, which means that their high-quality training is broken into chunks separated by long periods of peace-operations deployments. As a result, their proficiency probably suffers more than the model would predict.

The data presented in Appendix C can be used to present similar arguments for AC-130, HC-130, EF-111, F-4G, Europe-based F-15, A-10, F-15E, and other aircrew who routinely logged 20, 30, or 40 percent fewer operational-training flight hours per crew over the past several years than during the Cold War. As discussed earlier in this chapter, E-3 and C-130 crews also probably suffer some degree of combat-skill degradation while participating in peace operations. For example, in peace operations, E-3 crews do not work with the large number of aircraft that typify MRC air operations. However, since they do practice some of their combat skills (e.g., E-3s vectoring fighters or C-130s conducting assault landings), their proficiency is probably degraded less than that of fighter crews.

One factor is especially important to consider when evaluating decreased combat proficiency for electronic combat and special-operations aircraft: In contrast to fighters, similar assets cannot be called on from another command if a crisis arises and highly proficient crews are needed on short notice. These small fleets of specialized aircraft represent the *entire* Air Force capability in several critical mission areas.[15]

[15]This discussion focuses on Air Force aircrews because there is sufficient hard data to begin to draw some conclusions about the effect of peace operations on aircrew combat-skill proficiency. During our research, we consistently heard compelling arguments that peace operations, and the associated high TDY rates, compromise the

It is widely known and understood that both the USAF and the U.S. military are much smaller than they were at the end of the Cold War, or during the 1991 Gulf War. What is less widely appreciated is that the extensive commitment of USAF personnel to peace operations in the years since the Gulf War ended has come largely at the expense of high-quality training time. Consequently, relative to the forces that fought and won the Gulf War, today's Air Force is both smaller and, on average, less proficient at basic combat tasks. The extent of the qualitative difference and its implications are difficult to judge but are potentially serious. This qualitative degradation (and ways to minimize it) should be a factor in future assessments of USAF force structure.

POSSIBLE LONG-TERM EFFECTS OF EXTENDED TDYs ON THE USAF

During our research for this study, we traveled extensively to get inputs from operational headquarters, unit commanders, and other Air Force personnel actively engaged in MOOTW in general and peace operations in particular. The most common theme we heard—that high TDY rates were causing morale to suffer—was so consistent we are inclined to give credence to claims that excessive TDY rates may have already reduced retention rates and will almost certainly continue to reduce them in the future.

We know of no methodologically sound study that demonstrates a link between TDY rates and indicators of poor morale, such as increased voluntary separation, divorce rates, suicide rates, etc. This is not surprising, because the Air Force had no reliable way to track the number of days an individual spent TDY until about June 1995. The new TDY tracking system provides data that will allow future analysts to test for the existence of such links. This tracking could take some time. An individual with a 3-year commitment cannot simply up and quit the Air Force as soon as the TDY rate exceeds his or her personal threshold. There could be considerable lag between the decision to

ability of maintenance personnel, civil engineers, security police, and medical units to maintain the skills and equipment they need to successfully accomplish their primary MRC missions. We believe this is true. However, there is insufficient hard data on these career fields to conduct an analysis similar to that presented for aircrew.

separate and the actual separation. Thus, it may take several years' worth of data before a clear relationship between TDY rates and retention emerges. However, just because we have no scientific proof that a link exists does not mean that the Air Force can afford to ignore the statements of numerous unit commanders and hard-pressed line personnel who assert that there is a connection.

If we can assume that the aircrew and support personnel assigned to USAFE fighter units, electronic combat and surveillance aircraft, and special-operations C-130s aspire to some semblance of a normal family life, then a requirement that they spend over 120 days away from home each year provides a powerful incentive for seeking other career opportunities. The early years of the next century could see a dramatic decrease in pilot experience levels in all fighter and bomber aircraft. The airlines are expected to continue to hire large numbers of pilots, tempting experienced USAF pilots to leave the service when their commitments expire. The effect of this trend will be aggravated by the very small number of pilots produced during the early 1990s. The burdens peace operations impose on many of these same pilots provide yet another reason for them to leave. In short, already-small cohorts of experienced pilots will face attractive offers from airlines that will try to pull them out the door. At the same time, the undesirable side effects of high peace-operations tempo (reduced high-quality training, increased TDY, etc.) will be *pushing* them out the door.[16]

There is every reason to have similar concerns about the quantity and quality of personnel the Air Force will be able to retain in the aircraft maintenance, civil engineering, and security police career fields. These personnel are at least as likely to be "pushed out" by high optempo as are combat aircrews.

A NEW APPROACH TO PEACE OPERATIONS

The triple requirement that the USAF force structure be reduced, that it maintain its current support for peace operations, and that it maintain high combat readiness for two MRCs is, in our judgment,

[16]Based on a letter from Lt Col Chris Tope, Chief of Fighter/Bomber Assignments, HQAFPC, January 25, 1996.

impossible to achieve. Either support to peace operations must be reduced or DoD must accept a decline in USAF combat readiness. Reducing combat readiness is unacceptable in the current international security environment. Thus, the USAF needs to look at ways to reduce the optempo associated with peace operations. There is, however, a way of "reducing" the USAF role in peace operations that may not materially affect the United States' ability to achieve its national objectives in such contingencies. However, it requires that U.S. defense planners think very differently about peace operations.

This approach involves conceiving of at least some peace operations in a completely different way. Instead of viewing them as "mini-MRCs" requiring 24-hour-a-day operations to find, track, and engage enemy units, the Air Force could approach them in much the same way as police forces think about deterring crime.

Generally, what the United States is trying to do in peace operations is to deter aggressive air or ground activity by one or more parties, not to prevent 100 percent of the flight activity or to shoot down 100 percent of enemy aircraft. We recognize that, to establish the credibility of the peacekeeping force, the initial stage of a peace operation might call for combat-style optempo. After an initial period of round-the-clock operations, however, the Air Component Commander could adopt a "cop-on-the-beat" approach to peace operations.

Under the cop-on-the-beat approach, a small package of fighter aircraft would patrol at random times[17] and places within the area of interest. Surveillance, reconnaissance, tanker, and other support aircraft would be kept to the absolute minimum necessary for effective operations; heavy use would be made of unmanned assets. Additional aircraft could be on call to support patrols if they ran into trouble, and to punish aggressors for any unauthorized ground or air activity occurring while no patrols were airborne. If unauthorized activities increased significantly, reinforcing units could be deployed to the theater within days or, in some cases, hours.

[17]The F-22 could play an important role in such a concept. Its stealth would allow it to randomly patrol a no-fly zone without the warring parties knowing where it is. Violators would, therefore, find it much more difficult to play cat-and-mouse with an F-22–enforced no-fly zone. The authors are indebted to RAND colleague Eiichi Kamiya for this observation and for sharing his analysis of F-22 no-fly-zone operations.

This operational concept requires far fewer deployed forces, sorties, and flight hours than current U.S. peace operations. Therefore, it would be cheaper, would compromise the combat skills of fewer aircrew (increasing overall combat readiness), and would require fewer support units and, hence, significantly less TDY by hard-pressed units. We recognize that this concept may not be feasible in every situation; the desires of the theater commander, the adversary's capabilities, and U.S. foreign policy goals could all require a larger force in a particular peace operation. Nevertheless, this concept has much to recommend it, because it relies on air power's greatest strength—the ability to rapidly assemble combat power at unpredictable times and places—to help reduce the current burden of peace operations on Air Force units.

ORGANIZATIONAL OPTIONS TO IMPROVE COMBAT READINESS AND REDUCE TDYs

Besides the cop-on-the-beat CONOP just discussed, we considered two other options available to the Air Force for reducing the negative effect of peace operations on USAF combat readiness and morale: "spreading the wealth" and employing dedicated wings. Neither of these options will be as effective at reducing these effects as adopting the cop-on-the-beat CONOP discussed above. We are including these options for the sake of completeness and to share our analysis with interested readers.

Spreading the Wealth

One way to ease the burden is to have those commands and components that currently participate relatively little in peace operations take up more of the load. Under this scheme, PACAF and the Reserve Components would take over some of the deployments currently manned by crews from USAFE or ACC. This option has the advantage of calling on any given unit less often to participate in peace operations, so it would spend less time away from home station and would fully recover from the negative effects peace operations have on combat readiness.

However, this option is not really possible for such platforms as MC-130s, EF-111s, F-4Gs, E-3s, and RC-135s, because there are so

few of these aircraft that they effectively make up a single force. No other command can be called on to take up the burden. Even for more-numerous fighter aircraft, the spread-the-wealth option may be problematic. USAFE units are currently the most heavily burdened because they are closest to the peace-operations locations and, therefore, they are less expensive to deploy than units from the continental United States (CONUS) or PACAF. As noted earlier in this chapter, PACAF units are already beginning to play a larger role in peace operations than they did through FY 1995. They are also heavily committed to counter any aggressive moves by North Korea. And given the current high level of tension between the two Koreas and the continuing economic difficulties in the North, it is probably not advisable to significantly increase PACAF's role in peace operations beyond the commitments it took on in 1996.

Looking to the Reserve Component for additional support may not be feasible either. As of September 30, 1995, 12 Air National Guard F-15 and F-16 squadrons were dedicated to the continental air-defense mission. These squadrons are not available for peace-operations rotations. In addition, many civilian employers are willing to support Guard and Reserve deployments for major crises but are not willing to sacrifice revenue and hold jobs for employees who regularly deploy in support of peace operations year after year.[18] In short, given the current force structure, budget constraints, world political situation, and active/Reserve mix, the Air Force is probably doing about as much as it can to share the peace-operations load.

The data presented in this chapter suggest that, if peace operations continue to play a major role in driving USAF operations in the post–Cold War world, the active/Reserve mix might need to shift in favor of *active* forces, which is contrary to current conventional wisdom. Figure 3.10 shows the relative peace-operations burden of Reserve and active-duty F-16 crews. Clearly, even though about half of F-16 crews are now in the Reserve Components, they accomplish only about 10 percent of the F-16 peace-operations flight hours.

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[18]William Matthews, "Bosses Have Their Limits: Humanitarian Missions Receive Lukewarm Backing," *Air Force Times*, May 27, 1996.

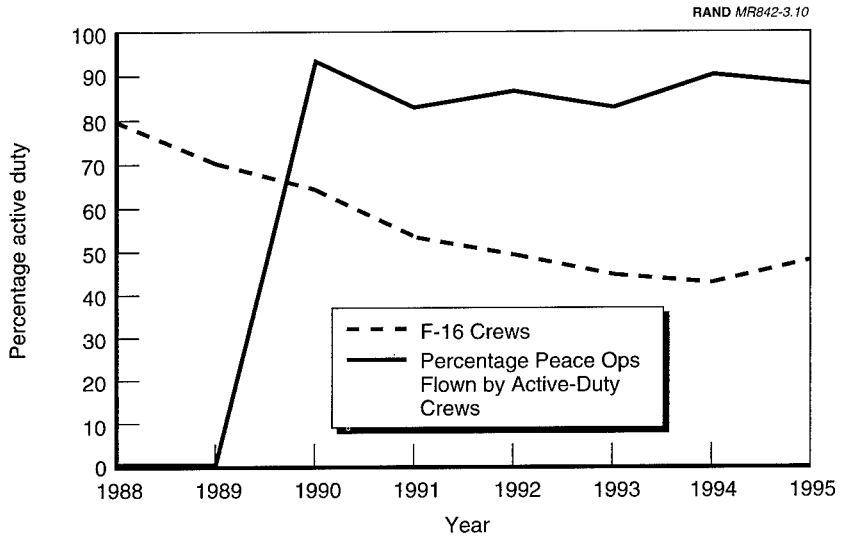


Figure 3.10—Percentage of F-16 Crews on Active Duty in Relation to F-16 Peace-Operations Flight Hours Logged by Active-Duty Crews, 1988–1995

In other words, for meeting peace-operations commitments, 1 active-duty fighter squadron is worth 9 Reserve squadrons. Peace operations are not the only thing to consider in formulating the active/Reserve force mix, and we do not suggest that it be altered 9 to 1 in favor of the active force. However, since peace operations were not explicitly considered when formulating the current force mix, and there seems to be a large difference in the relative utility of active and Reserve forces in peace operations, it is advisable to explicitly consider this feature when making future active/Reserve mix trades.

Dedicated Wings

Another possible solution to the peace-operations challenge to fighter crew readiness is to dedicate two fighter wings solely to peace operations. This is about the level of effort currently devoted to peace operations (see discussion of data presented in Figure 3.2). Since the wings' only mission would be peace operations, the Air Force would gain a test-bed and advocacy group for peace-

operations tactics, equipment, doctrine, and organization. Crew ratios could be set to sustain high operation tempos. The wings would have extraordinary TDY rates, but morale deterioration could be mitigated if they could seek volunteers who did not mind the deployments. Having these dedicated forces would allow the rest of the Air Force's fighter forces to concentrate on maintaining high proficiency for MRCs.

This solution suffers from two potential drawbacks. First, for reasons outlined above, it is not clear what the combat-skill proficiency of the dedicated wings would be. If these two wings were expected to sustain today's optempo, they would have little time for training and would likely face serious training shortfalls that could undermine both their capability to conduct sustained combat operations and even many peace operations. If the wings' combat readiness is, or is perceived to be, lower than that of other wings, the dedicated wings could get a reputation as second-rate units. This perception could delay promotions and lead to a downward spiral in both the quality and quantity of volunteers. The reduced combat capability of the two wings would also mean that two fewer wings are available to respond to MRCs and some MOOTW missions, such as counter-WMD (weapons of mass destruction) strikes or hostage rescues, for which high combat-skill proficiency is required.

Second, while dedicated wings might address the short-term fighter pilot proficiency problem, it would not solve the problems facing other types of units. These wings would still need support from surveillance, transport, tanker, and electronic combat assets. This option would do nothing to reduce demand for these assets or to reduce the TDY burden on their crews and support personnel.

CONCLUSION

Over the past 5–6 years, the Air Force has experienced a dramatic increase in the demand for many of its combat, airlift, special-operations, and support elements in peace operations. The number of aircraft flight hours devoted to this activity has increased almost twentyfold, while the total number of Air Force, Air National Guard,

and Air Force Reserve aircraft has decreased 30 percent, from 9,416 aircraft in 1988 to 6,621 in 1995.[19]

For many types of aircraft, particularly the fighters, peace operations provide little or no useful opportunity to practice many important combat skills. Although the total number of flight hours devoted to peace operations was less than 10 percent of the total flown by all three components in 1995, the burden was not distributed evenly between either active and Reserve Components or among active-duty commands. These two factors combine to dramatically affect the short-term combat readiness of large numbers of Air Force fighter crews (especially those in Europe) and special-operations crews. The concomitant increased demand for medical, security-police, and civil-engineering units strains those units' ability to meet MRC commitments by reducing training opportunities and limiting equipment availability. Finally, by pushing out highly trained and experienced personnel, the increased TDY generated by peace-operations commitments could have a serious long-term effect on Air Force combat readiness.

There are several possible approaches to dealing with the peace-operations challenge. One not mentioned previously is to simply do nothing and hope they go away. However, since none of the three major ongoing peace operations—Operation Provide Comfort, Operation Southern Watch, and Operation Joint Endeavor—has a definitive end date and other commitments may arise at any time, this approach is probably not advisable. Of the other possible alternatives, the most promising—a new approach to peace operations—would be to take advantage of air power's inherent economy-of-force attributes by adopting a "cop-on-the-beat" operational concept for conducting peace operations. This type of approach could dramatically reduce the size of deployed forces while constantly reminding the target parties that U.S. air power can appear anywhere at any time to punish peace-accord violators. This option has the advantage of addressing both the short-term combat-readiness issues and longer-term quality-of-life issues associated with peace operations.

[19]USAF, *United States Air Force Statistical Digest FY 1993 and 1994*, and *Air Force Almanac*, May 1996.

In Part II of this report, we move beyond these immediate concerns to consider tasks that the USAF could face in future MOOTW. Chapter Four begins this exploration with an assessment of the scope of future U.S. involvement in MOOTW. Chapter Five identifies first the tasks that the USAF is likely to be assigned in these operations, then new technologies and associated CONOPs that can enhance the USAF's capability to accomplish these tasks.

PART II

FUTURE U.S. INVOLVEMENT IN MOOTW

Chapter Four

PREDICTING THE SCOPE OF FUTURE U.S. INVOLVEMENT IN MOOTW

In this chapter, we move away from an assessment of problems associated with the USAF's current high optempo and toward the future. We begin by discussing the global developments that have made MOOTW more central to U.S. defense planning and operations. We then consider the evidence for and against a continuation of the current high level of U.S. involvement in MOOTW.

THE INCREASED SALIENCE OF MOOTW SINCE THE END OF THE COLD WAR

Since the end of the Cold War, MOOTW have moved from being perceived as a military "sideshow" to occupying center stage. If this is a temporary state of affairs, the USAF can make do with short-term fixes to the high-optempo problem. If, however, large-scale MOOTW are here to stay, more-permanent fixes such as those proposed in Chapter Three will be necessary. In looking ahead, therefore, force planners need to know whether to expect the increased salience of MOOTW to continue to be a feature of the geopolitical landscape. To answer this question, we must first consider what has caused the increased U.S. involvement in MOOTW since the end of the Cold War.

One view is that the increased involvement derives from the political volatility generated in the post–Cold War world by the collapse of communism. Communist regimes had repressed a great deal of potential ethnic strife. When they ceased to exist, the underlying animosities that had lain dormant for decades became active, most notably in the former Yugoslavia and in some regions of the former

Soviet Union (primarily the Caucasus, but also in Central Asia). In addition, according to this view, the Cold War itself imposed a certain stability on the world: The superpowers, concerned about the possibility of escalation, often restrained their client states from overt acts of violence. With the end of the Cold War, this restraint was no longer imposed.

At the same time, the "failed-state" phenomenon appears to be growing worse. Somalia and Liberia are the clearest examples of states that have completely collapsed under the pressures of civil war.[1] For some states, this process may have proceeded further than it would have during the Cold War, when one or the other superpower may have felt compelled to intervene more forcefully to prevent a client government from collapsing or to forestall intervention by its rival.

In addition, population pressure, resource depletion,[2] and the various pressures of "modernization" (increased urbanization,[3] disruption of subsistence agriculture, etc.) can cause instability and the disruption of traditional ways of life. A common reaction to this disruption is the growth of fundamentalist religious sentiment, as people search for a traditional anchor in the midst of progressively stormier seas; this fundamentalism can, in turn, lead to civil war and violence, directed either against a nonfundamentalist government or religious minorities.

While many of these trends in fact exist, it is not clear how fully they explain the increase in U.S. MOOTW activity. Aside from the fact

[1]Robert Kaplan presents a pessimistic assessment of this phenomenon in "The Coming Anarchy," *The Atlantic Monthly*, February 1994, pp. 44–76.

[2]For an insightful analysis of resource competition as a cause of conflict, see James Winnefeld and Mary Morris, *Where Environmental and Security Concerns Meet: Green Conflict in Asia and the Middle East*, Santa Monica, Calif.: RAND, MR-378-RC, 1994.

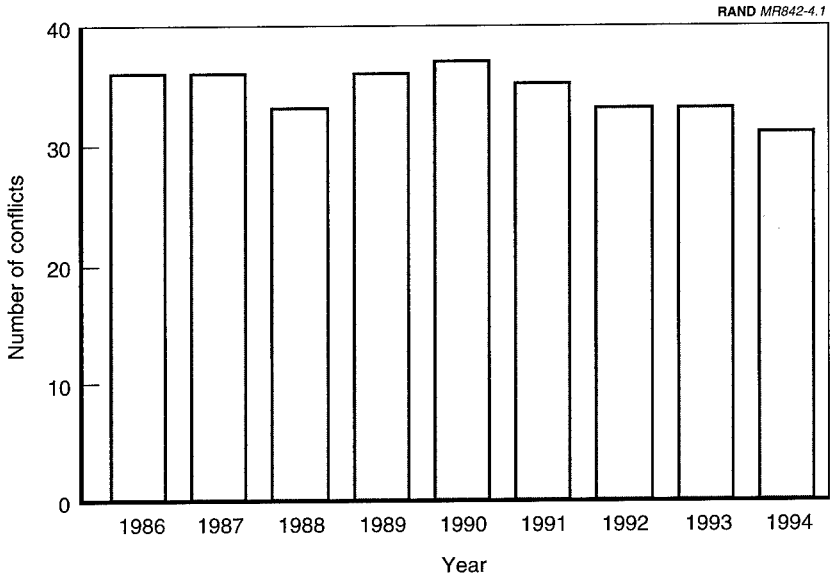
[3]It is interesting that the greatest urban population growth is occurring in the developing world. For example, Africa's urban population is projected to be three times that of North America by the year 2025. See Jennifer Taw and Bruce Hoffman, *The Urbanization of Insurgency*, Santa Monica, Calif.: RAND, MR-398-A, 1994, p. 3, and Eugene Linden, "The Exploding Cities of the Developing World," *Foreign Affairs*, January/February 1996, Vol. 75, No. 1, pp. 52–65.

(discussed more fully below) that the amount of disorder in the world does not necessarily correlate with the amount of U.S. military action to deal with it, a number of countervailing trends can also be discerned.

For example, the collapse of the Soviet Union has also meant that there is less support for anti-Western insurgencies throughout the world. This trend is most noticeable in Latin America. The economic crisis in Cuba, brought on by the cessation of Soviet subsidies, deprives anti-American groups throughout the hemisphere of a potential source of support. There has also been a decrease in the number of former Soviet client regimes against which insurgencies are being waged, either because the communist regime has ceased to exist (e.g., the Sandinistas in Nicaragua) or because the United States or other anti-communist states no longer have an incentive to oppose them (e.g., U.S.–supported insurgencies in Angola and Mozambique). Finally, the end of Soviet support for clients in the Middle East (e.g., the Palestine Liberation Organization [PLO] and Syria) has increased the chances of peace in that region of the world.

It is difficult to assess how these trends balance; however, data compiled by the Stockholm International Peace Research Institute (SIPRI) show a relatively stable number of armed conflicts in the world during the period 1986 through 1994 (see Figure 4.1). Explaining the increased U.S. MOOTW involvement as resulting from the greater amount of disorder in the world would be difficult. Furthermore, this disorder represents, at most, one side of the equation: the "demand," as it were, for U.S. involvement. The other side is the "supply": U.S. willingness to become involved in this disorder.

For U.S. involvement, the end of the Cold War has probably been an important factor for several reasons. Most important, U.S. moves are less constrained by the possibility of Russian counters. For example, Somalia (and the Horn of Africa generally) had been an important geopolitical battleground during the Cold War; the U.S. insertion of 30,000 troops into the region would have been a major event in the U.S.–Soviet competition and could easily have provoked a massive counteraction. Obviously, these types of considerations no longer posed a restraint to U.S. action in December 1992.



SOURCE: SIPRI, *1987 SIPRI Yearbook*, New York: Oxford University Press, p. 297; *1988 SIPRI Yearbook*, New York: Oxford University Press, p. 287; *1989 SIPRI Yearbook*, New York: Oxford University Press, p. 399; *1995 SIPRI Yearbook*, New York: Oxford University Press, p. 24.

Figure 4.1—Global Number of Armed Conflicts, 1986–1994

More generally, the end of the Cold War has meant that the United Nations can be more energetic and play a greater role in dealing with disorder throughout the world. The general paralysis of the Security Council (except in crises, such as those in the Middle East, that posed a serious enough threat to peace to require the United States and the Soviet Union to reach a compromise solution) no longer exists. At the same time, the United States could play a bigger role in peacekeeping operations, which, under Cold War circumstances, tended to be the preserve of a handful of small states, "neutrals," and essentially mercenary troops, such as those from Fiji and Nepal, whom both sides could trust to behave in an apolitical and strictly humanitarian manner.

PROJECTING THESE TRENDS INTO THE FUTURE

As for the future, the evidence is inconclusive. On the one hand, much of the current wave of ethnic strife seems to be a temporary phenomenon traceable to the end of communist repression. Unless a new anti-Western superpower emerges, anti-Western insurgencies, terrorist groups, etc., will not have an obvious source of potential support to turn to as they did during the Cold War. Thus, over the next decades, the collapse of communism could lead to a general trend toward a more peaceful world.

On the other hand, the other causes of instability discussed above may continue or increase. In particular, Samuel Huntington has predicted a more violent future, caused by a "clash of civilizations" among the Islamic, Chinese, Slavic-Orthodox, Western, and other groups.[4] This conflict could lead to large-scale warfare between such groupings or increased low-level violence (e.g., terrorism) as weaker civilizations seek to undermine and harass those they dare not confront in conventional combat.

The latter possibility might come about as Western influences impinge on more-traditional ways of life, particularly in the Muslim world. As the world becomes more interconnected through improved telecommunications, increased international trade, and a more global economy, then—according to this view—the differences between civilizations, instead of fading away, may become exacerbated. The reason: The pressures of modernization would produce a backlash as peoples around the world feel uprooted from their traditional way of life and uncertain about the future; in response, they would cling (or return) to their traditional ways, but with a certain fanaticism bred of insecurity and the sense that these traditional values are under attack. For example, the rise in India of the Hindu nationalist party in opposition to the cosmopolitanism of the Congress party could be understood along these lines. The victory of Islamic

[4]See Samuel P. Huntington, "The Clash of Civilizations?" *Foreign Affairs*, Summer 1993, Vol. 72, No. 3, pp. 22–49. Bernard Lewis discusses the possibility of a "clash of civilizations" between the Muslim and Western worlds in his "The Roots of Muslim Rage," *The Atlantic Monthly*, September 1990, pp. 47–60. For a critique of Huntington's thesis, see Fouad Ajami, "The Summoning," *Foreign Affairs*, September/October 1993, Vol. 72, No. 4, pp. 2–9.

fundamentalism in Iran in reaction to the Shah's program of rapid modernization and Westernization is another example.

Many of these groups see the United States as a threat to their traditions and have engaged in violent acts against U.S. interests.[5] Although the collapse of communism has removed one source of support for such groups, Iraq, Iran, Syria, and Libya all have sufficient resources to meet the relatively modest needs of those terrorist groups that wish the United States harm. Furthermore, terrorist organizations are becoming increasingly adept at exploiting the weaknesses of advanced nations.

This "clash of civilizations" may lead to instability in some cases. But instability is not a necessary outcome. For example, the vigorous promotion of "Asian values" (in opposition to Western "decadence") by such modernizing states as Singapore and Malaysia carries with it no reason to expect violence or instability to occur.

DETERMINANTS OF U.S. POLICY IN THE FUTURE

It would generally appear that there is no way to predict whether global instability will mushroom. In any case, there is not necessarily a correlation between such instability and U.S. involvement in MOOTW.

Evolution of National Security Policy

Instead, the degree of U.S. MOOTW involvement will depend primarily on how U.S. national security policy evolves. So far, U.S. policy in the post–Cold War world has been very internationalist in orientation; indeed, it has had a strong idealistic side, as is evident in the terms used to summarize it, such as the "New World Order" of the Bush administration and the "Engagement and Enlargement" of the Clinton administration. In both cases, the explicit goal of promoting democracy has been an important part of the overall strategy.

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[5]For an assessment of the link between religion and terrorism, see Bruce Hoffman, *"Holy Terror": The Implications of Terrorism Motivated by a Religious Imperative*, Santa Monica, Calif.: RAND, P-7834, 1993.

The Clinton administration has also set a goal of strengthening and energizing the U.N., to make it more relevant and to enable it to fulfill the functions initially envisioned for it. While the emphasis on this component of national security policy has decreased since the beginning of the administration, it remains a possible impetus for MOOTW involvement. In addition, the U.S. desire to preserve the vitality of its Cold War alliances provides a motive for MOOTW involvement, as exemplified by the U.S. contribution of ground forces to the NATO Implementation Force (IFOR) in Bosnia.

While the overall level of U.S. MOOTW involvement will probably be determined more by trends in U.S. national security policy than by any other factor, events in the world will, of course, serve as triggers for individual operations regardless of the policy preferences of a particular administration.

Instability or Violence Abroad

The greatest pressure will probably be felt in cases in which Americans, especially officials such as those serving in embassies, are endangered by instability or violence abroad. Noncombatant evacuation operations may be required in such cases, leaving very little choice for the administration. Examples include the evacuation of embassy staff from Somalia (1991) and Liberia (1996), the evacuation of Americans caught in the civil war in Lebanon (1976), and the rescue of the medical students in Grenada (1983), although, in that case, other, strategic motivations were probably more important.

Threats posed to Americans at home or abroad by terrorism or weapons of mass destruction are also likely to lead to military action. Military forces might intervene to stop a planned or ongoing terrorist operation, to rescue hostages, or to retaliate after a terrorist attack. Similarly, U.S. military forces might strike WMD production or storage facilities to prevent an attack or to retaliate after hostile use

of WMD against U.S. interests.[6] One increasingly worrisome possibility is that terrorists will use WMD against the United States.[7]

Instability that threatens a neighbor, ally, or strategically important nation could lead to U.S. intervention, despite the United States' desire to stay out of the counterinsurgency business. Unrest that threatened to provoke a massive flow of refugees, either to the United States (e.g., Haiti in 1994) or to an ally (the massive flight of Kurdish refugees to Turkey in 1991), may also prompt an administration to intervene.[8]

Other mechanisms that could force the United States to engage in MOOTW can also be imagined. For example, instability that threatened a regime possessing WMD or similar dangerous materials (plutonium, toxic materials, etc.) might force the United States to intervene to ensure that these items or the lethal infrastructures that produced them did not fall into the wrong hands.[9] Similarly, an outbreak of a highly contagious disease, in an area where the government was unable to maintain order and provide appropriate medical care, might frighten the United States (and others) into taking action to try to contain the spread of the epidemic.[10]

Fear of a Wider War

Beyond these situations in which an administration might feel compelled to take action lies a vaguer set of motives for MOOTW. In

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[6]U.S. military forces might also be involved in operations to protect allies from WMD. For example, Lesser and Tellis argue that European exposure to WMD threats in the Mediterranean will result in demands for additional U.S. guarantees, particularly during coalition operations such as Desert Storm. See Ian Lesser and Ashley Tellis, *Strategic Exposure: Proliferation Around the Mediterranean,* Santa Monica, Calif.: RAND, MR-742-A, 1996.

[7]A balanced discussion of this possibility is found in Walter Laquer, "Postmodern Terrorism," *Foreign Affairs,* September/October 1996, Vol. 75, No. 5, pp. 24–36.

[8]For a thoughtful analysis of the military role in responding to refugee flows, see Barry Posen, "Military Responses to Refugee Disasters," *International Security,* Summer 1996, Vol. 21, No. 1, pp. 72–111.

[9]We want to thank RAND colleague Bruce Nardulli for identifying this potential task.

[10]Laurie Garrett argues that such outbreaks will become more common, in "The Return of Infectious Disease," *Foreign Affairs,* January/February 1996, Vol. 75, No. 1, pp. 66–79.

some cases, the fear of a wider war that could affect the United States or its allies might prompt action. For example, initial U.S. involvement in Bosnia was motivated in part by the fear that war could spread to Kosovo and elsewhere in the Balkans. In Bosnia, for example, the war did not spread (although it is hard to know whether or not it would have, had the United States and others not taken the actions they did, such as deploying peacekeeping troops to Macedonia).

Humanitarian Concerns

Finally, there is what may be called the "CNN effect": intervention justified by humanitarian concerns and having little or no visible strategic rationale, such as the deployment to Somalia in 1992. A global U.S. responsibility is argued in one variation or another: If *X* is a serious enough problem, then the United States should do something about it. Thus, policymakers often feel compelled by pubic and media pressures to intervene in situations whether or not there is a clear U.S. interest.

CONCLUSION

Thus, the key issue for the future of MOOTW is the evolution of U.S. national security policy. If the general policy orientation remains "engagement and enlargement" or something similar, then the current high tempo of MOOTW is likely to continue. If, conversely, there were a turn toward a more nationalist or even isolationist policy, then involvement in certain types of MOOTW (particularly peace and humanitarian operations) would likely decrease. A reduction in peace operations would ease the optempo burden and combat-readiness problem but would not eliminate MOOTW challenges altogether. MOOTW directed at narrower national goals (e.g., counterproliferation, counterterrorism, NEOs, and counterdrug operations) would probably continue under any conceivable national security policy.

These latter operations are increasingly likely and will drive U.S. MOOTW involvement over the next decade. Thus, even if the need for peace operations goes away or the next few administrations choose not to participate in them, the USAF will, nevertheless, face

significant MOOTW challenges: responding to terrorism, proliferation of WMD, and instability that directly affects American interests. These operations may not produce the optempo problems associated with current peace operations, but they present a host of technical, operational, and diplomatic problems and tasks for dealing with those problems.

In the next chapter, we identify and analyze those specific tasks the USAF has been called upon to accomplish in past MOOTW and offer some thoughts on what additional tasks the USAF will face in the future. We then present four CONOPs for exploiting new technologies and enhancing the USAF capability to accomplish the additional tasks.

Chapter Five

ENHANCING USAF CAPABILITIES FOR MOOTW

The tasks we identify in this chapter are those the USAF may be called upon to perform in future MOOTW operations. Many of them have been performed by the USAF in the past or are part of current doctrine; others are more speculative and represent our attempt to think expansively about the future global environment. We first assess the Air Force's ability to accomplish these tasks with currently deployed forces, then present and discuss several new CONOPs—for both near term and long term—to accomplish some of the more challenging MOOTW tasks.

ASSESSING USAF CAPABILITIES FOR MOOTW

To assess USAF capabilities for current and future MOOTW, we need to move our discussion from general mission categories (e.g., disaster relief) to the specific tasks the USAF will be expected to accomplish in future MOOTW. We begin by considering the tasks air and space power has been called upon to accomplish in past MOOTW. These include the following:

- Airlift relief supplies
- Insert, support, and extract special forces during operations in denied territory
- Evacuate noncombatants from dangerous situations
- Airlift special cargoes or passengers
- Find and rescue victims of shipwrecks, plane crashes, and natural disasters

- Advise, train, and equip friendly nations to defeat internal or external threats
- Monitor and enforce peace agreements
- Provide surveillance and transportation for drug-interdiction efforts
- Conduct raids against high-value targets in well-defended areas
- Transport and provide surveillance and fire support for large intervention forces.

Each of these operational-level tasks can, in turn, be broken into more-detailed tactical-level tasks. For example, enforcing peace agreements might entail enforcing a no-fly zone, monitoring a zone of separation, providing close support to peacekeepers on the ground, transporting peacekeepers, and/or providing intelligence to joint or combined commanders. These tasks can be broken down still further into even more-detailed tasks. For our purposes, we stay at the operational level, with occasional forays down to the tactical level.

Continuing Tasks: How Has the USAF Done?

Generally, the USAF has successfully accomplished the tasks assigned to it, either because it was well equipped and well trained for the task or, when it was not, by devoting significant assets and personnel to the task. Although we were unable to identify any operations that failed to achieve their primary mission because of inadequacies in USAF MOOTW capabilities, significant problems or shortfalls may still have interfered. Certainly, the tragic shoot down of two U.S. Army helicopters over northern Iraq by USAF F-15s was evidence of just how inappropriate the standard operating procedures were for that environment. In Bosnia, surveillance shortfalls and concerns about collateral damage prevented the USAF from effectively countering Serb artillery, mortars, and snipers firing on Sarajevo. It is too early to tell how much air and space power can

contribute against these targets, but it appears that available technologies could significantly improve USAF capabilities.[1]

There are some particularly difficult tasks that the USAF has not yet been called upon to perform. For example, although the USAF struck Iraqi WMD facilities during Desert Storm, it has not yet been tasked to destroy a WMD facility in a peacetime raid, perhaps in part because of known limitations of existing deep-penetrating munitions, as well as for concerns that toxic agents might be released.

There are also instances in which air and space power might have made a major contribution if it had been available. For example, AC-130 gunships and even jet fighters might have made an important contribution on October 3, 1993 ("Bloody Sunday"), in Mogadishu, Somalia. On that day, U.S. Army Rangers and Delta Force commandos were ambushed and trapped by a large Somali force, resulting in the most-intense small-unit fighting since the Vietnam War. The endurance, precision, and shock effect of fixed-wing fire support might have suppressed Somali fire sufficiently so that the Rangers could be extracted by helicopters. At the least, it would have significantly increased the fire support available to U.S. soldiers and probably would have saved some lives in the process.

Preparing for Future MOOTW

Our review of past operations leads us to the conclusion that the USAF's MOOTW challenge is less about correcting shortfalls associated with past failures than it is about improving and expanding USAF capabilities to accomplish future, more-demanding tasks. Indeed, the greatest challenge may be thinking more expansively and creatively about how to apply air and space power in future MOOTW. Such thinking is particularly important in view of the new sensor, weapon, and aircraft technologies that, if embraced by the USAF,

[1]Concepts to defeat snipers and artillery from airborne platforms are presented in Alan Vick, David Orletsky, John Bordeaux, and David Shlapak, *Enhancing Air Power's Contribution Against Light Infantry Targets*, Santa Monica, Calif.: RAND, MR-697-AF, 1996.

could substantially increase its capability to accomplish MOOTW tasks, including such tactical-level tasks as the following:

- Maintain covert, persistent, high-resolution surveillance of a point target (e.g., hostage location)
- Detect, identify, and attack personnel in urban or heavily wooded areas
- Detect, identify, and attack artillery, mortars, and snipers
- Protect convoys
- Control mobs
- Secure an urban landing zone.

In some situations, it will not be possible to accomplish these tasks wholly or at all from the air. In other situations, advances in sensors, unmanned aircraft, and nonlethal weapons have the potential to significantly increase the contribution that air and space power can make in many MOOTW situations. For example, the combination of foliage-penetrating radars, hyperspectral image processors, thermal imagers, long-range electro-optical devices, and air-implanted ground sensors can give airborne platforms an enduring, often high-resolution, portrait of activities in urban or wooded areas.[2] When mounted on unmanned aerial vehicles, these sensors can often go where manned platforms would not be risked or could not go. One such application would use a small battery-powered UAV equipped with an uncooled thermal imager and flown at building level or below to provide high-resolution, covert, night monitoring of activities during urban peace operations. Other sensors, such as foliage-penetrating or synthetic aperture radars (SARs), could be carried by long-endurance, medium- or high-altitude UAVs to monitor wooded areas or roads. Finally, a number of nonlethal weapons, such as incapacitating agents or net barriers, could be used from airborne platforms.

[2]For a more detailed discussion of these technologies and their application in MOOTW settings, see Vick et al., *Enhancing Air Power's Contribution*, 1996.

NEW CONOPs FOR A NEW WORLD

To illustrate how these technologies could be applied in future MOOTW, we present and discuss four new concepts of operation—two near term and two far term—to accomplish the following tasks:

- Detect and destroy drug-growing and drug-processing locations
- Monitor peace agreement and enforce with air and space power only
- Conduct opposed evacuation of U.S. nationals from an urban setting
- Detect, identify, and neutralize a WMD-manufacturing facility.

For the first two tasks, we present CONOPs that could be implemented within the next five years using technologies either already deployed or well along in R&D. For the last two tasks, we present CONOPs for the year 2015 to illustrate how more-exotic technologies might be used to accomplish these missions.

The CONOPs presented here seek to achieve one or both of the following goals:

- The CONOP performs the MOOTW task better than one using currently available systems.
- The CONOP performs the MOOTW task while reducing the optempo of MRC-critical assets.

Near-Term CONOP 1: Detect Drug-Growing and Drug-Processing Locations

If the United States becomes more active in combating the flow of illegal drugs over its borders, the USAF will likely play a major role. Since beginning drug interdiction in 1983, the USAF has focused most of its effort on the surveillance of international airspace and waterways. Once a suspect vehicle is identified as a possible drug-runner, the Air Force generally passes the information to a different organization for engagement. In many cases, this organization is a U.S. law enforcement agency that engages the suspected drug-runners in U.S. territory—either upon landing at an airstrip or, for

boats, in U.S. territorial waters. Other times, the information is passed to the air force of an allied nation, whose fighter aircraft then identify and engage the suspected drugrunning aircraft.

One possible escalation of the drug war would be to significantly expand surveillance and engagement efforts within growing, producing, and exporting countries. Locating and identifying drug-growing and drug-processing locations is a task well suited to the USAF and its assets—a task that could become one of the more frequent uses of air and space power in a MOOTW context. Once these facilities were detected, they could be destroyed by U.S. air power, by host-nation military forces, or by a combined operation. Given past practices, the most common approach would probably be for the host nation's police and military forces to raid the facility following cueing from U.S. assets.

This near-term CONOP, depicted in Figure 5.1, would use a medium-altitude, long-endurance UAV carrying a foliage-penetrating (FolPen) radar and a hyperspectral image (HSI) processor to detect drug-growing and drug-processing locations. Radars operating in the high-frequency (HF) and very high-frequency (VHF) portion of the radio spectrum can penetrate foliage with relatively little attenuation. The FolPen radar could detect buildings and vehicles that are completely obscured by foliage. Under many circumstances, objects that lack the necessary contrast to be detected using only the visual portion of the spectrum can be detected using HSI processing, which samples across hundreds of bands from the ultraviolet to the infrared to produce a detailed description of the incident radiation on the detector element. An HSI processor would look through gaps in the foliage and, depending on the geometry, it may be able to detect and identify coca fields or other drug-producing infrastructure. In this way, unnatural objects, including visually camouflaged items that would otherwise appear to be completely masked by foliage in the visible portion of the spectrum, can often be detected.

The systems can be used to cue each other to further investigate suspicious areas; when used in combination, they can often positively identify such locations.

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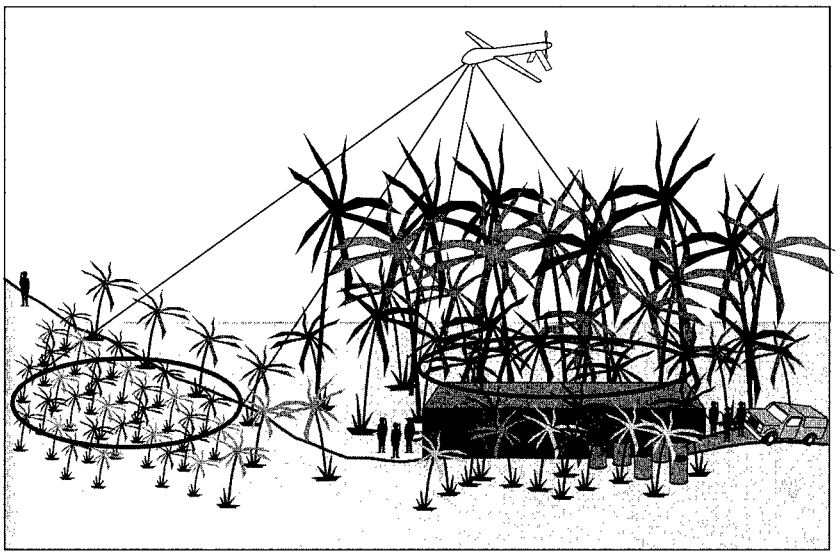

Figure 5.1—Detect Drug-Growing and Drug-Processing Locations: FolPen Radar and HSI

Near-Term CONOP 2: Monitor and Enforce Peace Agreements

This CONOP, depicted in Figure 5.2, was designed to mitigate some of the problems that result from the high optempo caused by USAF participation in peace operations. It does so by substituting unmanned surveillance platforms (e.g., UAVs) for manned (e.g., the Joint Surveillance Target Attack Radar System [JSTARS]). It envisions a peace agreement in which the warring parties are obligated to place their heavy weapons in cantonment areas (as the Dayton Agreement obliged the Bosnian parties). A high-altitude UAV (e.g., Global Hawk) monitors these cantonment areas, highways, and open areas, using a radar with an SAR mode and a moving-target indicator

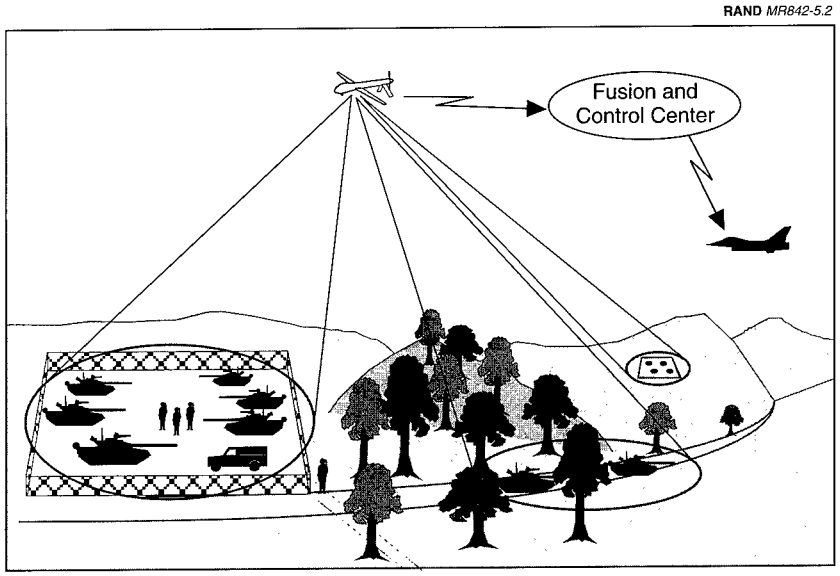

Figure 5.2—Monitor and Enforce Peace Agreement

(MTI) mode. A high-altitude platform was chosen to maximize the area covered and to provide long on-station times.[3]

To spot vehicles missing from a cantonment area, onboard computer processing of SAR images can compare images from the last mission with the current images to identify changes. If a change is detected, the radar's MTI mode can be used to search the area around the cantonment area for moving vehicles. The MTI mode can search large areas quickly. Tactical air (TACAIR) could be called upon to positively identify suspect vehicles that are moving away from the cantonment area. TACAIR can also be used to destroy the violators.

[3]The design parameters for the Global Hawk UAV are 3,000-nautical-mile range and 24 hours on-station.

Far-Term CONOP 1: Conduct Opposed Evacuation of U.S. Nationals from Urban Setting

As of this writing, the USAF has performed at least 31 noncombatant evacuation operations since U.S. personnel were evacuated from Hanoi in July 1954. In most of these operations, adversaries did not make serious attempts to disrupt the evacuation. This may not always be the case. The USAF should be prepared for situations in which the adversary's national military forces or a sizable subnational group attack the U.S. civilians and military forces during the evacuation.

Let's consider a situation in which the United States must conduct an opposed evacuation of a large number of noncombatants from an urban area. Such a contingency could require the USAF to accomplish all six of the tactical-level tasks listed earlier in this chapter.

In our concept of operation for the year 2015 (see Figure 5.3), we envision using high-endurance UAVs equipped with electro-optical sensors and SARs to provide continuous surveillance of critical areas such as landing zones, the U.S. Embassy, main roads, airfields, and locations of hostile forces. Large medium- and high-altitude UAVs would be supplemented by small, low-altitude platforms and air-dropped ground sensors that could provide very high-resolution surveillance of selected targets. Vertical takeoff and landing (VTOL) aircraft, such as CV-22 Ospreys, would be used to insert security forces to protect the landing zones. The security forces would deploy ground sensors and nonlethal weapons (e.g., acoustic devices) for perimeter security. The security forces would also be able to call on airborne platforms for support. These airborne platforms might deliver sticky foam and other barriers, incapacitating agents, small precision-guided munitions, or directed-energy weapons. Satellite telephones would be used by Embassy staff to arrange pickups for isolated evacuees and to organize the movement of others to landing zones.

If ground convoys were necessary to move evacuees to airfields, ports, or landing zones, their movement could be monitored by UAVs equipped with electro-optical sensors, counterbattery radars,

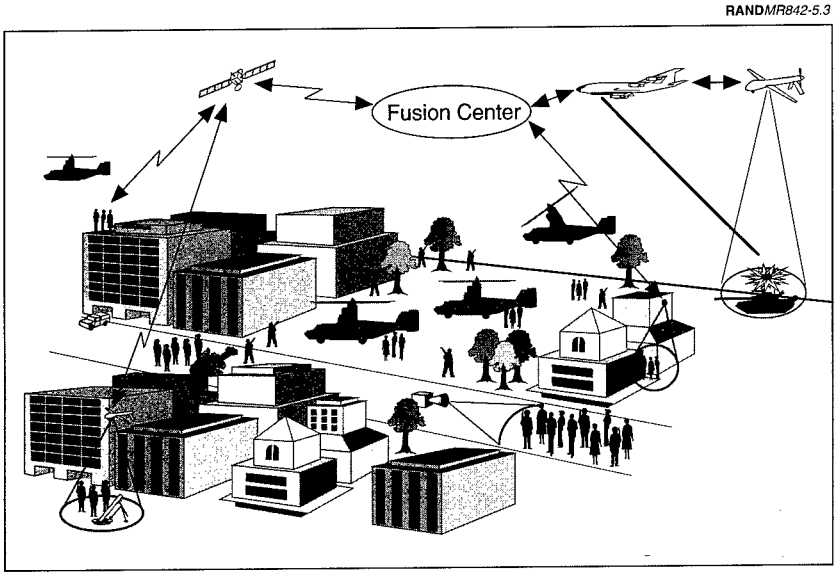

Figure 5.3—Conduct Opposed Evacuation of U.S. Nationals from Urban Setting

and sniper-detection systems. Airborne fire support could be provided by AC-130 gunships, fighter aircraft, or advanced aircraft carrying directed-energy weapons. The gunships and fighter aircraft could use a mix of lethal and nonlethal weapons, as the situation called for.

Far-Term CONOP 2: Detect, Identify, and Neutralize WMD Facilities

The spread of weapons of mass destruction may be the single greatest threat to U.S. interests in the post–Cold War world, particularly if these weapons become available to terrorists. To prevent these weapons from being deployed or used, the USAF may be tasked to detect, identify, and neutralize WMD-production facilities. This is a

task for which air and space power is well suited and will likely play a primary role.

This CONOP for the year 2015 describes a three-step approach to the identification and destruction of an underground biological-weapons research and production facility. First, the suspected facility must be positively identified as a weapons plant. Second, the facility must be destroyed without releasing toxic materials into the atmosphere. Third, battle-damage assessment (BDA) must be performed to confirm that the facility has indeed been destroyed and to determine whether any toxic materials were released during the attack.

The first step in this CONOP is to confirm that the suspected facility is producing biological weapons. In some cases, the United States might want the host nation to know that it is watching them; in others, this surveillance would need to be covert. In this CONOP, we assume that covert reconnaissance is called for and envision a stealthy UAV dropping insectoids over the suspect facility. *Insectoids* are small (fly size or smaller) autonomous land-based robots that can execute simple instruction sets.[4] Each insectoid would carry one or more sensors that can be used to confirm that the suspected facility is actually producing biological weapons. Sensor types could be video (visual and infrared), chemical, seismic, and others. The insectoids would be programmed to seek out ventilation tunnels and other routes of access to the facility. Some insectoids could be programmed to wait by the door and, at night, jump on a worker's pants' leg for access. We envision that each load of insectoids will be accompanied by one or more "mother insectoids," functioning as the communications center. It will be larger than the other insectoids, to accommodate the power required to communicate with an airborne relay station. Each insectoid will have a low-power communications device; a relay method may be used to transmit gathered information

[4]These sensors are currently being developed by Sandia National Laboratories and are expected to be available within the next five years. See Pat Cooper, "Tiny Troops May Combat Chemical Agents," *Air Force Times,* December 9, 1996, p. 42; and Keith W. Brendley and Randall Steeb, *Military Applications of Microelectromechanical Systems,* Santa Monica, Calif.: RAND, MR-175-OSD/AF/A, 1993.

to the mother insectoid. In addition to positively confirming that the facility is producing biological material, the insectoids could provide information on the type of toxins being produced, the underground structure of the facility, and other information necessary to plan an attack (see Figure 5.4).

A primary objective during the attack would be to minimize the amount of material that may be vented to the atmosphere. Either of two options is envisioned: (1) detonate high explosives underneath the facility in an effort to entomb the dangerous material or (2) detonate thermal weapons inside the facility to produce very high temperatures and destroy the material before it can be vented. The choice of engagement method requires a careful analysis of the likely characteristics of the underground facility, the types of agents involved, and the nature of the surrounding area (collateral-damage concerns). The engagement CONOP discussed here was chosen to illustrate a variety of plausible technologies.

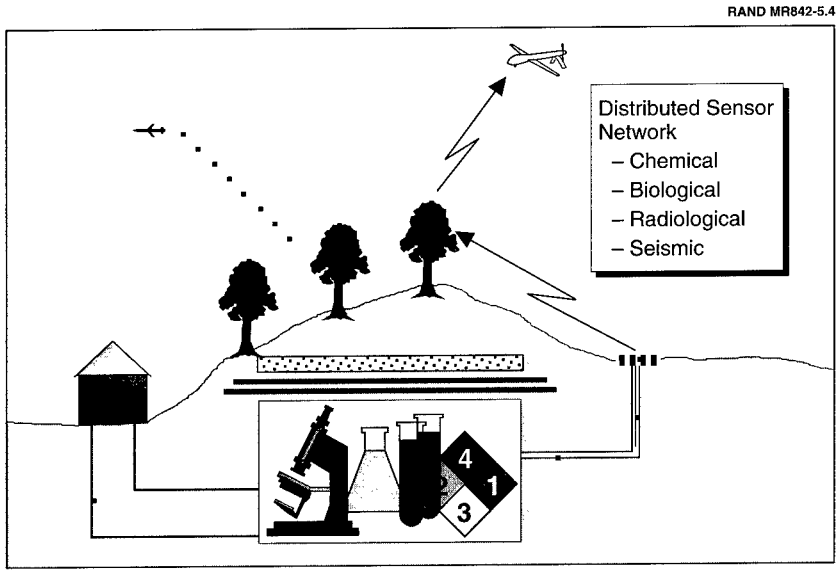

Figure 5.4—Step 1: Detect and Identify WMD Facilities

This CONOP uses a B-2 to deliver one or more guided boosted penetrator weapons equipped with thermal warheads,[5] as shown in Figure 5.5. This weapon would need either a smart or imaging fuze to ensure that it detonated at the optimal depth. One fuze under development by the Air Force uses an accelerometer to determine whether it is passing through concrete, soil, or an empty space (such as an underground room). The fuze could be programmed to detonate in the first room it reaches or on a particular floor of a multistory facility. The latter option would obviously require that superb intelligence about the facility be gained from the insectoids or other sources. A second fuzing option would be a ground-penetrating radar that, just prior to impact, would image the facility to determine the optimal location to detonate. This imaging fuze is in the earliest stages of development and may prove impractical. The figure also shows several other guided weapons being employed on the ventila-

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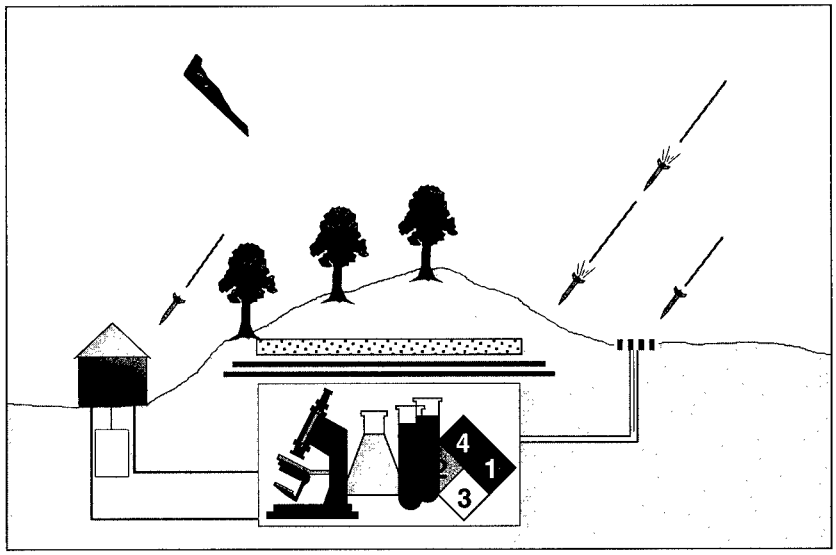


Figure 5.5—Step 2: Neutralize WMD Facilities

[5]The boosted penetrator is an Air Force program that is being developed by the Wright Laboratories.

tion shafts and entry ways. These weapons are intended to maximize damage to the facility and to make repair or extraction of any remaining material more difficult.

Once the facility has been attacked, another set of insectoids is dropped, as shown in Figure 5.6. These insectoids would function in much the same way as in the pre-attack phase, but would likely have a different set of sensors to perform BDA. These insectoids would likely provide images of the damage and test for traces of any biological agents that may have been vented.

EVALUATING THE CONCEPTS OF OPERATION

All of the CONOPs presented in this chapter could either enhance USAF capabilities to accomplish MOOTW tasks or reduce the operating tempo of USAF forces currently assigned to MOOTW missions. As Table 5.1 indicates, two of the CONOPs enhance USAF capabilities, one reduces optempo, and one achieves both objectives.

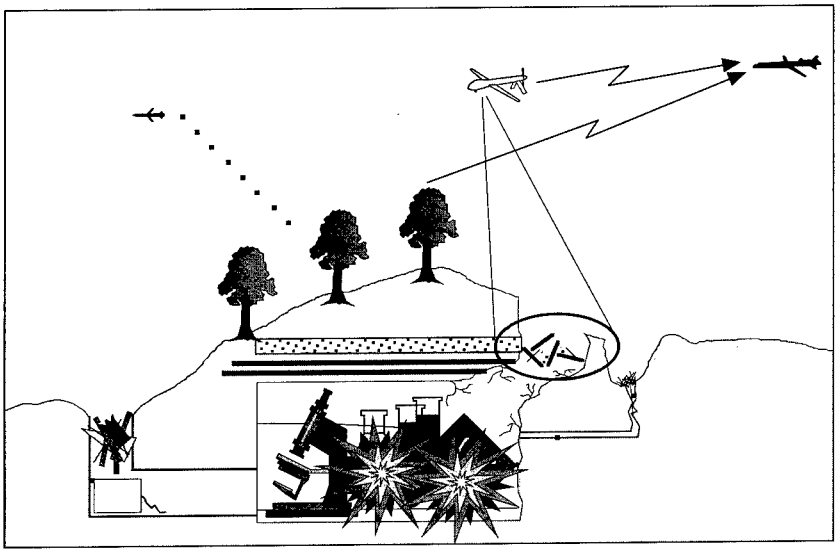


Figure 5.6—Step 3: Conduct BDA Following Attack on WMD Facility

Table 5.1

Potential of CONOP to Enhance Capabilities or Reduce Optempo

CONOP	Enhances USAF Capabilities	Reduces USAF Optempo
Drug interdiction	X	X
Peace monitoring		X
Opposed NEO	X	
Attack WMD	X	

The peace-monitoring concept was the only concept that would not enhance USAF capabilities, but it would achieve its primary objective of reducing optempo. Replacing JSTARS with a UAV would reduce capability, but UAVs with SARs can meet most peace-operations requirements for surveillance. Conversely, if the USAF develops air-implanted ground sensors, they could be used to supplement UAV monitoring of peace operations: Internetted ground-sensor arrays, when combined with airborne SARs, offer a vast improvement over even JSTARS' surveillance potential and could substantially improve USAF capabilities to monitor ground traffic. However, a ground-data fusion center equivalent to the JSTARS battle-management staff would probably have to be created to exploit the UAV and ground sensor data, driving up the cost of this option.

Most of the technologies discussed in this chapter are already being developed, but few are being funded for MOOTW purposes. Some of the technologies will need much more maturing before they can be deployed; others (e.g., SARs on UAVs) are being used operationally in Advanced Concept Technology Demonstration (ACTD) programs. Some of these technologies (e.g., directed-energy weapons) will most likely be developed for MRCs. MOOTW applications will be given low priority, and, unfortunately, most technologies for those applications will fail to reach operational status—some because they prove impractical or too expensive, but many others because they lack strong sponsorship from a user.

It is our hope that the CONOPs presented here will capture the imagination of planners and operators throughout the Air Force and will provide the impetus for new programs to enhance USAF

MOOTW capabilities. We recognize that these are difficult times in which to start new programs but believe that the USAF will find that a relatively small investment in some MOOTW-specific technologies will pay large dividends by adding critical MOOTW tasks to the list of USAF competencies and by minimizing the number of general-purpose forces involved in MOOTW.

Chapter Six

CONCLUSIONS

Most USAF MOOTW are relatively short, small-scale disaster-relief or humanitarian-aid missions. Both these common operations and many of the less frequent ones (e.g., search and rescue) do not significantly increase peacetime operational tempo. Recent peace operations, by contrast, have proved to be problematic because of their size, duration, overlapping nature, and demands on specialized assets (e.g., AWACS, intelligence platforms, and SOF aircraft) and on the fighter force. Indeed, although they represent only 9 percent of USAF MOOTW since 1989, peace operations are responsible for 90 percent of the USAF sorties flown in MOOTW during this same period.

As the USAF force structure has been reduced, the remaining forces and personnel have been stretched thinner and thinner across these peace operations, combat training, and exercises. As a result, many units are experiencing annual TDYs greatly exceeding the USAF 120-day goal and, for some fighter units, peace operations have cut significantly into time and sorties available for combat training. Thus, if the current pace of peace operations continues, particularly if additional force-structure reductions are made, the USAF is likely to face growing training, readiness, and morale problems. *In short, peace operations are the cause of the USAF's optempo problem: Solve this problem and the "MOOTW problem" will go away.*

A NEW APPROACH TO PEACE OPERATIONS

The USAF and DoD have several options for dealing with this challenge. First, they might determine that a somewhat lower combat

readiness is acceptable for some units or the USAF at large, given expected threats and warning times. Second, they might determine that a greater percentage of USAF force structure needs to be in the active component, where it can assist more readily with peace operations. Finally, they might attempt to influence the demand side of the equation by seeking to limit the number or size of DoD commitments to peace operations.

The first option does not appear to be credible in the near term, given short-warning threats in Southwest Asia and Korea. It may be worth reconsidering in the future if the threat situation changes fundamentally. The second option is likely to be problematic in view of the increased costs associated with moving forces from the Reserves to the active force, but it nevertheless deserves a closer look. At the least, the USAF should explore ways that Reserve forces might contribute more to ongoing peace operations.

We judge the greatest near-term leverage on this problem to be found on the demand side. What we have in mind is not so much that DoD question the wisdom of participating in peace operations, although there is value in asking tough questions prior to sending forces to these operations. Rather, we suggest that the Joint Staff, theater commands, and the services look very hard at the putative requirements for these operations. Current deployments, plans, and concepts for air peace operations reflect an operational orientation more appropriate to high-intensity combat than to peacekeeping. Therefore, a new approach to peace operations is called for that employs military forces in a manner consistent with the unique political and military objectives of peacekeeping.

The Office of the Secretary of Defense, the Joint Staff, USAF, and theater planners need to look hard at U.S. objectives in a particular operation to ensure that the deployed forces are sized to those objectives rather than to more-demanding combat tasks. For example, it is appropriate to ask what U.S. (and allied or U.N.) leaders hope to accomplish when they create and enforce a no-fly zone. In many cases, the objective is likely to be to deny the adversary routine use of some specified airspace. To accomplish this mission, it is not necessary to hermetically seal the no-fly zone; under these circumstances, combat air patrols need not be flown 24 hours a day. Good surveillance, combined with random patrols, should be sufficient to deter

most flights. This approach could significantly reduce the number of aircraft necessary to enforce no-fly zones, easing optempo for all affected units. We propose that the USAF take the lead in developing this cop-on-the-beat approach to operations.

Finally, technology can make a major contribution by reducing the number of expensive manned platforms that need to be deployed to such contingencies. UAVs and air-implanted ground sensors can meet many surveillance requirements at lower cost and with fewer deployed personnel than can manned platforms. Investing in these systems may, ironically, be the most cost-effective way of enhancing USAF capabilities for MRCs. By freeing expensive manned systems to focus on their MRC tasks, relatively cheap UAVs and ground sensors can contribute to both the MOOTW and MRC missions.

LOOKING TO THE FUTURE

In this report, we identify ten existing and four new operational-level tasks that the USAF is either currently doing, is expected to be prepared to accomplish, or could plausibly be assigned in the next 10 to 20 years. In our judgment, such taskings are going to come to the USAF whether or not the institution finds MOOTW an attractive mission. Even if the USAF makes no special effort to develop MOOTW capabilities, the inherent characteristics of air and space power—particularly global situational awareness, responsiveness, long range, precision strike, and potential to minimize friendly casualties—will make it the force of choice in many situations.

If the USAF chooses to embrace MOOTW and develop some of the technologies described in this report, air and space power could become the most versatile military instrument of the twenty-first century. It could decisively influence the outcome of events spanning the spectrum from peace operations to major conflicts. For this vision to be realized will require more than the development of new technologies. It will require that air-and-space-power theorists think more expansively and creatively about the application of that power in unconventional settings, and develop new doctrine, tactics, organizations, and procedures to meet the messy challenges of the early twenty-first century.

Appendix A

USAF MOOTW OPERATIONS, 1916–1996

This appendix presents our database of 869 military operations other than war (MOOTW) in which the United States Air Force (USAF) or its predecessors participated between 1916 and 1996. The database lists basic information about each operation; as the reader can see, the level of detail about the number and types of aircraft involved varies greatly. The database is drawn primarily from USAF sources. A second important source of information is the database developed by Defense Forecasts International (DFI, 1995), a defense consulting company based in the Washington, D.C., area.

Table A.1

USAF MOOTW Operations, 1916–1996

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Mexican Punitive Expedition	Strike/raid	Mexico	1916						USAF, 1993a, p.1.
Patrol of US-Mexico Border	Border control	SW US	1919–1921	DH-4s	67	14,000			Maurer, 1987, pp.99–108.
Forest Fire Patrol	Civil support	Calif, Oregon	1919–1921	JN-4Hs, DH-4s		3,000			Maurer, 1987, pp.131–137.
Aerial Mapping	Civil support	US	1919–1925						Maurer, 1987, p.139.
Flood Relief	Disaster relief	US/ Mexico	1919						Maurer, 1987, p.143.
Crop Dusting	Civil support	US	1921–1924						Maurer, 1987, p.142.
Rio Grande Flood	Disaster relief	US	1922						Maurer, 1987, p.143.
Colorado Mine Disaster	Disaster relief	US	1922						Maurer, 1987, p.144.
Delaware River Ice Jam	Civil support	US	1923						Maurer, 1987, p.144.
Platte River Ice Jam	Civil support	US	1924						Maurer, 1987, p.144.
Susquehanna River Ice Jam	Civil support	US	1926						Maurer, 1987, p.144.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Mauna Loa Eruption	Disaster relief	US	1926						Maurer, 1987, p.144.
First US Air Mail Flights	Civil support	US	Feb–Jun 1934			5,000[a]			Maurer, 1987, p.299.
Post-Hostilities Mapping	Map west Pacific	Pacific	Sep 47–52						USAF, 1991a, p.30.
Aid to Greece	Humanitarian aid	Greece	Sep 47–May 48	Airlifters					USAF, 1991a, p.21.
Egypt Cholera Outbreak	Disaster relief	Egypt	Oct 47	Airlifters					USAF, 1991a, p.30.
Saudi Cholera Outbreak	Disaster relief	Saudi Arabia	Nov 47	C-54	1			5	USAF, 1991a, p.30.
Soviet Escort Flights	Military assistance	Japan	Dec 47	Fighters					USAF, 1991a, p.12.
Hayride	Disaster relief	US	Jan–Mar 48		356	2,462		4,780	Lempert, 1992, pp.27–33.
Vittles (Berlin Airlift)	Humanitarian aid	Berlin	Jun 48–Sep 49	C-47s, C-54s		277,000 0		2,300,000	USAF 1991b, p.4.
Yellow Fever Outbreak	Disaster relief	Panama	Jan 49	B-29	1	1			USAF, 1991a, p.30.
Ecuador Earthquake	Disaster relief	Ecuador	Aug 49	C-47s	12			41	USAF, 1991a, p.30.
Indian Cholera Outbreak	Disaster relief	India	Sep 50	C-47s					USAF, 1991a, p.30.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Japanese Earthquake	Disaster relief	Japan	Mar 51	Airlifters					USAF, 1991a, p.30.
Indian Locust Infestation	Disaster relief	India	May 51	C-47s					USAF, 1991a, p.30.
Costa Rican Yellow Fever	Disaster relief	Costa Rica	Sep 51	C-82, H-5					USAF, 1991a, p.30.
Italian Flood	Disaster relief	Italy	Nov 51	Airlifters					USAF, 1991a, p.30.
Philippine Volcano Eruption	Disaster relief	Philippines	Nov 51	Airlifters					USAF, 1991a, p.30.
Aid to Berlin	Humanitarian aid	Berlin	Dec 51	Airlifters				1	Snyder and Shaw, 1993, p.42.
Iceland Fruit Lift	Humanitarian aid	Germany	Jan 52	C-119				2	USAF, 1991a, p.21.
Warm Clothes	Disaster relief	Japan	Mar 52	Airlifters					USAF, 1991a, p.30.
Support to French Forces	FID	Indo-China	Jul 52–Jul 54						USAF, 1991a, p.21.
British Airliner Crash	Search and rescue	Med. Sea	Jul 52	Helicopter					USAF, 1991a, p.31.
Hurricane Olive	Disaster relief	Kwajalein	Sep 52	Airlifters					USAF, 1991a, p.31.
Hajji Baba (Magic Carpet)	Humanitarian aid	Lebanon	Aug 52	C-154	13		3,763		USAF, 1993a, p.20.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
British Floods	Disaster relief	Great Britain	Jan 53	Airlifters					Synder and Shaw, 1993, p.46.
Dutch Flood	Disaster relief	Nether-lands	Feb 53	Airlifters				500	USAF, 1991a, p.31.
Ecuador Floods	Disaster relief	Ecuador	Mar 53	C-47s	6			657	USAF, 1991a, p.31.
Japanese Ship Rescue	Search and rescue	Okinawa	Mar 53	Helos					USAF, 1991a, p.31.
Turkish Earthquake	Disaster relief	Turkey	Apr 53	C-119s	4				USAF, 1991a, p.31.
Mercy Lift (Japanese Flood)	Disaster elief	Japan	Jun 53	Airlifters					USAF, 1991a, p.31.
Greek Earthquake	Disaster relief	Greece	Aug 53	C-119s	20			135	USAF, 1991a, p.31.
Kinderlift I	Humanitarian aid	Berlin to FRG	Aug 53	Airlifters			1,500		USAF, 1991a, p.21.
Korean Aid	Humanitarian aid	Korea	Nov 53	Airlifters				1	USAF, 1991a, p.31.
Austrian Avalanche	Disaster relief	Austria	Jan 54	Airlifters			68[b]		USAF, 1991a, p.31.
Rescue at Sea	Search and rescue	Casablanca	Jan 54	Airlifters					USAF, 1991a, p.31.
Aid to Island of Juist	Humanitarian aid	Germany	Feb 54	C-119				13	USAF, 1991a, p.31.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Middle Eastern Floods	Disaster relief	Iraq, Syria	Apr 54	Airlifters					USAF, 1991a, p.31.
Greek Earthquake	Disaster relief	Greece	May 54	C-119s	3			10	USAF, 1991a, p.31.
Wounded Warrior	Humanitarian aid	Vietnam	Jun–Jul 54	Airlifters			509		USAF, 1993a, p.21.
Hanoi Evacuation	NEO	Vietnam	19 Jul 54	Airlifters			75		USAF, 1994a, p.37.
Kinderlift II	Humanitarian aid	Berlin to FRG	Jul 54	Airlifters					USAF, 1991a, p.22.
Indian Floods	Disaster relief	India	Aug 54	C-119s	7				USAF, 1991a, p.31.
Pakistani Floods	Disaste r relief	East Pakistan	Aug 54	Airlifters					USAF, 1991a, p.31.
Honduran Floods	Disaster relief	Honduras	Sep 54	C-47s, helos	10, 2			50	USAF, 1991a, p.32.
Algerian Earthquake	Disaster relief	Algeria	Sep 54	Airlifters, helos					USAF, 1991a, p.32.
Japanese Oil-Storage Fire	Disaster relief	Japan	Oct 54	C-124s					USAF, 1991a, p.32.
Hurricane Hazel	Disaster relief	Haiti	Oct 54	Airlifters					USAF, 1991a, p.32.
Tachen Island Crisis	Military assistance	Taiwan	Feb 55	F-86s		184			USAF, 1994a, p.39.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Philippine Earthquake	Disaster relief	Philippines	Apr 55	Airlifters					USAF, 1991a, p.32.
Greek Earthquake	Disaster relief	Greece	May 55	Airlifters					USAF, 1991a, p.32.
Hiroshima Maidens	Humanitarian aid	Japan	May 55	Airlifters			25		USAF, 1991a, p.32.
French Wind Damage	Disaster relief	France	Aug 55	Airlifters					USAF, 1991a, p.32.
Kinderlift III	Humanitarian aid	Berlin to FRG	Aug 55	Airlifters					USAF, 1991a, p.22.
Mexican Floods	Disaster relief	Mexico	Sep 55	Airlifters, helos				630	USAF, 1991a, p.32.
Costa Rican Floods	Disaster relief	Costa Rica	Oct 55	Airlifters					USAF, 1991a, p.32.
Deep Freeze '55	Logistics support	Antarctica	Nov 55	Airlifters					USAF, 1991a, p.32.
Japanese Flooding	Search and rescue	Japan	Nov 55	Helos					USAF, 1991a, p.32.
Colombian Floods	Disaster relief	Colombia	Nov 55	C-47s					USAF, 1991a, p.32.
Drug Lift	Humanitarian aid	Italy	Jan 56	Airlifter					USAF, 1991a, p.32.
Snowbound	Disaster relief	Greece	Feb 56	C-119s	40			332	USAF, 1991a, p.32.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Turkish Earthquake	Disaster relief	Turkey	Mar 56	C-119s				89	USAF, 1991a, p.32; Snyder and Shaw, 1993, p.55.
Argentine Polio Outbreak	Disaster relief	Argentina	Mar 56	C-124s	2				USAF, 1991a, p.22.
Lebanese Earthquake	Disaster relief	Lebanon	Mar 56	Airlifters				18	Snyder and Shaw, 1993, p.55.
Iranian Floods	Disaster relief	Iran	Aug 56	Airlifters				17	USAF, 1991a, p.32.
Kinderlift IV	Humanitarian aid	Berlin to FRG	Aug 56				3,000+		USAF, 1991a, p.22.
Hungarian Refugee Aid	Humanitarian aid	Hungary	Nov 56	C-119	25			189	USAF, 1991a, p.22.
Suez Crisis	Peace ops/NEO	Suez Canal	Nov–Dec 56	C-121, C-124			1,500	170	USAF, 1993a, p.21.
Japanese Famine	Disaster relief	Japan	Dec 56						USAF, 1991a, p.32.
Safe Haven	Humanitarian aid	Austria	Dec 56–June 57				10,000		Lempert, 1992; USAF, 1993a.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Moroccan Locust Infestation	Disaster relief	Morocco	Jun 57	Airlifters				200	USAF, 1991a, p.32; Snyder and Shaw, 1993, p.57.
Japanese Flood	Disaster relief	Japan	Jul 57	H-21 helos					USAF, 1994a, p.43.
Kinderlift V	Humanitarian aid	Berlin to FRG	Jul 57				2,000		Lempert, 1992, p.42.
Deep Freeze '57	Logistics support	Antarctica	Oct 57	C-124					USAF, 1993a, p.22.
Iranian Earthquake	Disaster relief	Iran	Dec 57	Airlifters					USAF, 1991a, p.33.
Laos Road Building	FID	Laos	Mar 58	C-130s					USAF, 1991a, p.22.
Lebanon Crisis	NEO preparations	Germany	May 58	C-124s	18				Blechman and Kaplan, 1978, Table 7-1.
Thai Cholera Outbreak	Disaster relief	Thailand	Jun 58	C-130	1	1			USAF, 1991a, p.33.
Blue Bat	FID	Lebanon	Jul 58	Lifters, TACAIR	?, 55		5,500	5,500	USAF 1993a, p.22; USAF, 1991a, p.13.
Quemoy Crisis	Military assistance	Taiwan	Aug 58	Lifters, TACAIR					USAF, 1993a, p.23.
Japanese Typhoon	Disaster relief	Japan	Sep 58	C-47s, H-21 helos				2+	USAF, 1994a, p.47.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Portuguese Shipwreck	Search and rescue	Azores	Sep 58	Helo			48		USAF, 1991a, p.33.
Moroccan Flooding	Disaster relief	Morocco	Dec 58	Helos					USAF, 1991a, p.33.
People to People	Humanitarian aid	Korea, Japan	May 59	C-130s					USAF, 1991a, p.33.
Guatemalan Polio Outbreak	Disaster relief	Guatemala	Jun 59	C-118					USAF, 1991a, p.33.
Typhoon Vera Relief	Disaster relief	Japan	Sep 59	C-124, C-130, H-21			5,000	200	USAF, 1993a, p.23; USAF, 1991a, p.33.
Okinawan Ship Rescue	Search and rescue	Okinawa	Oct 59	SH-19 helos			29		USAF, 1994a, p.50.
Moroccan Food Poisoning	Disaster relief	Morocco	Nov 59	Airlifters					USAF, 1991a, p.33.
French Dam Break	Disaster relief	France	Dec 59	Airlifters					USAF, 1991a, p.33.
Peruvian Earthquake	Disaster relief	Peru	Jan 60	Airlifters	3			15	USAF, 1991a, p.33.
Amigo	Disaster relief	Chile	Feb 60	C-130s					USAF, 1991a, p.33.
Moroccan Earthquake	Disaster relief	Morocco	2–7 Mar 60	C-118s			505	185	USAF, 1993a, p.23.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Brazilian Floods	Disaster relief	Brazil	Mar-Apr 60	C-124s, helos	6, 2			160	USAF, 1993a, p.23; USAF, 1991a, p.33.
Chilean Earthquake	Disaster relief	Chile	May 60	C-118s, C-124s			1,020	851	USAF, 1993a, p.24.
Japanese Typhoon	Disaster relief	Japan	Jun 60	Airlifters					USAF, 1991a, p.34.
New Tape	Peace operation	Belgian Congo	Jul 60–Jan 64	Airlifters	110	2,128	63,798	18,593	USAF, 1993a, p.24.
Japanese Polio Outbreak	Disaster relief	Japan	Aug 60	Airlifters					USAF, 1993a, p.24.
Philippine Flooding	Disaster relief	Philippines	Sep 60	Airlifters					USAF, 1991a, p.34.
Pakistan Cyclone	Disaster relief	Pakistan	Oct 60	C-130s				80	USAF, 1991a, p.34.
Japanese Floods	Disaster relief	Japan	Dec 60	Airlifters					USAF, 1991a, p.34.
Road Grader	Humanitarian aid	Pakistan	Dec 60	Airlifters				664	Snyder and Shaw , 1993, p.66.
Korean Aid	Humanitarian aid	Korea	Jan 61	Airlifters				2	USAF, 1991a, p.34.
Congo Famine	Disaster relief	Congo	Jan 61	C-130s	16			1,000	USAF, 1991a, p.34.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Kenyan Floods	Disaster relief	Kenya	1961	Airlifters				24	Matthews and Ofcansky, 1986, p.4.
Jordan Floods	Disaster relief	Jordan	Apr 61	Airlifters					USAF, 1991a, p.34.
Bell Tone	Military assistance	Thailand	Apr 61	F-100s, F-102s	6, 4				USAF, 1991a, p.14.
Yemeni Fires	Disaster relief	Yemen	Apr 61	Airlifters					USAF, 1991a, p.34.
Libyan Storms	Disaster relief	Libya	Apr 61	Airlifter					USAF, 1991a, p.34.
Egyptian Insect Infestation	Disaster relief	Egypt	Aug 61	Airlifter				60	USAF, 1991a, p.34.
Assistance to Peru	Humanitarian aid	Peru	Aug 61	C-130s	5			299	USAF, 1991a, p.22.
Taiwan Air Defense	Military assistance	Taiwan	Aug–Sep 61	F-102					USAF, 1991a, p.14.
Thai Flood	Disaster relief	Thailand	Sep 61	C-130s					USAF, 1991a, p.34.
Project Tackhammer	Military assistance	Germany	4–7 Sep 61	Airlift, TACAIR	?, 7 sqdrns				USAF, 1993a, p.25.
Cambodian Flood	Disaster relief	Cambodia	Oct 61	Airlifters					USAF, 1991a, p.34.
Pipe Stem	FID	Vietnam	Oct 61	RF-101s	4	87			USAF, 1991a, p.14.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Stair Step	Military assistance	Germany	Oct–Nov 61	Airlift, TACAIR			10,000	2380	USAF, 1993a, p.25.
Brass Ring	Military assistance	Germany	Nov 61	Lifters, F-104s					USAF, 1993a, p.25.
Farmgate	FID	Vietnam	Nov 61	C-47s, T-28s	4, 8				USAF, 1993a, p.25; USAF, 1991a.
Hurricane Hattie	Disaster relief	Belize	3–14 Nov 61	C-141s					USAF, 1993a, p.25.
Able Mable	FID	Thailand	Nov 61	RF-101	4				USAF, 1991a, p.14.
Kenyan Floods	Disaster relief	Kenya	Nov 61	Airlifters					USAF, 1991a, p.34.
Congolese Famine	Disaster relief	Congo	Nov 61	Airlifters					USAF, 1991a, p.34.
Somalian Floods	Disaster relief	Somalia	Nov 61	Airlifters					USAF, 1991a, p.34.
Vietnam Defoliate Test	FID	Vietnam	Dec 61	C-123s	6				USAF, 1991a, p.15.
Project Mule Train	FID	Vietnam	Dec 61	C-123s					USAF, 1993a, p.25.
Support to A. Schweitzer	Humanitarian aid	Gabon	1961						Matthews and Ofcansky, 1986, p.4.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
German Floods	Disaster relief	FRG	Feb 62	C-130s, helos	6, ?			45	USAF, 1991a, p.34; Snyder and Shaw, 1993, p.70.
Philippine Floods	Disaster relief	Philippines	Feb 62	Airlifters				29	USAF, 1991a, p.34.
Guatemalan Unrest	FID	Panama	Mar 62	C-130s	6				USAF, 1991a, p.23.
Libyan Floods	Disaster relief	Libya	Mar 62	Airlifters					USAF, 1991a, p.34.
Back Porch	FID	Thailand, VN	May 62					1,500	USAF, 1991a, p.23.
Aircraft Deployment	Military assistance	Vietnam	Mar 62	F-102	4				USAF, 1991a, p.15.
Tanganyikan Flood Relief	Disaster relief	Tanganyika	May 62	C-124s		77		1,543	Matthews and Ofcansky, 1986, p.4.
Project Handclasp	Humanitarian aid	Liberia	May 62	C-118	1	1		4	Matthews and Ofcansky, 1986, p.4.
Thailand Border Threat	Military assistance	Thailand	May 62	F-100s	18				USAF, 1991a, p.15.
Iranian Locust Infestation	Disaster relief	Iran	May 62	UC-123					USAF, 1991a, p.35.
Transfer of Control	Peace operation	New Guinea	Aug 62	C-47, helos	6, 6				USAF, 1991a, p.23.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Colombian Floods & Famine	Disaster relief	Colombia	Aug 62	C-130s				90	USAF, 1991a, p.35.
Cuban Missile Crisis	Compellence	Cuba	Oct 62	Fighters, recce, lifters					
Iranian Earthquake	Disaster relief	Iran	Oct–Nov 62	C-124, C-133, C-118				480	USAF, 1993a, p.26.
Congolese Famine	Disaster relief	Congo	Oct 62	Airlifters					USAF, 1991a, p.35.
Typhoon Karen Relief	Disaster relief	Guam	2–16 Nov 62				650	1,180	USAF, 1993a, p.26.
Long Skip	Military assistance	India	Nov 62	Airlifters		45	17,000	24,000	USAF, 1993a, p.26; USAF 1991a, p.23.
People to People	Humanitarian aid	Afghanis-tan	Nov 62	C-97	1	1			USAF, 1991a, p.23.
Venezuelan Electrical Outage	Humanitarian aid	Venezuela	Nov 62						USAF, 1991a, p.23.
Tunisian Floods	Disaster relief	Tunisia	Nov 62	Airlifters					USAF, 1991a, p.35.
Moroccan Floods	Disaster relief	Morocco	Jan 63	Airlifters, helos			2,000	350	USAF, 1991a, p.35; Snyder and Shaw, 1993, p.72.
Ecuadoran Air Transport	Humanitarian aid	Ecuador	Jan 63	C-130	1				USAF, 1991a, p.23.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Honduran Aid	Humanitarian aid	Honduras	Jan 63	C-119s	4			9	USAF, 1991a, p.35.
Korean Farm Aid	Humanitarian aid	Korea	Jan 63						USAF, 1991a, p.23.
Turkish Floods	Search and rescue	Turkey	Feb 63	Helos			90		USAF, 1991a, p.35.
Libyan Earthquake	Disaster relief	Libya	Feb 63	Airlifters, helos	6		Unk. no.		USAF, 1991a, p.35; Snyder and Shaw, 1993, p.72.
Japanese Blizzard	Disaster relief	Japan	Feb 63	Airlifters					USAF, 1991a, p.35.
Korean Blizzard	Disaster relief	Korea	Feb 63	C-124					USAF, 1991a, p.35.
Spanish Floods	Disaster relief	Spain	Feb 63	Airlifters			69		USAF, 1991a, p.35.
Indonesian Floods	Disaster relief	Indonesia	Feb 63	C-130s				8	USAF, 1991a, p.35.
Azores Storms	Disaster relief	Azores	Mar 63	Airlifters					USAF, 1991a, p.35.
New Guinea Famine	Disaster relief	New Guinea	Apr 63	Airlifters				3	USAF, 1991a, p.35.
Mexican Famine	Disaster relief	Mexico	May 63	C-119s, C-47	?, 1			17	USAF, 1991a, p.35.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Catholic Mission Hospital	Humanitarian aid	Nigeria	Jun 63						Matthews and Ofcansky, 1986, p.4.
Vietnamese Fire	Disaster relief	Vietnam	Jul 63	C-130s				1	USAF, 1991a, p.36.
Blue Boy	Disaster relief	Yugoslavia	Jul 63	C-130s, C-124s	25, 8		410	455	Lempert, 1992, p.83; USAF, 1991a, p.36.
Laotian Hospital	Humanitarian aid	Laos	Jul 63	Airlifters				2	USAF, 1991a, p.36.
Okinawan Ferry Sinking	Search and rescue	Okinawa	17 Aug 63	Helos			235		USAF, 1994a, p.65.
Bolivian Hemorrhagic Fever	Disaster relief	Bolivia	Aug 63	C-46	1		Unk. no.	10	USAF, 1991a, p.36.
Iranian Earthquake	Disaster relief	Iran	Sep 63	Airlifters					USAF, 1991a, p.36.
Brazilian Forest Fires	Disaster relief	Brazil	Sep 63	C-130	1			50	USAF, 1991a, p.36.
Korean Orphans	Humanitarian aid	Korea	Sep 63	Airlifters				6	USAF, 1991a, p.36.
Peruvian Air Transport	Humanitarian aid	Peru	Sep 63	C-130s	2				USAF, 1991a, p.23.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Typhoon Gloria	Disaster relief	Taiwan	Oct 63	Airlifters				10	USAF, 1991a, p.36.
Hurricane Flora	Disaster relief	Tobago	Oct 63	C-124	1				USAF, 1991a, p.36.
Thai Insect Infestation	Disaster relief	Thailand	Nov 63	C-123s	3				USAF, 1991a, p.36.
Greek Ship Rescue	Search and rescue	Atlantic	Dec 63	C-54s	6				USAF, 1991a, p.36.
Vietnamese Cholera Outbreak	Disaster relief	Vietnam	Jan 64	C-130	1			14	USAF, 1991a, p.36.
Brazilian Flooding	Disaster relief	Brazil	Jan 64	C-124s	2			120	USAF, 1991a, p.36.
Volcanic Eruptions	Disaster relief	Costa Rica	Jan 64	Airlifters			Unk. no.	289	USAF, 1991a, p.36.
Panamanian Unrest	NEO	Panama	Jan 64	Airlifters	10		1,500		USAF, 1991a, p.23.
Thai Medical Support	Humanitarian aid	Thailand	Jan 64	C-97	1	1		12	USAF, 1991a, p.23.
Nicaraguan Hospital Support	Humanitarian aid	Nicaragua	Feb 64						USAF, 1991a, p.36.
Azores Earthquakes	Disaster relief	Azores	Mar 64	Airlifters				60	USAF, 1991a, p.36.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
National Geo. Expedition	Logistics support	Greenland	Mar 64	C-130s	2		Unk. no.		USAF, 1991a, p.36.
Peruvian Indian Unrest	FID	Peru	Mar 64	Airlifters					USAF, 1991a, p.23.
Lucky Dragon	FID	Vietnam	Mar 64	U-2					USAF, 1991a, p.15.
Panamanian Forest Fires	Disaster relief	Panama	Apr 64	C-118	1			3	USAF, 1991a, p.36.
UN Peace Operations	Peace operation	Cyprus	Apr–Jun 64	C-130s, C-124s		50, 28	3,351	405	Snyder and Shaw, 1993, p.75.
Helping Hand	Disaster relief	Alaska	Mar–Apr 64	Airlifters			Medevac	1,375	USAF, 1993a, p.27.
Mount Irazu Eruption	Disaster relief	Costa Rica	22 May–5 Jun 64	C-133s, C-124s	8, 5		Some		USAF, 1993a, p.27.
Colombian Medical Support	Humanitarian aid	Colombia	May 64	Airlifters				15	USAF, 1991a, p.37.
Pakistan Flood Relief	Disaster relief	Pakistan	Jun–Jul 64	C-130s				950	USAF, 1993a, p.28.
Japanese Earthquake	Disaster relief	Japan	Jun 64	C-130s					USAF, 1991a, p.37.
Bolivian Epidemic	Disaster relief	Bolivia	Jun 64	Airlifters	4		Unk. no.		USAF, 1991a, p.37.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
JTF-Leopoldville	NEO	Congo	Aug 64	C-130s	4				Siegel and Fabbri, 1993a, p.19.
Hurricane Cleo	Disaster relief	Guade-loupe	Aug 64	C-124	1			7	USAF, 1991a, p.37.
Panamanian Storm	Disaster relief	Panama	Sep 64	Airlifters					USAF, 1991a, p.37.
Yugoslavian Assistance	Humanitarian aid	Yugoslavia	Oct 64	C-124s, C-130	10, 1			169	USAF, 1991a, p.37.
Tunisian Floods	Disaster relief	Tunisia	Nov 64	Airlifters			Unk. no.		USAF, 1991a, p.37.
Dragon Rouge	NEO	Congo	Nov 64	C-130s	15		Soldiers		USAF, 1991a, p.23.
Philippine Typhoon	Disaster relief	Philippines	Dec 64	C-54	1				USAF, 1991a, p.37.
Hospital-Ship Hope Repair	Humanitarian aid	Africa	Dec 64	Airlifter					USAF, 1991a, p.37.
Somalia Famine Relief	Disaster relief	Somalia	Dec 64–Jan 65	C-130s		7		100	Matthews and Ofcansky, 1986, p.4.
Tunisian Floods	Disaster relief	Tunisia	Jan 65	Airlifters				10	USAF, 1991a, p.37; Snyder and Shaw, 1993, p.77.
Cyprus Peacekeeping	Peace operation	Cyprus	Mar 65	C-124s			3,000	76	USAF, 1991a, p.24.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Chilean Earthquake	Disaster relief	Chile	Apr 65	C-130s	4			55	USAF, 1991a, p.37.
Somaliland Assistance	Humanitarian aid	Somaliland	Apr 65	C-130s	2				USAF, 1991a, p.37.
Dominican Republic	FID	Dom Rep	Apr–May 1965	Airlifters		700	4,500	7,000	USAF, 1993a, p.28.
El Salvadoran Earthquake	Disaster relief	El Salvador	May 65	Airlifters			207	300	USAF, 1991a, p.37.
Norwegian Tanker Fire	Disaster relief	near Japan	May 65	Airlifters				30	USAF, 1991a, p.37.
Korean Drought	Disaster relief	Korea	Jun 65	Airlifters					USAF, 1991a, p.37.
Ethiopian Hostage Rescue	Hostage rescue	Ethiopia	Jul 65	Airlifters				4 helos	USAF, 1991a, p.24.
Japanese Leper Colony Aid	Humanitarian aid	Japan	Aug 65	C-54s			25		USAF, 1991a, p.37.
Philippine Volcano Eruption	Disaster relief	Philippines	Sep 65	Airlifters					USAF, 1991a, p.37.
Honduran Floods	Disaster relief	Honduras	Sep 65	C-130s				25	USAF, 1991a, p.38.
Italian Floods	Disaster relief	Italy	Sep 65	Helos			43		USAF, 1991a, p.38.
Nice Way	NEO	Pakistan	15–21 Sep 65	C-130s			1,000		USAF, 1993a, p.29.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Cruise Ship Fire	Disaster relief	Bahamas	Nov 65	Airlifters					USAF, 1991a, p.38.
Thai Fire	Disaster relief	Thailand	Dec 65	Airlifters					USAF, 1991a, p.38.
Moroccan Floods	Disaster relief	Morocco	Dec 65	C-130s				125	USAF, 1991a, p.38; Snyder and Shaw, 1993, p.79.
Japanese Fire	Disaster relief	Japan	Jan 66	C-130s					USAF, 1991a, p.38.
Peruvian Air Transport	Humanitarian aid	Peru	Jan 66	C-130s	2			500	USAF, 1991a, p.24.
Samoan Typhoon	Disaster relief	Pago Pago	Feb 66	C-124s	3				USAF, 1991a, p.38.
Ghana Aid	Humanitarian aid	Ghana	Mar 66	Airlifters				25	USAF, 1991a, p.38.
Taiwan Medical Mission	Humanitarian aid	Taiwan	Mar 66	Airlifter	1	1			USAF, 1991a, p.24.
Peruvian Air Transport	Humanitarian aid	Peru	May 66	C-130s					USAF, 1991a, p.24.
Sudan Cholera Outbreak	Disaster relief	Sudan	Apr 66	C-130	1			16	Matthews and Ofcansky, 1986, p.5.
Dominican Republic	Humanitarian aid	Dom Rep	Jun 66	Airlifters					USAF, 1991a, p.24.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Panama	Humanitarian aid	Panama	Jun 66	C-130	1				USAF, 1991a, p.24.
Turkish Earthquake	Disaster relief	Turkey	Aug 66	Airlifters				50	USAF, 1991a, p.38.
Chad Aid	Humanitarian aid	Chad	Sep 66	C-130s	2		Unk. no.	500	USAF, 1991a, p.38.
Japanese Typhoon	Disaster relief	Japan	Sep 66	Airlifters					USAF, 1991a, p.38.
Thai, Laotian Floods	Disaster relief	SE Asia	Sep 66	Airlifters					USAF, 1991a, p.38.
Dominican Hurricane	Disaster relief	Dom Rep	Oct 66	C-130s, C-124	2,1				USAF, 1991a, p.38.
People to People	Humanitarian aid	Suriname	Oct 66	C-130					USAF, 1991a, p.24.
Boldface	Disaster relief	Mexico	Oct 66	C-130s	2				Siegel and Fabbri, 1993; USAF, 1991a, p.38.
Peruvian Earthquake	Disaster relief	Peru	Oct 66	C-130s	4			55	USAF, 1991a, p.38.
Arno River Flood	Disaster relief	Italy	11–12 Nov 66	Airlifters			93	205	USAF, 1993a, p.29.
Panama Floods	Disaster relief	Panama	Nov 66	Helos			105	3	USAF, 1991a, p.38.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Torrey Canyon Oil Spill	Disaster relief	Great Britain	Apr 67						Snyder and Shaw, 1993, p.83.
Creek Haven	NEO	Libya	6–11 Jun 67	Airlifters			7,000		USAF, 1993a, p.30.
Creek Dipper	NEO	Jordan	10–11 Jun 67	Airlifters			816		USAF, 1993a, p.30.
Congo FID	FID	Congo	Jul 67	C-130s	3	180			USAF, 1991a, p.24.
Venezuelan Earthquake	Disaster relief	Venezuela	Jul 67	C-130, C-54	1, 1			30	USAF, 1991a, p.38.
Turkish Earthquake	Disaster relief	Turkey	Jul 67	Airlifters					USAF, 1991a, p.38.
Typhoon Sarah	Disaster relief	Wake Island	Sep 67	Airlifters					USAF, 1991a, p.39.
Mexican Floods	Disaster relief	Mexico	Sep 67	Airlifters	20		175	116	USAF, 1991a, p.39.
Virgin Island Tick Invasion	Disaster relief	Virgin Is	Oct 67	Airlifters					USAF, 1991a, p.24.
Sicilian Earthquake	Disaster relief	Sicily	Jan 68	C-130s, C-124s			59	168	USAF, 1991a, p.39.
Fruit Fly Infestation	Disaster relief	Nic, CR, Pan	Jan 68	Airlifters					USAF, 1991a, p.24.
Combat Fox (*Pueblo* Crisis)	Deterrence	Korea	29 Jan–17 Feb 68	Various		800[c]	7,996	13,683	USAF, 1993a, p.30.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Bolivian Floods	Disaster relief	Bolivia	Feb 68	C-130s				20	USAF, 1991a, p.39.
Greek Earthquake	Disaster relief	Greece	Feb 68	Airlifters					Snyder and Shaw, 1993, p.85.
Ecuadoran Drought	Disaster relief	Ecuador	Apr 68	C-130	1			46	USAF, 1991a, p.39.
Panama Insect Infestation	Disaster relief	Panama	Apr 68	TAC spray plane					USAF, 1991a, p.24.
Typhoon Jean	Disaster relief	Guam	Apr 68	Airlifters				97	USAF, 1991a, p.39.
Ethiopia Flood Relief	Disaster relief	Ethiopia	May 68	C-141s	5	5		96	Matthews and Ofcansky, 1986, p.5.
Biafran Refugee Relief	Humanitarian aid	Nigeria	Jun 68	C-141	1			34	Matthews and Ofcansky, 1986, p.5.
Volcano Eruption	Disaster relief	Costa Rica	Jul 68	Airlifters				12	USAF, 1991a, p.39.
Nicaraguan Floods	Disaster relief	Nicaragua	Aug 68	Airlifters			260	26	USAF, 1991a, p.39.
Minami Daito Storms	Disaster relief	Minami Daito	Sep 68	C-130s					USAF, 1991a, p.39.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Typhoon Della	Disaster relief	Ryukyu Is	Sep 68	C-130s	4				USAF, 1991a, p.39.
Iranian Earthquake	Disaster relief	Iran	Oct 68	C-133s	2			57	USAF, 1991a, p.39.
Combat Locust	Disaster relief	Saudi Arabia	Feb 69	TAC spray planes	3				USAF, 1991a, p.39.
Moroccan Fire	Disaster relief	Morocco	Apr 69	Airlifters					USAF, 1991a, p.39.
Encephalitis Outbreak	Disaster relief	Ecuador	May 69	C-141s, C-123s				54	USAF, 1991a, p.39.
Russian Sailor Medevac	Humanitarian aid	Pacific	Jul 69	C-141	1				USAF, 1991a, p.39.
Honduran Floods	Disaster relief	Honduras	Jul 69	Airlifters				26	USAF, 1991a, p.39.
Hurricane Camille Relief	Disaster relief	US	Aug–Sep 69		85		3,909	5,900	Lempert, 1992, p.53.
Hurricane Francelia	Disaster relief	Guatemala	Sep 69	Airlifters	6				USAF, 1991a, p.39.
Chad Famine Relief	Disaster relief	Chad	Oct 69	C-130s	2			164	USAF, 1991a, p.39.
Tunisian Floods	Disaster relief	Tunisia	Oct–Nov 69	Airlifters, helos	?, 3	?, 108	443		USAF, 1991a, p.39; Snyder and Shaw, 1993, p.89.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Russian Medevac	Humanitarian aid	Pacific	Dec 69	Airlifters			3		USAF, 1991a, p.40.
Moroccan Floods	Disaster relief	Morocco	Jan 70	C-141					USAF, 1991a, p.40.
Central American Floods	Disaster relief	CR, Panama	Jan 70	Airlifters			576	56	USAF, 1991a, p.40.
Biafran Refugee Relief	Humanitarian aid	Nigeria	17 Jan–10 Feb 70	C-141s		21		437	Matthews and Ofcansky, 1986, p.6.
Ships Sinking in Pacific	Search and rescue	Pacific	Feb 70	Helos					USAF, 1991a, p.40.
Turkish Earthquake	Disaster relief	Turkey	Mar 70	Airlifters					USAF, 1991a, p.40.
Peruvian Earthquake	Disaster relief	Peru	May 70	Airlifters	18			732	USAF, 1991a, p.40.
Jordanian Civil War	NEO preparations	Turkey	Sep 70	C-130s,F-4s	10, 25				Blechman and Kaplan, 1978, Table 7-2.
Puerto Rican Floods	Disaster relief	Puerto Rico	Oct 70	C-124s	3			16	USAF, 1991a, p.40.
Jordanian Civil War	Humanitarian aid	Jordan	Oct 70	Airlifters					USAF, 1991a, p.40.
Italian Floods	Disaster relief	Italy	Oct 70	C-130	1				USAF, 1991a, p.40.
Philippine Typhoon	Disaster relief	Philippines	Oct 70	Airlifters			453	375	USAF, 1991a, p.40.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Colombian Floods	Disaster relief	Colombia	Nov 70	C-130s				12	USAF, 1991a, p.40.
Pakistan Aid	Humanitarian aid	Pakistan	Nov 70	Airlifters					USAF, 1991a, p.40.
Korean Ferry Disaster	Search and rescue	Korea	Dec 70	Rescue units					USAF, 1991a, p.40.
Costa Rican Floods	Disaster relief	Costa Rica	Dec 70	C-123, helicopter			279	73	USAF, 1991a, p.40.
Ecuadoran Earthquake	Disaster relief	Ecuador	Dec 70	C-130s				140	USAF, 1991a, p.40.
Malaysian Floods	Disaster relief	Malaysia	Jan 71	Airlifters					USAF, 1991a, p.40.
Bolivian Floods	Disaster relief	Bolivia	Feb 71	C-130	1			7	USAF, 1991a, p.40.
US Hostage in Uruguay	Medevac	Uruguay	Mar 71	C-141	1		1		USAF, 1991a, p.40.
Okinawan Typhoon	Disaster relief	Okinawa	Mar 71	Airlifters				40	USAF, 1991a, p.40.
Nicaraguan Volcano Eruption	Disaster relief	Nicaragua	Mar 71	Airlifters				95	USAF, 1991a, p.40.
Truk Island Typhoon	Disaster relief	Truk Island	May 71	C-130s	2				USAF, 1991a, p.41.
Soviet Ship Accident	Humanitarian aid	Pacific	May 71	Rescue unit					USAF, 1991a, p.41.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Turkish Earthquake	Disaster relief	Turkey	May 71	C-130s				4	USAF, 1991a, p.41; Snyder and Shaw, 1993, p.91.
Bangladesh War Refugees	Humanitarian aid	Pakistan	Jun 71	Airlifters			23,000	2,176	USAF, 1991a, p.41.
Bonny Jack	Humanitarian aid	India	Jun 71	C-130s	3				USAF, 1991a, p.41.
Chilean Earthquake	Disaster relief	Chile	Jul 71	Airlifters				43	USAF, 1991a, p.41.
Chad Cholera Outbreak	Disaster relief	Chad	Jul 71	C-130s					USAF, 1991a, p.41; Snyder and Shaw, 1993, p.93.
Mexican Floods	Disaster relief	Mexico	Jul 71	Airlifters, helos			19	5	USAF, 1991a, p.41.
Hurricane Edith	Disaster relief	Nicaragua	Sep 71	Airlifters				93	USAF, 1991a, p.41.
Tropical Storm Fern	Disaster relief	Mexico	Sep 71	Helicopters			91		USAF, 1991a, p.41.
Sinking Taiwanese Freighter	Search and rescue	Philippines	Oct 71	Helicopters					USAF, 1991a, p.41.
Silkworm Eradication	Disaster relief	Puerto Rico	1971–1975						USAF, 1991a, p.25.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Earthquake, Floods	Disaster relief	Peru	Mar 72	C-130s				135	USAF, 1991a, p.25.
Turkish Medical Aid	Humanitarian aid	Turkey	May 72	Airlifters				2	USAF, 1991a, p.41.
Rapid City, SD, Flood Relief	Disaster relief	US	June–July 72	Helos	12	49	245	7,250	Lempert, 1992, p.57.
Philippine Floods	Disaster relief	Philippines	Jul 72	C-130s				2,000	USAF, 1991a, p.41.
Typhoon Celeste	Disaster relief	Johnston Island	Aug 72	Airlifters			Unk. no.		USAF, 1991a, p.41.
Korean Floods	Disaster relief	Korea	Aug 72	Rescue units					USAF, 1991a, p.41.
Korean Floods II	Disaster relief	Korea	Nov 72	Helos	4				USAF, 1991a, p.41.
Taiwan Air Defense	Military assistance	Taiwan	Nov 72–Nov 74	F-4Cs	2 sqdrns				USAF, 1991a, p.16.
Nicaraguan Earthquake	Disaster relief	Nicaragua	Dec 72		43	300	2,000	1,938	Lempert, 1992, p.83; USAF, 1991a, p.41.
Icelandic Volcano Eruption	Disaster relief	Iceland	Jan 73	Airlifters			Unk. no.	833	USAF, 1991a, p.42.
Homecoming	POW repatriation	Vietnam	17 Feb–4 Apr 73	Various			591 US POWs		USAF, 1993a, p.32.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Scoot	FID	Cambodia	Apr 73–Apr 75	Airlifters				124,000	USAF, 1991a, p.25.
Medfly Infestation	Disaster relief	Nicaragua	Apr 73	Airlifters				38	USAF, 1991a, p.25.
Authentic Assistance	Disaster relief	Mali, Chad	May–Nov 73	C-130s				6,000	Matthews and Ofcansky, 1986, p.6.
Guatemalan Flood	Disaster relief	Guatemala	Jun 73	C-130	1			7	USAF, 1991a, p.42.
End Sweep	Peace operation	Vietnam	Jul 73	C-130s					USAF, 1991a, p.25.
Hemorrhagic Fever	Disaster relief	Vietnam	Jul 73	C-130s				100	USAF, 1991a, p.42.
Encephalomyelitis Epidemic	Disaster relief	Panama	Jul 73	Airlifters				9	USAF, 1991a, p.42.
Borer Worm Infestation	Disaster relief	Pakistan	Aug 73	C-47s	2				USAF, 1991a, p.42.
Frontier Development	Humanitarian aid	Paraguay	Sep 73	C-130	1			60	USAF, 1991a, p.25.
Colombian Floods	Disaster relief	Colombia	Oct 73	C-130s	2			16	USAF, 1991a, p.42.
Nickel Grass	Military assistance	Israel	13 Oct–13 Nov 73	C-5s, C-141s		567		22,318	USAF, 1993a, p.32.
Night Reach	Peace operation	Sinai	Nov 73	Airlifters					USAF, 1991a, p.25.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Panamanian Floods	Disaster relief	Panama	Nov 73	Helicopters					USAF, 1991a, p.42.
Australian Floods	Disaster relief	Australia	Feb 74	C-141	1				USAF, 1991a, p.25.
Bolivian Floods	Disaster relief	Bolivia	Feb 74					20	USAF, 1991a, p.42.
Nimbus Star/Moon	Peace operation	Egypt	Apr 74	C-5s, C-141s	11, 7				USAF, 1991a, p.26.
Missing Sailboat	Search and rescue	Caribbean	May 74	C-130	1				USAF, 1991a, p.42.
King Grain	Disaster relief	Mali, Chad	Jun–Oct 74	C-130s	19			8,576	Matthews and Ofcansky, 1986, p.6.
Cyprus Crisis	Humanitarian aid	Cyprus	Jul 74	C-130s	10				USAF, 1991a, p.26; Snyder and Shaw, 1993, p.98.
Colombian Landslide	Disaster relief	Colombia	Jul 74	C-130s					USAF, 1991a, p.42.
Chilean Floods	Disaster relief	Chile	Jul 74	C-5, C-141	1, 1			84	USAF, 1991a, p.42.
Bangladeshi Floods	Disaster relief	Bangladesh	Aug 74	C-141s	3				USAF, 1991a, p.42.
Burmese Floods	Disaster relief	Burma	Aug 74	C-141s	2			34	USAF, 1991a, p.42.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Honduran Hurricane	Disaster relief	Honduras	Sep 74	C-130s					USAF, 1991a, p.42.
Virgin Island Floods	Disaster relief	Virgin Is	Nov 74	Airlifters					USAF, 1991a, p.42.
Bangladesh Famine	Disaster relief	Bangladesh	Dec 74	Airlifters		51		1,000	USAF, 1991a, p.42.
Cyclone Tracy	Disaster relief	Australia	Dec 74	C-141s	3	10			USAF, 1991a, p.43.
Thai Floods	Disaster relief	Thailand	Jan 75	Airlifters, helos					USAF, 1991a, p.43.
Singapore Oil Spill	Disaster relief	Singapore	Jan 75	C-141s					USAF, 1991a, p.26.
Mauritius Cyclone Relief	Disaster relief	Mauritius	Feb 75	C-141	1			6	Matthews and Ofcansky, 1986, p.6.
Nuclear Reactor Shutdown	CP	Vietnam	Mar 75	C-130s	2				USAF, 1991a, p.26.
Eagle Pull (USMC/USN)	NEO	Cambodia	12 Apr 75		32	52	287		Patrick, 1977b.
Eagle Pull (USAF)	Air cover for evacuation	Cambodia	12 Apr 75		201	36			Patrick, 1977b.
Frequent Wind (USMC/USN)	NEO	Vietnam	29–30 Apr 75	Rotary wing	87	750	6,968		Patrick, 1977b.
Frequent Wind (USAF)	Air cover for evacuation	Vietnam	29–30 Apr 75		201 avail	152			Patrick, 1977b.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Frequent Wind (USAF)	NEO	Vietnam	1–29 Apr 75	Fixed wing		383			Tobin et al., 1978, p.122.
Frequent Wind (USAF)	NEO		29–30 Apr 75	CH-53s/ HH-53s	10	82			Tobin et al., 1978, p.122.
Frequent Wind (USN)	Air cover for evac	Vietnam	29–30 Apr 75		150 avail	158			Patrick, 1977b.
Frequent Wind (totals)	NEO	Vietnam	Mar–Apr 75	Fixed wing ac			50,493		Tobin et al., 1978, p.122.
				Rotary wing			7,014		Tobin et al., 1978, p.122.
New Life	Humanitarian aid	Vietnam	4–30 Apr 75	Various		375	50,493		USAF, 1993a, p.33.
New Life Support	Humanitarian aid	Various	Apr–Jun 75				5,469	8,556	USAF, 1993a, p.34.
Baby Lift	Humanitarian aid	Vietnam	4 Apr–9 May 75	C-141s, civil			1,794		USAF, 1993a, p.34.
New Arrival	Humanitarian aid	Various	29 Apr–16 Sep 75	C-141s, civil	251, 349		121,562		USAF, 1993a, p.34.
Dengue Fever Outbreak	Disaster relief	Guam	May 75	Airlifters					USAF, 1991a, p.43.
Mayaguez Rescue	Hostage rescue	Philippines	May 75	C-141s			1,165	121	USAF, 1993a, p.34.
Mayaguez Rescue	Hostage rescue	Cambodia	13–15 May 75	CH-53s, HH-53s	12	23	452		Patrick, 1977a.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Mayaguez Rescue (CAS)	Hostage rescue	Cambodia	13–15 May 75	Various TACAIR		260			Patrick, 1977a.
Somalia Overflights	Recce	Somalia	Jun 75	U-2 or SR-71					USAF, 1991a, p.16.
Brazilian Floods	Disaster relief	Brazil	Jul 75	C-130s				30	USAF, 1991a, p.43.
Romanian Floods	Disaster relief	Romania	Aug 75	C-141s	2			60	USAF, 1991a, p.43; Snyder and Shaw, 1993, p.99.
Angolan Civil War	Humanitarian aid	Angola	7 Sep–3 Nov 75	Civil			31,597		USAF, 1993a, p.34.
Jamaican Civil Unrest	Humanitarian aid	Jamaica	Jan 76	Airlifters					USAF, 1991a, p.26.
Guatemalan Earthquake	Disaster relief	Guatemala	5 Feb–5 Mar 76	C-5, C-141, C-130		2, 29, 33	696	926	USAF, 1993a, p.35.
Italian Earthquake	Disaster relief	Italy	May 76	C-141	1				USAF, 1991a, p.43.
Philippine Typhoon	Disaster relief	Philippines	May 76	Helos			734		USAF, 1991a, p.43.
Guam Typhoon	Disaster relief	Guam	May 76	Airlifters					USAF, 1991a, p.43.
Lebanon NEO	NEO	Lebanon	Jun 76	Helos, OV-10s					USAF, 1991a, p.26.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Indonesian Earthquake	Disaster relief	Indonesia	Jul 76	C-141, C-130s	1, 2			20	USAF, 1991a, p.43.
Paul Bunyan (Airlift)	Military assistance	Korea	19–21 Aug 76	C-5s, C-141s		3, 26	598	457	USAF, 1993a, p.35.
Paul Bunyan (TACAIR)	Military assistance	Korea	19–21 Aug 76	F-4s, F-111s	18, 18				USAF, 1993a, p.35.
Bolivian Airliner Crash	Humanitarian aid	Bolivia	Oct 76	C-141s	1				USAF, 1991a, p.43.
Turkish Earthquake (phase 1)	Disaster relief	Turkey	26–29 Nov 76	C-5, C-141s, C-130s		1, 14, 55		520	USAF, 1993a, p.35.
Turkish Earthquake (phase 2)	Disaster relief	Turkey	20–22 Jan 77	C-130s		10		86	USAF, 1993a, p.35.
Snow Go	Disaster relief	US	2–12 Feb 77	C-5s, C14s, C-130s		10, 11, 28	495	1,000	USAF, 1993a, p.35.
Snow Go	Disaster relief	US	Feb 77	C-5s, C-14s, C-130s		5, 5, 31	383	752	USAF, 1993a, p.35.
Aid to Zaire	Humanitarian aid	Zaire	Mar 77	Airlifters					USAF, 1991a, p.26.
Romanian Earthquake	Disaster relief	Romania	Mar 77	Airlifters				7	USAF, 1991a, p.43.
Canary Islands Air Collision	Medevac	Canary Is	Mar 77	Airlifters			50		USAF, 1991a, p.43.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Marshall Islands Typhoon	Disaster relief	Marshall Is	Apr 77	Airlifters					USAF, 1991a, p.43.
Closure of US Bases	Disaster relief	Ethiopia	May 77	Airlifters			323	350	USAF, 1991a, p.26.
US-Soviet Energy Project	Logistics support	US	Jun 77	C-5	1	1		40	USAF, 1993a, p.36.
Refugee Relief	Humanitarian aid	Afars & Issas	Oct 77	C-141	1			170	Matthews and Ofcansky, 1986, p.7.
Soviet Satellite Crash	Humanitarian aid	Canada	Jan 78	C-141s			DOE		USAF, 1991a, p.27.
Lebanon Peace Operation	Peace operation	Senegal	Apr 78	C-5s, C-141s, DC-8s		6, 7, 3			Matthews and Ofcansky, 1986, p.7.
Katangan Rebel Invasion	FID/peace ops	Zaire	16 May–16 Jun 78	C-5, C-141		12, 103	1,349	2,550	USAF, 1993a, p.36.
Sudan Flood Relief	Disaster relief	Sudan	Aug 78	C-141s	2		Soldiers	26	Matthews and Ofcansky, p.7; USAF, 1991a, p.43.
UN Namibian Planning	Peace operation	Namibia	Aug 78	C-141	1		50		Matthews and Ofcansky, 1986, p.7.
Israeli Invasion of Lebanon	Peace op/relief	Lebanon	21–30 Sep 78				2,462	3,280/85[d]	USAF, 1993a, p.37.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Search for Fishing Boat	Search and rescue	Atlantic	Sep 78	U-2	1				USAF, 1991a, p.44.
Hurricane Greta	Disaster relief	Honduras	Sep 78	C-130s				50	USAF, 1991a, p.44.
Costa Rican Floods	Disaster relief	Costa Rica	Oct 78	Helos			23		USAF, 1991a, p.44.
Medical Aid to Algerian Pres.	Humanitarian aid	Algeria	Nov 78	C-5, C-141	1, 1		6		USAF, 1991a, p.27.
Jonestown Body Recovery	Remains recovery	Guyana	Nov 78	C-141, C-130, HH53	21	59	603	690	Lempert, 1992, pp.60–67; USAF, 1991a, p.44.
Sri Lankan Typhoon	Disaster relief	Sri Lanka	Nov 78	C-141s	5				USAF, 1991a, p.44.
Iranian NEO	NEO	Iran	9 Dec 78–17 Feb 79	C-5s, C-141s			5,800	687	USAF, 1993a, p.37.
Prize Eagle	Military assistance	Saudi Arabia	Jan 79	F-15s	18				USAF, 1991a, p.16.
Flying Star	Military assistance	Saudi Arabia	Mar 79	E-3s					USAF, 1991a, p.17.
Sinking Fishing Boat	Search and rescue	Hawaii	Mar 79	Helos			19		USAF, 1991a, p.44.
Three Mile Island	Disaster relief	US	31 Mar–15 Apr 79	C-5s, C-14s, C-130	2, 12, 1	15			USAF, 1993a, p.37.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Yugoslav Earthquake	Disaster relief	Yugoslavia	19–20 Apr 79	C-141s, C-130	7, 1	7, 4		139	USAF, 1993a, p.37.
Zaire Drought Relief	Disaster relief	Zaire	Apr 79	C-141	1			20	Matthews and Ofcansky, 1986, p.8.
Liberia Relief	Humanitarian aid	Liberia	Apr 79	C-141	1			5	Matthews and Ofcansky, 1986, p.8.
St Vincent Volcano Eruption	Disaster relief	St Vincent	Apr 79	C-130s				30	USAF, 1991a, p.44.
Typhoon Mali	Disaster relief	Fiji	Apr 79	C-141s	2				USAF, 1991a, p.44.
Sinking Korean Fishing Boat	Search and rescue	Korea	Apr 79	Helos			24		USAF, 1991a, p.44.
Nicaraguan Civil War	NEO/ Humanitarian aid	Nicaragua	Jun 79	Airlifters			1,400	51	USAF, 1991a, pp.17, 27.
Zaire Peacekeeping	Peace operation	Zaire	Aug 79	Airlifters					USAF, 1991a, p.27.
Hurricane David Relief	Disaster relief	Caribbean	31 Aug–21 Nov 79			251	1,358	2,881	USAF, 1993a, p.37.
Thai Refugee Aid	Humanitarian aid	Thailand	Oct 79	Airlifters					USAF, 1991a, p.44.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Majuro Islands Tsunami	Disaster relief	Majuro Is	Nov 79	Airlifters					USAF, 1991a, p.44.
Bolivia Civil Unrest	NEO	Bolivia	Nov 79	Airlifters			133		USAF, 1991a, p.27.
Panamanian Floods	Disaster relief	Panama	Nov 79	Airlifters, helos			27		USAF, 1991a, p.44.
Zimbabwe Cease-Fire	Peace operation	Zimbabwe	19–27 Dec 79	C-5, C-141		39, 2	455	528	USAF, 1993a, p.38.
Colombian Earthquake	Disaster relief	Colombia	Dec 79	C-130s	4		118	87	USAF, 1991a, p.44.
Nicaraguan Floods	Disaster relief	Nicaragua	Dec 79	C-130s			247	117	USAF, 1991a, p.44.
Flood in Belize	Disaster relief	Belize	Dec 79	C-130	1			15	USAF, 1991a, p.44.
Cyclone Claudette	Disaster relief	Mauritius	Jan 80	C-141	1				Matthews and Ofcansky, 1986, p.8.
Azores Earthquake	Disaster relief	Azores	Jan 80	C-141s					USAF, 1991a, p.44.
Eagle Claw	Hostage rescue	Iran	Apr 80	Various	20	14	120+		Martin and Walcott, 1988, p.3; Beckwith and Knox, 1983, p.253.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Thai Refugee Relief	Humanitarian aid	Thailand	Apr 80	Airlifters					USAF, 1991a, p.44.
Mariel Exodus from Cuba	Humanitarian aid	Cuba	May 80	Airlifters			7,568	2,371	USAF, 1991a, p.27.
US Hostage Medevac	Medevac	Iran	Jul 80	Airlifter	1				USAF, 1991a, p.44.
Hurricane Allen	Disaster relief	Caribbean	Aug 80	Airlifters	5			61	USAF, 1991a, p.45.
Nicaraguan Floods	Disaster relief	Nicaragua	Oct 80	C-130	1			40	USAF, 1991a, p.45.
Algerian Earthquake	Disaster relief	Algeria	12–26 Oct 80	C-5s, C-141s, C-130		2, 14, 1		340	USAF, 1993a, p.38.
MGM Fire, Las Vegas	Search and rescue	US	Nov 80	Helos	10	40+	308	Unk.	Lempert, 1992, pp.70–71.
Italian Earthquake	Disaster relief	Italy	Nov 80	Airlifters, U-2	?, 1				USAF, 1991a, p.45.
Typhoon Dinah	Disaster relief	Saipan	Nov 80	Airlifters					USAF, 1991a, p.45.
Creek Century	Military assistance	Germany	Dec 80–May 81	E-3s, KC-135s	4, ?				USAF, 1991a, p.17; DFI, 1995.
Elf One	Military assistance	Saudi Arabia	Jan 81–Dec 89	E-3s, C-130s, KC-135s		8,685			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
El Salvador Airlift	FID	El Salvador	Jan 81	C-130s				984	USAF, 1993a, p.39.
Iranian Hostage Repatriation	Medevac	Algeria	20–25 Jan 81	C-9s, C-137	2, 1	2, 1	52		USAF, 1993a, p.39.
Greek Earthquake	Disaster relief	Greece	Feb 81	C-130		1			USAF, 1991a, p.45; DFI, 1995.
Sadat Visit to Sudan	Military assistance	Egypt	May 81	E-3	1				USAF, 1991a, p.17.
Deep Freeze	Logistics support	Antarctica	Jun 81	C-141		2			DFI, 1995.
Chadian Civil War	Humanitarian aid	Chad	6–13 July 81	C-130s				113	USAF, 1993a, p.40.
Gambia Civil Unrest	NEO	Gambia	Jul 81	C-141s					USAF, 1991a, p.28.
Peruvian Earthquake	Disaster relief	Peru	Jul 81	C-130	1			8	USAF, 1991a, p.45.
Philippine Shipwreck	Search and rescue	Philippines	Sep 81	Unk.		1			DFI, 1995.
Volant Boom	Military assistance	Jordan	Sep 81	C-5, KC-10		2			DFI, 1995.
Elf Century	Military assistance	Egypt	Oct 81–Mar 82	E-3s, C-130s, KC-135s		1,000			USAF, 1991a, p.17; DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Post Sadat Medevac	Medevac	Egypt	Oct 81	C-141, C-5, C-9		3			DFI, 1995.
Deep Freeze	Logistics support	Antarctica	Oct–Dec 81	C-141		26			DFI, 1995.
Turkish Earthquake	Disaster relief	Turkey	Nov 81	C-130s					USAF, 1991a p.45; DFI, 1995.
Chadian Civil War	Peace operation	Chad	Nov 81	C-5, C-141					DFI, 1995.
Yemeni Earthquake	Disaster relief	Yemen	Dec 81	C-141s	6				USAF, 1991a, p.45.
Korean Crisis	Military assistance	Korea	Dec 81	B-52s					DFI, 1995.
Aid to Senegal	Humanitarian aid	Senegal	Dec 81	C-141s		5			DFI, 1995.
Support to El Salvador	FID	El Salvador	Mar–May 82	C-5, A-37, O-2					DFI, 1995.
Delivery of FMS	Military assistance	Egypt/ Oman	Mar 82	C-141, DC-8		2			DFI, 1995.
Falklands War Aid to Britain	Military assistance	Ascension Is	May 82	C-141, KC-135		12	USAF airmen		USAF, 1991a, p.28; DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Panamanian Bridge Collapse	Disaster relief	Panama	May 82	C-130s		49		381	USAF, 1991a, p.45; DFI, 1995.
Deep Freeze '82	Logistics support	Antarctica	Jun 82	C-141		1			DFI, 1995.
Aid to El Salvador	FID	El Salvador	Jun–Aug 82	C-130s, DC-10		16			DFI, 1995.
Lebanon Refugee Relief	Humanitarian aid	Lebanon	Jun 82	Airlifters					USAF, 1991a, p.28.
Military Aid to Somalia	Military assistance	Somalia	Jul–Aug 82	C-141, DC-10, 747		10			DFI, 1995.
Chad Famine	Disaster relief	Chad	Jul 82	C-130	1	7			USAF, 1991a, p.45; DFI, 1995.
Lebanon Refugee Aid	Humanitarian aid	Lebanon	Aug 82	Airlifters					USAF, 1991a, p.45.
Sinai Peace-keeping	Peace operation	Sinai	Aug 82	C-141		9			USAF, 1991a, p.28; DFI, 1995.
FMS Delivery to Kuwait	Military assistance	Kuwait	Aug 82	C-141s	2	2			DFI, 1995.
Beirut Airlift	Humanitarian aid	Beirut	Aug–Oct 82	C-141s		2			DFI, 1995.
Typhoon Iwa	Disaster relief	Hawaii	Nov 82	Unk.		2			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Tunisian Floods	Disaster relief	Tunisia	Nov 82	Airlifters					USAF, 1991a, p.45.
FMS to Saudi Arabia	Military assistance	Saudi Arabia	Dec 82	C-5		1			DFI, 1995.
FMS to Burma	Military assistance	Burma	Dec 82	707		1			DFI, 1995.
Yemeni Earthquake	Disaster relief	Yemen	24–30 Dec 82	C-141s, civil	6, ?			187	USAF, 1993a, p.41.
Italian Forest Fires	Disaster relief	Italy	Jan 83	C-130s					USAF, 1991a, p.45; Snyder and Shaw, 1993, p.115.
Nigerian Telecomm Fire	Disaster relief	Nigeria	Feb 83	C-141	1	1		15	USAF, 1991a, p.28.
Early Call	Military assistance	Egypt	14–24 Feb 83	E-3s, KC-10s, C-141, C-5	4, 3, 1, 1	39	832	1,340	USAF, 1990, p.77; USAF, 1993a, p.41; DFI, 1995.
Fiji Typhoon	Disaster relief	Fiji	Mar 83	Airlifters					USAF, 1991a, p.45.
Colombian Earthquake	Disaster relief	Colombia	Apr 83	C-130s		5		34	USAF, 1991a, p.45; DFI, 1995.
Bombing of US Embassy	Medevac	Lebanon	Apr 83	Airlifters					USAF, 1991a, p.45.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Burmese Invasion	Military assistance	Thailand	Apr 83	C-5		2			DFI, 1995.
Operations Bahamas & Turks	Counterdrug	Bahamas	May 83	H-1 helos	2				USAF, 1991a, p.18.
FMS to Zaire	Military assistance	Zaire	Jun 83	C-141		1			DFI, 1995.
Deep Freeze '83	Logistics support	Antarctica	Jun 83	C-141		2			DFI, 1995.
El Salvador Medical Aid	Humanitarian aid	El Salvador	Jun 83	C-130s	2				USAF, 1991a, p.45.
Peruvian Floods	Disaster relief	Peru	Jul 83	C-130s	3	13		170	USAF, 1991a, p.45; DFI, 1995.
Ecuadoran Floods	Disaster relief	Ecuador	Jul 83	Helos	2			10	USAF, 1991a, p.45.
Senior Look	Military assistance	Egypt	Jul–Aug 83	U-2					DFI, 1995.
Chadian Insurgency	FID	Chad	7 Aug–15 Sept 83	C-141, E-3, F-15		15	soldiers	185	USAF, 1993a, p.41; USAF, 1991a, p.28; DFI, 1995.
Rockets to Norway	Logistics support	Norway	Aug 83	C-141		1			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
El Salvador Aid	Military assistance	El Salvador	Aug 83	C-130, DC-10		6			DFI, 1995.
Sudan Crisis	Military assistance	Sudan	Aug 83	E-3s, F-15s, C-141	2, 8	44			USAF, 1991, p.18; DFI, 1995.
KAL 007 Rescue Support	Search and rescue	Korea	Sep 83	KC-135, C-141	?, 4	157, ?	86	36	USAF, 1990a, p.78; USAF, 1991a, p.46.
Rubber Wall	Peace operation	Lebanon	3–25 Sep 83	C-5s, C-141s, C-130s		24, 85, 4		4,058	USAF, 1993a, p.41.
Cholera Outbreak	Disaster relief	Truk Is	Sep 83	Airlifters					USAF, 1991a, p.46.
Protection for Korean President	Military assistance	Korea	Oct 83	E-3, KC-135		2			DFI, 1995.
Military Aid to El Salvador	Military assistance	El Salvador	Oct 83	C-130		5			DFI, 1995.
Deep Freeze '83	Logistics support	Antarctica	Oct 83	C-141		13			DFI, 1995.
Beirut Bombing Medevac	Medevac	Lebanon	23 Oct–16 Nov 83	C-141s, C-9As	8, 12	35	78		USAF, 1993a, p.43; DFI, 1995.
Urgent Fury	Strike/raid	Grenada	Oct–Nov 83						
Urgent Fury—Airlift	Strike/raid	Grenada	Oct–Nov 83	C-5s, C-141s, C-130s		991	35,911	15,374	USAF, 1991b.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Urgent Fury—Refueling	Strike/raid	Grenada	Oct–Nov 83	KC-10, KC-135					USAF, 1990, p.79.
Cuban POW Repatriation	Humanitarian aid	Grenada	Nov 83	C-130s	22		755		USAF, 1991a, p.28.
Turkish Earthquake	Disaster relief	Turkey	1–5 Nov 83	C-141, C-130		4, 13			USAF, 1993a, p.43.
FMS to Philippines	Military assistance	Philippines	Dec 83	C-5		1			DFI, 1995.
Lebanon Peace Operation	Peace operation	Lebanon	Dec 83	C-5, C-141		3			DFI, 1995.
Grenadan Peacekeeping	Peace operation	Grenada	Jan–Dec 84	C-141		152			DFI, 1995.
Hostage Return	Medevac	Syria	Jan 84	C-141		1			DFI, 1995.
Aid to El Salvador	FID	El Salvador	Jan 84	C-130		1			DFI, 1995.
Lebanon Evacuation	Peace operation	Cyprus	Feb 84	C-141		2			DFI, 1995.
Eagle Lift (Airlift)	Military assistance	Egypt	19 Mar–9 Apr 84	C-5, C-141		28, 17	1,286	1,594	USAF, 1993a, p.43.
Eagle Lift (Refueling)	Military assistance	Egypt	19 Mar–9 Apr 84	KC-10, KC-135		2, 5			USAF, 1993a, p.43.
Eagle Lift (Surveillance)	Military assistance	Egypt	19 Mar–9 Apr 84	E-3, RC-135					DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
FMS to El Salvador	FID	El Salvador	Mar 84	DC-8		1			DFI, 1995.
El Salvador Election	FID	El Salvador	Mar 84	C-130		2			DFI, 1995.
FMS to Costa Rica	Military assistance	Costa Rica	Mar 84	C-141		6		24	DFI, 1995.
FMS to Burma	Military assistance	Burma	Apr 84	C-130		2			DFI, 1995.
FMS to El Salvador	FID	El Salvador	Apr 84	C-130, C-141		4			DFI, 1995.
FMS to Philippines	Military assistance	Philippines	May 84	C-141		2			DFI, 1995.
FMS to Australia	Military assistance	Australia	Jun 84	C-5		2			DFI, 1995.
Antarctica Resupply	Logistics support	Antarctica	Jun 84	C-141, KC-10	1, 1				DFI, 1995.
Saudi Air Defense	Military assistance	Saudi Arabia	Jun 84	E-3					USAF, 1991a, p.18.
FMS to El Salvador	FID	El Salvador	Jul 84	C-130, C-141		4			DFI, 1995.
Vietnam MIAs	Medevac	Vietnam	Jul 84	C-130		1			DFI, 1995.
Intense Look	Military assistance	Persian Gulf	Aug 84	C-5, C-141, C-130					USAF, 1991a, p.18; DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Chadian Insurgency II	Military assistance	Sudan	Aug 84	E-3					USAF, 1991a, p.18.
Johnston Island Typhoon	Disaster relief	Johnston Is	Aug 84	Airlifters		2			USAF, 1991a, p.46; DFI, 1995.
Support for NIH	Humanitarian aid	Zaire	19–21 Sep 84	C-141	1	1	3	9	USAF, 1993a, p.44
Korean Floods	Disaster relief	Korea	Sep 84	Airlifters					USAF, 1991a, p.46.
Threats to US Embassy	Embassy security	Lebanon	Sep 84	C-141		2			DFI, 1995.
Deep Freeze '84	Logistics support	Antarctica	Sep 84	C-141		17			DFI, 1995.
Pope Paul II Visit to Puerto Rico	Logistics support	Puerto Rico	Oct 84	Unk.					DFI, 1995.
El Salvadoran Military Training	FID	US	Oct 84	C-130		2			DFI, 1995.
Gandhi Assassination	Peace operation	India	Oct 84	C-130					DFI, 1995.
Threats to US Embassy	Embassy security	Colombia	Nov 84	C-141s	2	2			USAF, 1991a, p.28.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
FMS to El Salvador	FID	El Salvador	Nov 84	C-141, C-130		2			DFI, 1995.
Disabled Merchant Ship	Military assistance	Cuban waters	Nov 84	E-3, fighters	1, 2				USAF, 1991a, p.18.
Ethiopian Refugee Relief	Humanitarian aid	Sudan	Dec 84	C-141	1	1			USAF, 1993a, p.44.
Aircraft Hijacking	Medevac	Kuwait	Dec 84	C-141s	2				USAF, 1991a, p.46.
Mali Famine	Disaster relief	Mali	Jan 85	Airlifters		1			USAF, 1991a, p.28; DFI, 1995.
Fiji Typhoon	Disaster relief	Fiji	Jan 85	C-5s, C-141	2, 1				USAF, 1991a, p.46.
Ethiopian Refugee Aid	Humanitarian aid	Ethiopia	Jan 85	Airlifters					USAF, 1991a, p.46.
Bolivian Plane Crash	Search and rescue	Bolivia	Jan 85	C-141		3			DFI, 1995.
Grenadan Troop Redeployment	Redeployment	Grenada	Jan–Jun 85	C-5, C-141, C-130		38			DFI, 1995.
Mozambique Goodwill Flight	Humanitarian aid	Mozam-bique	Feb 85	C-141	1			44	Matthews and Ofcansky, 1986, p.8.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Argentine Earthquake	Disaster relief	Argentina	Feb 85	C-141	1	2			USAF, 1991a, p.46; DFI, 1995.
Sudan, Niger & Mali Famine	Disaster relief	Various	5–9 Mar 85			4		123	USAF, 1993a, p.44.
Return of Remains	Medevac	Mexico	Mar 85	C-141		2			DFI, 1995.
Chilean Earthquake	Disaster relief	Chile	Mar 85	C-5	1	1		60	USAF, 1991a, p.46; DFI, 1995.
Caribbean Drug Interdiction	Counterdrug	Caribbean	Apr 85	Helos					USAF, 1991a, p.18.
Project Raft	Humanitarian aid	Mali	May–Nov 85	C-141, C-130		32			DFI, 1995.
Grenada Troop Airlift	Redeployment	Grenada	May–Jun 85				245		USAF, 1993a, p.44.
FMS to Costa Rica	Military assistance	Costa Rica	Jun 85	DC-8		4			DFI, 1995.
Return of Remains	Medevac	El Salvador	Jun 85	C-130		4			DFI, 1995.
Deep Freeze '85	Logistics support	Antarctica	Jun 85	C-141		4			DFI, 1995.
Greenland Expedition	Logistics support	Greenland	Jun–Jul 85	C-130		7			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Meeting with Greek Prime Minister	Logistics support	Greece	Jul 85	C-130		2			DFI, 1995.
Transport of Firefighters	Disaster relief	US	4–10 Jul 85	C-141		10	385	181	USAF, 1993a, p.44.
Aerial Firefighting	Disaster relief	US	4–10 Jul 85	C-130		200		280	USAF, 1993a, p.44.
Return of Hostages	Medevac	Syria	Jul 85	C-141			39		USAF, 1991a, p.46.
Sudanese Famine	Disaster relief	Sudan	Aug 85	C-5, helos	1, 3				USAF, 1991a, p.46.
Return of MIA Remains	Medevac	Vietnam	Aug 85	C-130		2			DFI, 1995.
Mexican Earthquake	Disaster relief	Mexico	21–30 Sep 85	C-5s, C-141, C-130s		4, 1, 5	300	375	USAF, 1993a, p.44.
FMS to Somalia	Military assistance	Somalia	Sep 85	DC-8		1			DFI, 1995.
Display Determination	Military assistance	Turkey	Sep–Oct 85	F-16	12				DFI, 1995.
Deep Freeze '85	Logistics support	Antarctica	Oct–Nov 85	C-141		18			DFI, 1995.
Tropical Storm Isabella	Disaster relief	Puerto Rico	Oct 85	C-5s, C-141s, C-130s		5, 2, 3	66	361	USAF, 1993a, p.45.
Achille Lauro Deployment	Hostage rescue	Med. Sea	Oct 85	C-5s, C-141			e		Martin and Walcott, 1988, p.238.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Achille Lauro Hostage Return	Medevac	Egypt	Oct 85	Airlifter	1		11		USAF, 1991a, p.46.
Ponape	Humanitarian aid	Ponape Is	Nov 85	C-141		1			DFI, 1995.
Colombian Volcano Relief	Disaster relief	Colombia	15–18 Nov 85	C-130s	4	12+		82	USAF, 1993a, p.45; DFI, 1995.
Arrow Air Crash in Canada	Medevac	Canada	Dec 85	C-5, C-130		26			USAF, 1991a, p.46; DFI, 1995.
VIP Evacuation	Humanitarian aid	Haiti	Feb 86	C-141	1				USAF, 1991a, p.47.
Afghan Refugee Relief	Humanitarian aid	Pakistan	Mar 86–May 93			80+	1,200	2,000+	USAF, 1993a, p.45.
Eldorado Canyon	Strike/raid	Libya	Apr 86	Various	58				Venkus, 1992, p.24; Martin and Walcott, 1988, pp.296–297.
Eldorado Canyon (refuelings)	Strike/raid	Libya	Apr 86	KC-10s, KC-135s	28				USAF, 1993a, p.47.
Yemeni Deputy Prime Minister Illness	Humanitarian aid	Yemen	Apr 86	C-141	1	1	1		DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Chernobyl Nuclear Accident	Air sampling	Global	Apr–Jun 86	WC-135, WC-130		55			Lempert, 1992, p.77.
Solomon Islands Typhoon	Disaster relief	Solomon Is	May 86	C-130s	4				USAF, 1991a, p.47.
Jamaican Floods	Disaster relief	Jamaica	Jun 86	C-130s	5			27	USAF, 1991a, p.47; DFI, 1995.
Father Jenico Airlift	Humanitarian aid	Syria	Jun 86	Airlifter					USAF, 1991a, p.47.
Haylift	Disaster relief	US	19–28 Jul 86	C-141s, C-130s		32		500	USAF, 1993a, p.47.
Musk Oxen	Humanitarian aid	Greenland	Jul 86	C-141		1			DFI, 1995.
Blast Furnace	Counterdrug	Bolivia	Jul–Nov 86	C-5		10			DFI, 1995.
Cameroon Lake Disaster	Disaster relief	Cameroon	Aug 86	Unk.		1			DFI, 1995.
Humanitarian Cargo	Humanitarian aid	Philippines	22–23 Sep 86	C-5s	2	2		87	USAF, 1993a, p.47.
Asia Games	Military assistance	Korea	Sep–Oct 86	E-3, F-16					DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
El Salvadoran Earthquake	Disaster relief	El Salvador	11–16 Oct 86	C-5s, C-141s, C-130s	18	22		39	USAF, 1993a, p.47; USAF, 1991a, p.47.
Arson Investigation	FID	Puerto Rico	Jan 87	C-5, C-141		2			DFI, 1995.
Marcos Evacuation	Humanitarian aid	Philippines	26–28 Feb 87	C-9, C-141	2				USAF, 1993a, p.47.
Typhoon Uma	Disaster relief	New Guinea	Feb 87	C-141s		8		66	USAF, 1991a, p.47; DFI, 1995.
Ecuadoran Earthquake	Disaster relief	Ecuador	Mar 87	C-141s, C-130s	2, 4	10		107	USAF, 1991a, p.47; DFI, 1995.
Sinai Multinational Force	Peace operation	Egypt	Apr 87	C-141s					USAF, 1991a, p.29.
Attack on USS *Stark*	Medevac	Persian Gulf	May 87	C-141		1		36 dead	USAF, 1991a, p.47; DFI, 1995.
Earnest Will	Military assistance	Persian Gulf	Aug 87–Aug 88	C-5s, E-3s, KC-10s		100s			Stewart et al., 1994, p.43; USAF, 1990, p.84.
Chad Aid	Humanitarian aid	Chad	Sep 87	Airlifters					USAF, 1991a, p.47.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Thai Aid	Humanitarian aid	Thailand	Sep 87	Airlifters					USAF, 1991a, p.47.
Cuban Prisoner Riots	Domestic security	US	Nov–Dec 87				800+		USAF, 1993a, p.48.
Mexican Medical Aid	Medical assistance	Mexico	Feb 88	Airlifter					USAF, 1991a, p.47.
Typhoon Roy	Disaster relief	Marshall Is	Feb 88	C-130		2			DFI, 1995.
Golden Pheasant	Military assistance	Honduras	Mar 88	Lifters, tankers	31, 23		3,200		USAF, 1990, p.85.
Sinai MFO Support	Peace operation	Egypt	Apr 88	C-141s			1,000		USAF, 1993a, p.48.
USS *Roberts* Mine Strike	Medevac	Bahrain	Apr 88	C-141	1				USAF, 1991a, p.47.
Valiant Boom	Protect US citizens	Panama	5–8 Apr 88	C-5s, C-141s	8, 22	45	1,300		USAF, 1993a, p.48.
Joint Verification Ops	Arms control	Soviet Union	17 Apr–23 Jul 88	C-5s, KC-10s					USAF, 1993a, p.49.
US Strike Against Iran	Strike/raid	Persian Gulf	18–19 Apr 88	Tankers					USAF, 1993a, p.49.
Pakistani Medical Aid	Humanitarian aid	Pakistan	Apr 88	C-141		4			DFI, 1995.
Issue Forth	FID	Pakistan	Apr 88	C-141		2			DFI, 1995.
Sled Dog Lift	Humanitarian aid	Greenland	Apr 88	C-130		1			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Return of MIA Remains	Medevac	Vietnam	Apr 88	C-141		1			DFI, 1995.
Sudanese Floods	Disaster relief	Sudan	Jul–Aug 88	Unk.		3			DFI, 1995.
INF Treaty Verification	Arms control	USSR, US	1 July–31 Aug 88	C-5s, C-141s					USAF, 1993a, p.49.
Aid to Somalia	Humanitarian aid	Somalia	Aug 88	Unk.		1			DFI, 1995.
Tibet Expedition	Logistics support	China	Aug 88	C-5		3			DFI, 1995.
Post Road	Peace operation	Iraq	15–28 Aug 88	C-5s, KC-135s		29, 40	500		USAF, 1993a, p.49.
Montana and Wyoming Fires	Disaster relief	Various	22 Aug–1 Sep 88	C-5, C-141s, C-130		1, 29, 1	2,957	420	USAF, 1993a, p.49.
Bangladeshi Floods	Disaster relief	Bangladesh	Sep 88	C-5, C-141		3			USAF, 1991a, p.47; DFI, 1995.
Korean Olympics	Military assistance	Korea	Sep 88	E-3					DFI, 1995.
Hurricane Gilbert Relief	Disaster relief	Jamaica	Sep–Oct 88	C-5, C-141, C-130		12			USAF, 1993a, p.49; DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Hostage Release	Medevac	Syria	Sep 88	C-141					DFI, 1995.
Philippine Typhoon	Disaster relief	Philippines	Oct 88	Airlifters					USAF, 1991a, p.47.
Medical Aid to Cameroon	Humanitarian aid	Cameroon	Nov 88	C-5		1			DFI, 1995.
Senegal Insect Infestation	Disaster relief	Senegal	Nov 88	C-141		14			USAF, 1991a, p.47; DFI, 1995.
Aid to Kenya	Humanitarian aid	Kenya	Dec 88	C-141					DFI, 1995.
Zambian Ambassador Remains	Humanitarian aid	Zambia	Dec 88	C-141		1			DFI, 1995.
Armenian Earthquake Relief	Disaster relief	Armenia	10 Dec 88–31 Dec 89	C-5s, C-141s		20	188	572	USAF, 1993a, p.50.
Aid to Contra Rebels/Refugees	Humanitarian aid	Honduras	Jan–Dec 89	C-141, C-130		34			DFI, 1995.
Armenian Earthquake	Disaster relief	Armenia	Jan–Feb 89	C-141	1	13			DFI, 1995.
Return of US Pilot Remains	Medevac	Libya	Jan 89	C-141	1				DFI, 1995.
Antidrug Mission	Counterdrug	Latin America	3 Feb 89 –96	Tankers, lifters					USAF, 1993a, p.50.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Jamaican Hurricane	Disaster relief	Jamaica	Feb 89	Unk.		18			DFI, 1995.
Troop Withdrawal	Peace operation	Namibia	Mar 89	C-5s	3	23			USAF, 1991a, p.29; DFI, 1995.
MIA Search	Search for remains	Cambodia	Mar 89	C-130		2			DFI, 1995.
Election District	Peace operation	Angola	5 Mar–May 89	C-5, C-141, C-130			854	1,023	USAF, 1993a, p.51.
US MIA Search	Find remains	Thailand	26–28 Mar 89	C-130s	2		14	10	USAF, 1993a, p.51.
Alaskan Oil Spill	Disaster relief	Alaska	Apr 89	C-5s, C-141s		7, 4	Some		USAF, 1993a, p.51.
USS *Iowa* Accident	Medevac	Atlantic Ocean	Apr 89	Unk.		1			DFI, 1995.
Africa 1	Disaster relief	Gambia, Chad	Apr 89	C-5		2			DFI, 1995.
Nimrod Dancer	Deterrence	Panama	May 89	Lifters		50			USAF, 1991a, p.19.
Blade Jewel	NEO	Panama	May 89	C-141s, C-130, civil	50, ?, ?		5,915		USAF, 1993a, p.51; DFI, 1995.
Afghan Rebel Aid	Military assistance	Pakistan	May–Jun 89	C-141		2			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Soviet Fire	Disaster relief	Soviet Union	Jun 89	C-141		3			DFI, 1995.
Aid to Pakistan	Humanitarian aid	Pakistan	Jul 89	C-5		2			DFI, 1995.
Mickey Leland Search	Search and rescue	Ethiopia	Aug 89	Various	15	100+			Lempert, 1992, pp.78–82.
Anchor Mark	Counterdrug	Mexico	Aug–Sep 89	E-3					DFI, 1995.
Liberian Medical Aid	Humanitarian aid	Liberia	Sep 89						USAF, 1991a, p.48.
Hurricane Hugo Relief	Disaster relief	US/ Caribbean	Sep–Nov 89	C-5s,141s, C-130s		215	3,300	8,200	USAF, 1993a, p.51.
Hawkeye	Disaster relief	Virgin Islands	Sep–Nov 89	C-5s, C-141s, C-130s		See Hugo	US MPs		USAF, 1993a, p.51.
Deep Freeze 89	Logistics support	Antarctica	Oct 89	C-5, KC-10	1, 1	1			USAF, 1993a, p.51.
Africa 2	Humanitarian aid	Chad, others	Oct 89	C-5		7			DFI, 1995.
San Francisco Earthquake	Disaster relief	US	18–24 Oct 89		9				Lempert, 1992; USAF, 1993a, p.51.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Philippine Coup	FID	Philippines	Dec 89	F-4s	2				Siegel and Fabbri, 1993; USAF, 1991a, p.19.
Just Cause	Strike/raid	Panama	Dec 89	Various	250	1,571+	39,994	20,675	USAF, 1991b.
Communications Test	Arms control	Soviet Union	Dec 89	TC-135					DFI, 1995.
Communications Test	Arms control	Alaska	Dec 89	TC-135					DFI, 1995.
Aid to Armenia	Humanitarian aid	Armenia	Dec 89	C-5		1			DFI, 1995.
Coronet Nighthawk	Counterdrug	Mexico	Jan 90–Dec 94	F-15, F-16, KC-135					DFI, 1995.
Denton Amendment Missions	Humanitarian aid	Worldwide	Jan–Dec 90	C-130		19			DFI, 1995.
Gen Noriega's Trip to Jail	Counterdrug	Panama	Jan 90	MC-130		1			DFI, 1995.
Typhoon Ofa	Disaster relief	Samoa	Feb 90	C-5, C-130	1, 1	9			USAF, 1991a, p.48; DFI, 1995.
Aid to Ivory Coast	Humanitarian aid	Ivory Coast	Feb 90	Unk.		1			DFI, 1995.
Aid to Paraguay	Humanitarian aid	Paraguay	Feb 90						DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Afghanistan War Relief	Humanitarian aid	Afghanistan	Mar 90	C-5	1	1			USAF, 1991a, p.29.
Lebanon Hostage Return	Medevac	Syria	Apr 90	C-141	1				USAF, 1991a, p.48.
INF Missile Redeployment	Arms control	Sicily	11 Apr 90–Mar 91	C-5s, ?					Lempert, 1992; USAF, 1993a, p.52.
Sailor Stricken in Pacific	Humanitarian aid	Pacific	Jun 90	C-141	1				USAF, 1991a, p.48.
Philippine Earthquake	Disaster relief	Philippines	Jul 90	C-130					USAF, 1991a, p.48.
Sharp Edge	NEO	Liberia	Aug 90–Jan 91						Snyder and Shaw, 1993, p.133.
Korean Floods	Disaster relief	Korea	Sep 90	Helos			24		USAF, 1991a, p.48.
Jordan NEO	NEO	Jordan	Sep 90	NWA 747	1	1	300		Snedecker, 1992, pp.34–35.
Panamanian Ship Rescue	Search and rescue	Korea	Dec 90	Helos			22		USAF, 1991a, p.48.
Typhoon Owen	Disaster relief	Guam	Dec 90	Unk.		2			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Return of MIA Remains	Medevac	Laos, VN	Jan 91–Apr 92	Unk.		17			DFI, 1995.
Eastern Exit	NEO	Somalia	Jan 91	C-130			260		Siegel, 1995, p.43; Snedecker, 1992, p.82; DFI, 1995.
Sudan NEO	NEO	Sudan	Jan 91	Airlifters		1			DFI, 1995.
Liberian Coup	Humanitarian aid	Liberia	Feb 91	C-5, C-130		2			DFI, 1995.
Sierra Leone	Humanitarian aid	Sierra Leone	Feb–Nov 91	Airlifters		2			DFI, 1995.
Medical Aid to Nicaragua	Humanitarian aid	Nicaragua	Feb 91	C-130		1			DFI, 1995.
Aid to Laos	Humanitarian aid	Laos	Feb 91	Airlifters		2			DFI, 1995.
Aid to Romania	Humanitarian aid	Romania	Mar 91	C-5	1	1		65	USAF, 1992a, p.51.
Kuwaiti Oil Field Fires	Disaster relief	Kuwait	Mar–Jun 91	Airlifters		8			DFI, 1995.
Aid to Armenia	Humanitarian aid	Armenia	Mar 91	C-130		1			DFI, 1995.
Peruvian Cholera Epidemic	Disaster relief	Peru	Apr 91	C-5s				200	USAF, 1992a, p.51.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Ecuadoran Aid	Humanitarian aid	Ecuador	May 91	C-5	1	1		25	USAF, 1992a, p.51.
Sea Angel	Disaster relief	Bangladesh	11 May–13 Jun 91	C-5, C-141, C-130		10, 14, 5	738	832	USAF, 1993a, p.54.
Operation GTMO	Humanitarian aid	Cuba	May 91–Jun 93	Airlifters					USAF, 1992a, p.51; Siegel, 1995.
Ethiopian Drought	Disaster relief	Ethiopia	Jun 91	C-5s					USAF, 1992a, p.51.
Mongolian Aid	Humanitarian aid	Mongolia	Jun 91	C-141	1	1			USAF, 1992a p.51.
Fiery Vigil (USMC)	NEO	Philippines	17–21 Jun 91	Helos	8	384	13,500		Interview—Col. Bill Cato
Fiery Vigil (USAF)	NEO	Philippines	8 Jun–1 Jul 91	C-5s, C-141s, C-130s		12, 195, 38	52,018	4,443	Bazzell, 1992, p.25.
UN Monitoring of Iraq WMD	CP	Iraq	1991–1996	U-2s		300			Capaccio, 1996, p.16.
Provide Comfort	Peace operation	Iraq	Apr 1991–present	Various		33,381	29,555	118,340	USAF, 1994b.
Aid to Ecuador	Humanitarian aid	Ecuador	May 91	C-5	1	1			DFI, 1995.
Aid to Romania	Humanitarian aid	Romania	May 91	C-141, C-130					DFI, 1995.
Aid to Bosnia	Humanitarian aid	Bosnia	May 91	C-5, C-141, C-130					DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Aid to Kenya	Humanitarian aid	Kenya	Jun 91	Airlifters		1			DFI, 1995.
Aid to Ethiopia	Humanitarian aid	Ethiopia	Jun 91	C-5		7			DFI, 1995.
Aid to Ecuador	Humanitarian aid	Ecuador	Jun 91	C-141, C-130					DFI, 1995.
Aid to Peru	Humanitarian aid	Peru	Jun 91	Airlifters		1			DFI, 1995.
Aid to Romania	Humanitarian aid	Romania	Jun 91	Airlifters		1			DFI, 1995.
Aid to Kuwait	Humanitarian aid	Kuwait	Jun 91	C-5		1			DFI, 1995.
Aid to Mongolia	Humanitarian aid	Mongolia	Jun 91	C-141		1			DFI, 1995.
Chad Drought	Disaster relief	Chad	Jul 91	Airlifters		1			DFI, 1995.
Ethiopian Drought	Disaster relief	Ethiopia	Jul–Sep 91	Airlifters		17			DFI, 1995.
Aid to Mongolia	Humanitarian aid	Mongolia	Jul 91	Airlifters		1			DFI, 1995.
Aid to Kuwait	Humanitarian aid	Kuwait	Jul 91	Airlifters		1			DFI, 1995.
Aid to Romania	Humanitarian aid	Romania	Jul 91	Airlifters		1			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Albanian Aid	Humanitarian aid	Albania	Jul 91	Airlifters		7			USAF, 1992a, p.51; DFI, 1995.
Aid to Mongolia	Humanitarian aid	Mongolia	Aug 91	C-5		1			DFI, 1995.
Chinese Floods	Disaster relief	China	Aug 91	C-5	1	1			USAF, 1992a, p.51.
Mongolian Floods	Disaster relief	Mongolia	Aug 91	C-5	1	1			USAF, 1992a, p.51.
Albanian Aid	Humanitarian aid	Albania	Aug 91	Airlifters		4			USAF, 1992a, p.51; DFI, 1995.
Djibouti Aid	Humanitarian aid	Djibouti	Aug 91	Airlifters		1			DFI, 1995.
Chinese Floods	Disaster relief	China	Aug 91	Airlifters		1			DFI, 1995.
Quick Lift	NEO	Zaire	Sep 91	Airlifters		41			Siegel and Fabbri, 1993; DFI, 1995.
Aid to Ethiopia	Humanitarian aid	Ethiopia	Sep 91	Airlifters		3			DFI, 1995.
Aid to Romania	Humanitarian aid	Romania	Sep 91	Airlifters		1			DFI, 1995.
Aid to FSU	Humanitarian aid	FSU	Sep–Oct 91	Airlifters		3			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Aid to Angola	Humanitarian aid	Angola	Sep–Oct 91	Airlifters		6			DFI, 1995.
Aid to Ukraine	Humanitarian aid	Ukraine	Oct 91	C-5s	2	2			USAF, 1992a, p.51.
Aid to Mongolia	Humanitarian aid	Mongolia	Oct 91	Airlifters		1			DFI, 1995.
Aid to Sierra Leone	Humanitarian aid	Sierra Leone	Nov 91	Airlifters		1			DFI, 1995.
Typhoon Yuri	Disaster relief	Guam	Nov 91	Airlifters					USAF, 1992a, p.52.
Canadian C-130 Crash	Search and rescue	North Pole	Nov 91	Various					USAF, 1992a, p.52.
Aid to Somalia	Humanitarian aid	Somalia	Nov 91	Airlifters		1			DFI, 1995.
Aid to Angola	Humanitarian aid	Angola	Nov 91	Airlifters		1			DFI, 1995.
Aid to Pakistan	Humanitarian aid	Pakistan	Nov 91	Airlifters		1			DFI, 1995.
Safe Harbor	Humanitarian aid	Haiti	Nov 91–Apr 93	Airlifters		400			DFI, 1995.
Typhoon Zelda	Disaster relief	Marshall Is	Dec 91	Airlifters		1			DFI, 1995.
Hurricane Val	Disaster relief	Somalia	Dec 91	Airlifters		9			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Aid to Liberia	Humanitarian aid	Liberia	Dec 91	Airlifters		4			DFI, 1995.
Aid to Haiti	Humanitarian aid	Haiti	9 Dec 91	C-141					USAF, 1992b.
Romania Relief	Humanitarian aid	Romania	12 Dec 91	C-5					USAF, 1992b.
Afghanistan Relief	Humanitarian aid	Afghanistan	15 Dec 91	C-5					USAF, 1992b.
Albanian Relief	Humanitarian aid	Albania	16 Dec 91	C-141					USAF, 1992b.
Philippine Relief	Humanitarian aid	Philippines	17 Dec 91	C-5					USAF, 1992b.
Croatian Relief	Humanitarian aid	Croatia	17 Dec 91	C-5					USAF, 1992b.
CIS Relief	Humanitarian aid	Russia	17 Dec 91	C-5					USAF, 1992b.
Armenian Relief	Humanitarian aid	Armenia	19 Dec 91	C-5					USAF, 1992b.
Belarus Relief	Humanitarian aid	Belarus	19 Dec 91	C-141					USAF, 1992b.
Russian Relief	Humanitarian aid	Russia	21–22 Dec 91	C-5	2	2			USAF, 1992a, p.52; USAF, 1992b.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Lebanon Hostage Return	Medevac	Syria	1 Dec 91	Airlifter	1	1	1		Snyder and Shaw, 1993, p.140.
Return of MIA Remains	Medevac	Vietnam	Jan–Apr 92	Airlifter		9			DFI, 1995.
Armenian Relief	Humanitarian aid	Armenia	9 Jan 92	C-5					USAF, 1992b.
Mongolian Relief	Humanitarian aid	Mongolia	24 Jan 92	C-5					USAF, 1992b.
Afghanistan Relief	Humanitarian aid	Afghanistan	Feb–Aug 92	C-5, C-141					USAF, 1992b.
Provide Hope I	Humanitarian aid	FSU	10–26 Feb 92	C-5s, C-141s		19, 46		2,270	USAF, 1993a, p.55.
Provide Hope II	Humanitarian aid	FSU	29 Feb–Sep 92	C-5s, C-141s, civil		26, 76, 5		2,387	USAF, 1992b.
Turkish Earthquake	Disaster relief	Turkey	Mar 92	C-5s, C-130s		10			USAF, 1992a, p.52; DFI, 1995.
Uzbekistan Oil Field Fires	Disaster relief	Uzbekistan	Apr 92	C-141s		5			USAF, 1992a, p.52; DFI, 1995.
Nicaraguan Volcano Eruption	Disaster relief	Nicaragua	Apr 92	Airlifters					DFI, 1995.
Aid to Bolivia	Humanitarian aid	Bolivia	Apr 92	Airlifters		2			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Aid to El Salvador	Humanitarian aid	El Salvador	Apr 92	Airlifters					DFI, 1995.
Return of Remains	Medevac	Cambodia	Apr–Dec 92	Airlifters					DFI, 1995.
Bosnia Relief	Humanitarian aid	Bosnia	18–19 Apr 92	C-141s		5		130	USAF, 1993a, p.56.
Bosnia Relief via Croatia	Humanitarian aid	Croatia	May 92	C-141s	2	2		43	USAF, 1992b.
Return of MIA Remains	Humanitarian aid	North Korea	May 92	Airlifter		1			DFI, 1995.
Sinai Peace-keeping	Peace operations	Egypt	May 92	Airlifter					DFI, 1995.
Los Angeles Riots	Domestic security	US	May 92						Siegel, 1995, p.6.
Mil. Support to US Embassy	NEO	Sierra Leone	3–4 May 92	C-141s	2	2	350		USAF, 1992b.
Search for Pablo Escobar	Counterdrug	Colombia	Jul 92	C-130					DFI, 1995.
Provide Promise	Humanitarian aid	Bosnia	2 July 92–9 Jan 96	C-17s, C-141s, C-130s		4,553		178,000	"Provide Promise," 1996, p.2.
Intrinsic Action	Military Assistance	Kuwait	Aug 92	Various		53			DFI, 1995.
Southern Watch	Peace operation	Iraq	Aug 92–present	Various					USAF, 1994b.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Provide Transition	Peace operation	Angola	12 Aug–7 Oct 92	C-130s		326	8,805	265	USAF, 1993b, p.2; DFI, 1995.
Provide Relief	Humanitarian aid	Somalia	21 Aug 92–28 Feb 93			3,100		34,400	USAF, 1993b, p.2
Hurricane Andrew	Disaster relief	US	25 Aug–28 Oct 92			724	13,500	21,500	USAF, 1993b, p.2.
Chernobyl Victims Airlift	Humanitarian aid	Belarus	Aug 92				70 children		USAF, 1993b, p.2.
Typhoon Omar	Disaster relief	Guam	1–25 Sep 92			59	750	2,000	USAF, 1993b, p.2.
Typhoon Iniki	Disaster relief	Hawaii, US	12 Sep–18 Oct 92	Lifters, tankers		613	8,600	9,200	USAF, 1993b, p.2.
Impressive Lift	Peace operation	Somalia	13–29 Sep 92			94	974	1,168	USAF, 1993b, p.3.
Liberia Evacuation	NEO	Liberia	23–25 Oct 92	C-130s			96		USAF, 1993b, p.3.
Tajikistan Evacuation	NEO	Tajikistan	Oct 92	C-141	1	1	21		USAF, 1993b, p.3.
Aid to Mongolia	Humanitarian aid	Mongolia	Oct 92	C-141		1			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Armenian Relief	Humanitarian aid	Armenia	1–11 Nov 92	C-5s, C-141		4, 1		236	USAF, 1993b, p.3.
Military Hospital Support	Humanitarian aid	Croatia	10–22 Nov 92	C-5s, C-141s		4, 6			USAF, 1995b.
Pakistani Flood Relief	Disaster relief	Pakistan	6–20 Dec 92	C-5s		6		415	USAF, 1993b, p.4.
Restore Hope	Peace op	Somalia	9 Dec 92–4 May 93	C-5s, C-141s, C-130s		1,182	51,431	41,243	USAF, 1993b, p.4.
Return of Remains	Medevac	Liberia	Dec 92–Jan 93	Airlifter		1			DFI, 1995.
Attack on Iraqi Air Defenses	Strike/raid	Iraq	Jan 93	Various	80				Apple, 1993, p.1.
Follow-Up Attack on Air Defenses	Strike/raid	Iraq	Jan 93	Various					Friedman, 1993, p.1.
Aid to Mongolia	Humanitarian aid	Mongolia	Feb 93	C-141		1			DFI, 1995.
Bosnian Medevac	Humanitarian aid	Bosnia	3 Feb 93	C-141	1	1	8		USAF, 1993b, p.4.
Return of MIA Remains	Medevac	Vietnam	Feb–Oct 93	C-141					DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Provide Refuge	Humanitarian aid	Kwajalein Atoll	13 Feb–9 Mar 93	C-5, C-141, civil		1, 5, 3	930	167	USAF, 1994a, p.1.
Deny Flight	Peace operation	Bosnia	12 Apr 93–20 Dec 95	Various	54 USAF	24,201			USAF, 1995b.
Ecuador Counterdrug Ops	Counterdrug	Ecuador	Apr 93	E-3, KC-135					DFI, 1995.
Bolivia Counterdrug Ops	Counterdrug	Bolivia	May 93	E-3, KC-135					DFI, 1995.
Election Monitoring	Peace operation	Cambodia	17–29 May 93	C-5, C-141		9, 15	254	326	USAF, 1993b, p.2.
Aid to Mongolia	Humanitarian aid	Mongolia	May 93	C-141		1			DFI, 1995.
Able Sentry	Peace operation	Macedonia	5–12 Jul 93	C-5, C-141, C-130		15, 2, 3	334	850	USAF, 1993b, p.4.
Midwest Flood Relief	Disaster relief	US	11 July–1 Aug 93	C-5, C-141		20	141	797	USAF, 1993b, p.4.
Nepal Flood Relief	Disaster relief	Nepal	11–15 Aug 93	C-5s	3	6			USAF, 1993b, p.5; DFI, 1995.
Somalia Escalation	Peace operation	Somalia	25–27 Aug 93	C-5s, KC-10		5, 1	400		USAF, 1993b, p.5.
Shutdown VII	Counterdrug	Bolivia	Aug 93	E-3		3			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Indian Earthquake Relief	Disaster relief	India	Oct 93	C-5s	2	2			USAF, 1993b, p.5; DFI, 1995.
Aid to Mongolia	Humanitarian aid	Mongolia	Oct 93	C-141		1			DFI, 1995.
Somalia Reinforcements	Peace operation	Somalia	5–13 Oct 93	C-5, C-141		56	1,300	3,000	USAF, 1993b, p.6.
UN Troop Rotation	Peace operation	Nepal	24 Oct 93	C-5	3	3	350	250	USAF, 1993b, p.6.
Transport of UN Troops	Peace operation	Croatia	Oct 93	C-130		1			DFI, 1995.
Fiji President Medevac	Humanitarian aid	Fiji	Nov 93	Airlifter		1			DFI, 1995.
Aid to Mexico	Humanitarian aid	Mexico	Nov 93	C-5		1		7	DFI, 1995.
Aid to Grenada	Humanitarian aid	Grenada	Nov 93	C-5		1		7	DFI, 1995.
Aid to Dominican Republic	Humanitarian aid	Dom. Republic	Nov 93	C-5		1		7	DFI, 1995.
Aid to Venezuela	Humanitarian aid	Venezuela	Nov 93	C-130		1		1.5	DFI, 1995.
Aid to Ecuador	Humanitarian aid	Ecuador	Nov 93	C-130		1		1.5	DFI, 1995.
Aid to Virgin Islands	Humanitarian aid	Virgin Islands	Nov 93	C-130		1		12.5	DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Return of MIA Remains	Medevac	Vietnam	Dec 93	Airlifter		1			DFI, 1995.
Aid to Honduras	Humanitarian aid	Honduras	Dec 93	C-5		2		40	DFI, 1995.
Aid to Guatemala	Humanitarian aid	Guatemala	Dec 93	C-130		1		12.5	DFI, 1995.
Los Angeles Earthquake	Disaster relief	Los Angeles	17–25 Jan 94	C-5s, C-141s		6, 4	270	170	USAF, 1995a, p.1.
Aid to Belize	Humanitarian aid	Belize	Jan 94	C-141		1		21	DFI, 1995.
Aid to Mongolia	Humanitarian aid	Mongolia	Jan 94	C-141		1			DFI, 1995.
Aid to Nicaragua	Humanitarian aid	Nicaragua	Feb 94	C-141		1		14	DFI, 1995.
Aid to Guatemala	Humanitarian aid	Guatemala	Feb 94	C-141		2		20	DFI, 1995.
Rwanda NEO	NEO	Rwanda	Apr 94	C-5s, C-141s		12, 4	400+		USAF, 1995a, p.2.
Aid to Mongolia	Humanitarian aid	Mongolia	Apr 94	C-141		1			DFI, 1995.
Aid to Nicaragua	Humanitarian aid	Nicaragua	Apr 94	C-130		1		13	DFI, 1995.
Yemen NEO	NEO	Yemen	May 94			7	619		USAF, 1995b.
Aid to Mongolia	Humanitarian aid	Mongolia	May 94	C-141		1			DFI, 1995.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Rwandan Refugee Aid	Humanitarian aid	Tanzania	11–17 May 94	C-141s	4	13		239	USAF, 1995a, p.3.
Aid to Honduras	Humanitarian aid	Honduras	May 94	C-5		1		14	DFI, 1995.
Aid to Guatemala	Humanitarian aid	Guatemala	May 94	C-5		1		14	DFI, 1995.
Aid to India	Humanitarian aid	India	May 94	C-130		1		12	DFI, 1995.
Sea Signal	Humanitarian aid	Cuba	May 94	C-130					DFI, 1995.
UN Rwandan Operations	Peace operation	Uganda	22–30 June 94	C-5s, C-141s	2, 5				USAF, 1995a, p.3.
Ukraine Medical Aid	Humanitarian aid	Ukraine	Jun 94	C-5	1	1			USAF, 1995a, p.3.
Aid to Honduras	Humanitarian aid	Honduras	Jul 94	C-5		3		24	DFI, 1995.
Aid to Puerto Rico	Humanitarian aid	Puerto Rico	Jul 94	C-5		1		3	DFI, 1995.
Aid to Jamaica	Humanitarian aid	Jamaica	Jul 94	C-5		1		3	DFI, 1995.
Distant Haven	Humanitarian aid	Haiti	Jul–Dec 94	C-5, C-130					DFI, 1995.
Support Hope	Humanitarian aid	Rwanda	Jul–Sep 94	C-141s, C-135s, C-5s		700	11,000	23,000	USAF, 1995a, p.5.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Hurricane John	Disaster relief	Johnston Island	24–25 Aug 94	C-141s, C-130, DC-8s	6, 1, 2		1,107		USAF, 1995a, p.5.
Aid to Honduras	Humanitarian aid	Honduras	Aug 94	C-5				22.5	DFI, 1995.
Aid to Guatemala	Humanitarian aid	Guatemala	Aug 94	C-5				23	DFI, 1995.
Haitian Embassy Security	Military assistance	Dom. Republic	Aug–Oct 94	C-130					DFI, 1995.
Safe Haven	Humanitarian aid	Cuba	Aug–Dec 94	C-130					DFI, 1995.
Uphold Democracy	Peace operation	Haiti	Sep 94–Apr 95	Various		2,651	24,152	22,274	USAF, 1995b.
Deliberate Force	Peace operation	Bosnia	30 Aug–20 Sep 95	Various	87+ USAF	1,211		1,000 bombs[f]	USAF, 1995b.
Aid to Mongolia	Humanitarian aid	Mongolia	Oct 94	C-141		1			DFI, 1995.
Infant Medevac	Medevac	US	Oct 94	C-9As	2				USAF, 1995a, p.7.
Russian Flood	Disaster relief	Russia	Oct 94	C-141	1			20	USAF, 1995a, p.7.
Vigilant Warrior	Military assistance	Kuwait	Oct 94	Various					DFI, 1995.
Project Sapphire	CP	Kazakhstan	21–23 Nov 94	C-5s, tankers	3, ?			<1	USAF, 1995a, p.8.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Shoot Down of US OH-58	Medevac	Korea	Dec 94	VC-137	1		1		USAF, 1995a, p.8.
Transport of Cuban Migrants	Humanitarian aid	Cuba-US	Jan 95–Jan 96	727s		161	27,000		USAF, 1977, p.1.
Withdrawal of UN Forces	Peace operation	Somalia	7 Jan–24 Mar 95	Airlifters, tankers		59	1,400	1,400	USAF, 1996, p.1.
Safe Passage	Humanitarian aid	Panama-Cuba	1–20 Feb 95	C-5s, C-141s, C-130s			7,300		USAF, 1996, p.1.
UN Troop Rotation	Peace operation	Nepal-Haiti	3–10 Feb 95	C-141s	8		410		USAF, 1996, p.1.
Joint Endeavor (Airlift Only)	Peace operation	Bosnia	4 Dec 95–19 Jan 96	Various		1,535	10,933	20,791	"The Air Force in the Balkans," 1996, p.26.
Joint Endeavor (Surveillance)	Peace operation	Bosnia	Dec 95–Apr 96	E-8A JSTARS		97			Watkins, 1996, p.26.
Joint Endeavor (Total to Date)	Peace operation	Bosnia	Dec 95–10 May 96	Various		2,783			Bosnia Link Web Site.
Ukraine Medical Aid	Humanitarian aid	Ukraine	7 Apr 95	C-141	1		40		USAF, 1996, p.2.
Mongolian Aid	Humanitarian aid	Mongolia	11 Apr 95	DC-8	1			25	USAF, 1996, p.2.
Oklahoma City Bombing	Disaster relief	US	19 Apr–4 May 95	Airlifters		25	1,359	3,864	USAF, 1996, p.2.
Ebola Outbreak	Disaster relief	Zaire	11 May 95	C-141	1			1	USAF, 1996, p.2.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Quick Lift	Peace operation	Croatia	30 Jun–4 Jul 95	C-5s, C-141s		27, 53	4,742	1,504	USAF, 1996, p.4.
Refugee Relief	Humanitarian aid	Croatia	13 Aug 95	C-5	1	1		75	USAF, 1996, p.5.
Tajikistan Aid	Humanitarian aid	Tajikistan	17 Aug 95	DC-8	1	1		38	USAF, 1996, p.5.
Rwandan Refugee Aid	Humanitarian aid	Rwanda	6 Sep 95	747	1	1			USAF, 1996, p.6.
Refugee Relief	Humanitarian aid	Croatia	6 Sep 95	DC-8	1	1			USAF, 1996, p.6.
Kurdish Refugee Relief	Humanitarian aid	Turkey	7 Sep 95	C-5s	2	2			USAF, 1996, p.6.
Caribbean Express	Disaster relief	Caribbean	16 Sep–10 Oct 95	C-17s, C-5s, C-141s, C-130s		212	2,348	3,617	USAF, 1996, p.6.
Vietnamese Medical Aid	Humanitarian aid	Vietnam	3 Oct 95	DC-8	1	1		28	USAF, 1996, p.6.
Counterterrorism Aid	FID	Israel	5 Mar 96	C-141, KC-135	1, 1	1, 1			USAF, 1997, p.2.
Return of MIA Remains	Medevac	Laos-US	27 Mar 96	C-141	1	1			USAF, 1997, p.3.
Return of Remains	Medevac	Croatia-US	6 Apr 96	C-17	1	1			USAF, 1997, p.3.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Southern Watch Enhancement	Peace operation	Jordan	Apr 96	F-15, F-16, KC-135	12, 18, 4				Reuters, 1996a, p.17.
Assured Response	NEO	Liberia	Apr 96	Various	17	68	2,000		Reuters, 1996b, p.30.
Central African Republic	NEO	CAR	23 May 96	Airlifter	1		60		Bird, 1996, p.18.
Romanian Aid	Humanitarian aid	Romania	28 May 96	C-141	1	1			USAF, 1997, p.5.
Saudi Arabia Barracks Bombing	Medevac	SA/ Germany	27 Jun 96	C-141	3				*European Stars & Stripes*, 6/27/96, p.4.
Return of Remains	Medevac	Saudi Arabia	27 Jun 96	C-5	1				USAF, 1997, p.5.
Qatar Air Expeditionary Force	Peace operation	Qatar	30 Jun 96	Various	34				USAF, 1997, p.5.
Mongolian Aid	Humanitarian aid	Mongolia	1 Aug 96	C-141	1				USAF, 1997, p.6.
Saudi NEO	NEO	Saudi Arabia	18 Aug 96	AMC chartered 747	1				USAF, 1997, p.6.
Infant Medevac	Medevac	US	20 Aug 96	C-141	2				USAF, 1997, p.7.

Operation	Purpose	Location	Date	Aircraft Type	No. of Aircraft	Sorties	PAX	Cargo (tons)	Source
Response to Iraqi Aggression	Strike/raid	Iraq	2–3 Sep 96	B-52s, KC-10s, C-5	2, 9, 1				USAF, 1997, p.7.
Burundi Civil War	Aid/NEO	Burundi	4 Sep 96	C-141	1	2	30		USAF, 1997, p.7.
Support for Kurdish Refugees	Humanitarian aid	Guam	17–18 Sep 96	C-5, C-141	1,1		44		USAF, 1997, p.8.
Rwandan Relief	Humanitarian aid	Various	14 Nov 96	C-17s, C-5, C-141	2, 1, 1				USAF, 1997, p.8.
Christmas Airdrop	Humanitarian aid	Pacific Islands	16–21 Dec 96	C-130s					USAF, 1997, p.9.

[a]Our estimate.

[b]Evacuated.

[c]Airlift only.

[d]Relief supplies.

[e]Delta Force and SEAL Team Six.

[f]Total dropped by NATO.

Table A.2

Acronyms and Abbreviations in Table A.1

ac	aircraft
AMC	Air Mobility Command
avail	available
CAR	Central African Republic
CAS	close air support
CIS	Commonwealth of Independent States
civil	civilian aircraft leased from the airlines
CP	counterproliferation
CR	Costa Rica
DOE	Department of Energy
FID	foreign internal defense
FMS	Foreign Military Sales
FRG	Federal Republic of Germany
FSU	former Soviet Union
GTMO	Guantánamo
HA	humanitarian aid
helos	helicopters
INF	Intermediate Range Nuclear Force
Is	Island
JSTARS	Joint Surveillance Target Attack Radar System
JTF	Joint Task Force
MFO	Multilateral Force Operation
MIA	(persons) missing in action
MPs	military police
NEO	noncombatant evacuation operation
NIH	National Institutes of Health
ops	operations
PAX	passengers
PM	Prime Minister
POW	prisoner of war
Pres.	President
recce	reconnaissance
SA	Saudi Arabia
SD	South Dakota
SEAL	Sea, Air, and Land (Navy personnel)
sqdrns	squadrons

SW	Southwest
TAC	Tactical Air Command
TACAIR	tactical air
telecomm	telecommuntications
UN	United Nations
Unk.	Unknown
Unk. no.	Unknown number
USMC	U.S. Marine Corps
USN	U.S. Navy
VIP	very important person
VN	Vietnam
WMD	weapons of mass destruction

Appendix B

ORDER-OF-BATTLE AND SORTIE DATA FOR SELECTED OPERATIONS

This appendix presents USAF air order-of-battle (AOB) and sortie data for two recent peace operations:

- Operation Joint Endeavor (OJE)
- Operation Uphold Democracy.

OPERATION JOINT ENDEAVOR

Operation Joint Endeavor was established to implement the peace agreement signed in Dayton, Ohio, on November 21, 1995, between Bosnia's Croatians, Muslims, and Serbs. On December 15, 1995, the United Nations Security Council authorized the establishment of a NATO-led multinational military Implementation Force (IFOR), consisting of ground, air, and sea forces from NATO and 14 non-NATO countries. On December 16, the North Atlantic Council (NAC) directed that NATO implement OJE and began deploying the main force into Bosnia.[1]

Table B.1 presents the USAF AOB from January 18, 1996, through September 6, 1996. These data were compiled from IFOR *Air Component Fact Sheets* published on the Internet.[2] Table B.2 pro-

[1]IFOR Coalition Press, *Information Centre Fact Sheet,* posted on the Internet: gopher://marvin.stc.nato.int:70/11/yugo/.

[2]gopher://marvin.stc.nato.int:70/11/yugo/.

Table B.1

USAF Air Order-of-Battle Data for Operation Joint Endeavor: January 18, 1996, Through September 6, 1996

Date	F-15E	F-16 A/C/D	OA-10	ABCCC	EC-130 (CC)	AC-130	KC-135	KC-10	MH53J (SAR)	HC-130P SAR	MH-60L (SAR)	C-12	F-16C (Recon)	F-15
1/18/96	8	12	12	4	2	3	10	5	8	2	3	0	0	0
1/26/96	8	12	12	4	2	3	10	5	8	2	3	0	0	0
2/9/96	8	12	12	4	0	4	10	0	8	2	3	1	0	0
2/23/96	8	12	12	3	0	0	0	0	8	2	3	0	0	0
3/1/96	8	12	12	3	0	3	10	0	8	2	3	2	0	0
3/8/96	0	6	6	0	0	0	0	0	8	2	3	2	0	0
3/22/96	0	6	6	3	0	2	10	0	8	2	3	2	0	0
3/29/96	0	6	6	3	0	2	10	0	8	2	3	2	0	0
4/5/96	0	6	6	3	0	2	8	0	4	2	0	2	0	0
4/12/96	0	6	6	3	0	2	9	0	2	2	0	2	0	0
4/19/96	0	6	6	3	0	2	9	0	2	2	0	2	0	0
5/3/96	0	6	6	3	0	2	9	0	4	2	0	2	0	0
5/10/96	0	6	6	3	0	2	8	0	4	2	0	2	0	0
5/24/96	0	6	6	3	0	2	8	0	4	2	0	2	0	0
5/31/96	0	6	6	3	0	2	8	0	2	2	0	3	5	0
6/7/96	0	6	6	3	0	2	8	0	2	2	0	4	5	0
6/13/96	0	6	6	3	0	2	8	0	2	2	4	3	5	0
6/24/96	0	6	6	3	0	2	8	0	2	2	0	4	5	4
7/19/96	0	6	6	3	0	2	8	0	4	2	0	4	0	0
7/26/96	0	6	6	3	0	2	8	0	4	2	0	4	0	0
8/9/96	0	6	6	3	0	2	8	0	4	2	0	4	0	0
8/16/96	0	6	6	3	0	2	8	0	4	2	0	4	0	0
8/23/96	0	6	6	3	0	2	8	0	4	2	0	4	0	0
9/6/96	0	6	6	3	0	2	8	0	4	2	0	4	0	0

SOURCE: IFOR Coalition Press, *Information Centre Fact Sheet*, posted on the Internet: gopher://marvin.stc.nato.int:70/11/yugo/.
NOTE: ABCCC = Airborne Command and Control Center; CC = Compass Call; SAR = Search and Rescue; Recon = Reconnaissance.

Table B.2

USAF Sorties Flown in Operation Joint Endeavor: January 18, 1996, Through September 6, 1996

Date	CAP	CAS	Support
18 Jan	406	1870	1150
26 Jan	475	2252	1389
9 Feb	676	2982	1928
23 Feb	933	3790	2502
1 Mar	984	4150	2727
8 Mar	1090	4531	3002
22 Mar	1223	5004	3516
29 Mar	1276	5257	3770
5 Apr	1356	5462	3990
12 Apr	1423	5712	4199
19 Apr	1455	5989	4365
3 May	1524	6436	4771
10 May	1570	6693	5018
24 May	1658	7202	5450
31 May	1717	7417	5661
7 Jun	1781	7661	5907
13 Jun	1873	7975	6209
24 Jun	1947	8214	6460
19 Jul	2132	9373	7505
26 Jul	2173	9726	7808
9 Aug	2220	10324	8281
16 Aug	2242	10612	8512
23 Aug	2267	10864	8744
6 Sep	2308	11390	9188

vides the USAF sortie data during this time, from the same source.[3] The sortie data are presented according to functional areas: combat air patrol (CAP), close air support (CAS), and support sorties.

Using the data presented in Table B.1, we categorized the aircraft by mission type—air superiority, ground attack, multirole, or support—and present them in Table B.3. Figure B.1 presents these AOB data graphically, and Figure B.2 charts the cumulative sorties flown.

[3]Data on all countries participating with air forces are provided at this site. We present data only for USAF aircraft.

Table B.3

USAF AOB for Operation Joint Endeavor, by Category: January 18, 1996, Through September 6, 1996

Date	Air Superiority	Ground Attack	Multirole	Support
18 Jan	0	15	20	34
26 Jan	0	15	20	34
9 Feb	0	16	20	28
23 Feb	0	12	20	16
1 Mar	0	15	20	28
8 Mar	0	6	6	15
22 Mar	0	8	6	28
29 Mar	0	8	6	28
5 Apr	0	8	6	19
12 Apr	0	8	6	18
19 Apr	0	8	6	18
3 May	0	8	6	20
10 May	0	8	6	19
24 May	0	8	6	19
31 May	0	8	6	23
7 Jun	0	8	6	24
13 Jun	0	8	6	27
24 Jun	4	8	6	24
19 Jul	0	8	6	21
26 Jul	0	8	6	21
9 Aug	0	8	6	21
16 Aug	0	8	6	21
23 Aug	0	8	6	21
6 Sep	0	8	6	21

Figure B.3 presents the average number of sorties flown per day for each of the time periods.

OPERATION UPHOLD DEMOCRACY

Operation Uphold Democracy was conducted to install Jean-Bertrand Aristide as the legally elected president of Haiti. It was based on a peace agreement reached on September 18, 1994, with the military rulers of Haiti led by General Raoul Cédras.

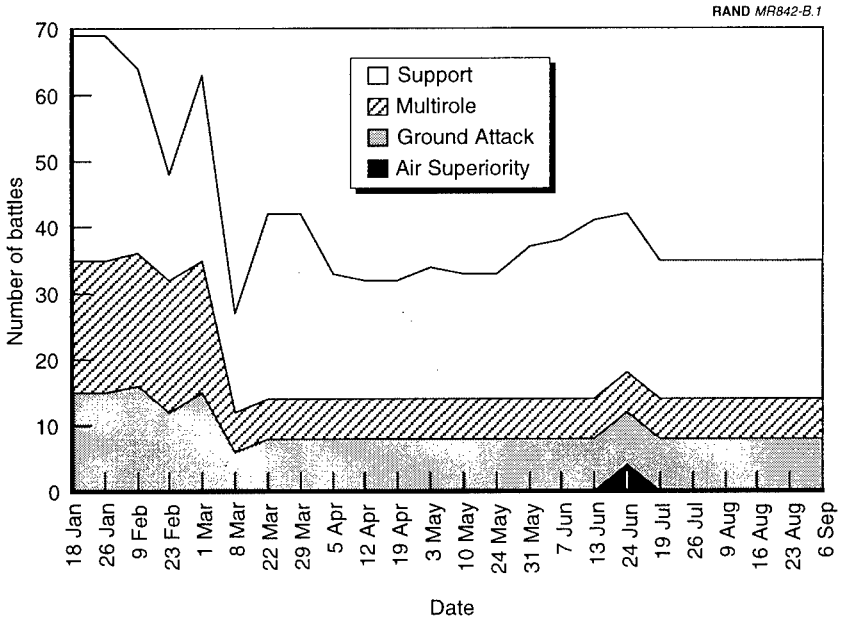


Figure B.1—USAF AOB in Operation Joint Endeavor, by Category: January 18, 1996, Through September 6, 1996

Table B.4 presents the deployment data in 5-day increments, from December 13, 1994, through April 11, 1995, for each airlift aircraft type used. The numbers for each aircraft are cumulative for sorties flown, cargo delivered (in short tons), and passengers delivered (PAX). The last three columns present the cumulative total for all aircraft. Figures B.4, B.5, and B.6 graphically break down, by aircraft type, the cumulative sorties, cargo delivered, and passengers delivered, respectively. Table B.5 presents the sorties flown for all aircraft that participated for the same time period.

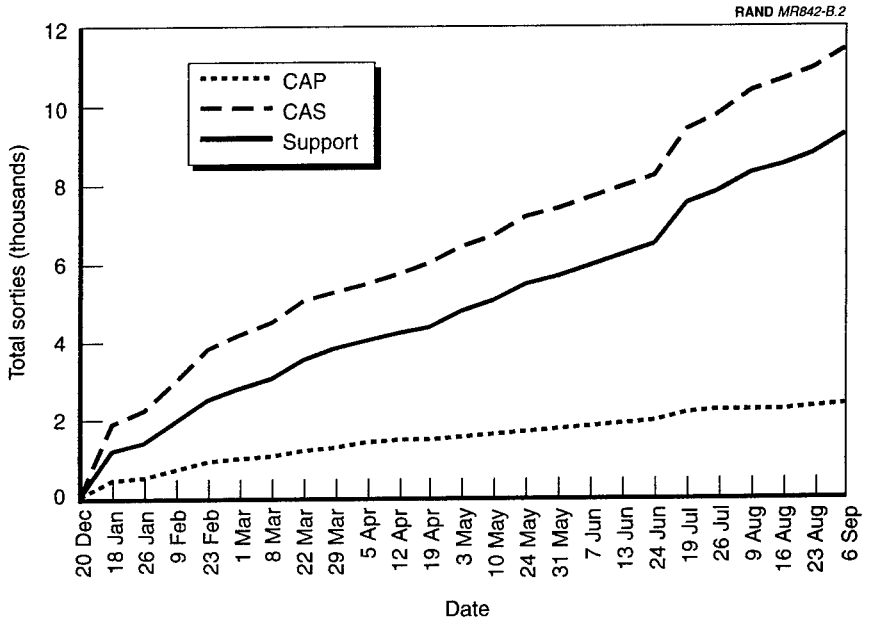


Figure B.2—Cumulative USAF Sorties in OJE, January 18, 1996, Through September 6, 1996

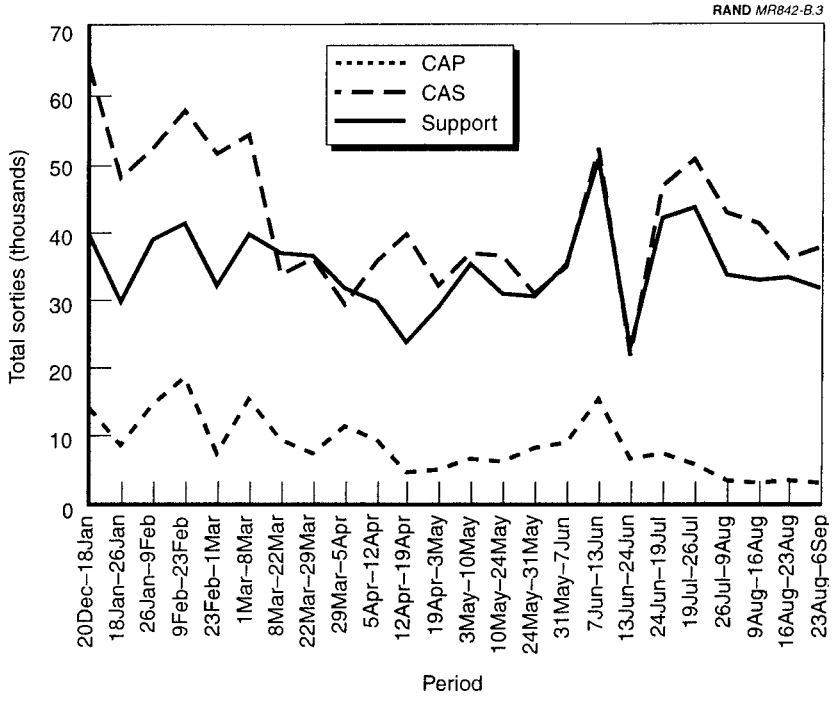


Figure B.3—Average OJE USAF Sorties per Day, by Aircraft Type

Table B.4

Cumulative USAF Airlift Deployment Data for Operation Uphold Democracy

	C-5			C-141			C-130			KC-135 A/L			C-9			KC-10 A/L			Total		
Date	Fln	Cargo	PAX	Fln	Cargo	PAX	Fln	Cgo	PAX	Fln	Cgo	PAX	Fln	Cgo	PAX	Fln	Cgo	PAX	Flown	Cargo	PAX
9/13/94	1	44	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	44	2
9/18/94	22	940	920	23	249	243	41	168	314	0	0	0	0	0	0	1	0	0	87	1357	1477
9/23/94	77	3050	2406	184	2206	2285	185	1105	1055	63	8	44	1	0	57	16	0	0	526	6369	5847
9/28/94	105	4287	2998	280	4034	3757	396	2224	3322	73	8	66	1	0	57	19	0	0	874	10553	10200
10/3/94	140	6103	3852	385	5480	4436	442	2456	4086	73	8	66	1	0	57	19	0	0	1060	14047	12497
10/8/94	151	6702	4042	406	5775	5497	462	2538	4365	73	8	66	1	0	57	19	0	0	1112	15023	14027
10/13/94	159	7091	4139	416	6028	5635	467	2576	4445	73	8	66	1	0	57	19	0	0	1135	15702	14342
10/18/94	164	7362	4275	424	6160	5694	471	2579	4570	73	8	66	1	0	57	19	0	0	1152	16109	14662
10/23/94	175	7961	4686	437	6408	5949	496	2629	5597	73	8	66	1	0	57	19	0	0	1201	17006	16355
10/28/94	181	8221	4871	448	6593	6207	506	2682	5973	73	8	66	1	0	57	19	0	0	1228	17504	17174
11/2/94	187	8483	4998	457	6739	6324	514	2719	6112	73	8	66	1	0	57	19	0	0	1251	17949	17557
11/7/94	193	8760	5229	467	6872	6657	524	2728	6563	73	8	66	1	0	57	19	0	0	1277	18368	18572
11/12/94	201	9127	5396	473	6947	6790	532	2753	6747	73	8	66	1	0	57	19	0	0	1299	18835	19056
11/17/94	207	9310	5514	484	7104	6968	532	2753	6747	73	8	66	1	0	57	19	0	0	1316	19175	19352
11/22/94	210	9458	5676	493	7309	7148	532	2753	6747	73	8	66	1	0	57	19	0	0	1328	19528	19694
11/27/94	221	9885	5910	499	7405	7227	532	2753	6747	73	8	66	1	0	57	19	0	0	1345	20051	20007
12/2/94	222	9932	5956	504	7488	7380	532	2753	6747	73	8	66	1	0	57	19	0	0	1351	20181	20206
12/7/94	222	9932	5956	516	7652	7475	532	2753	6747	73	8	66	1	0	57	19	0	0	1363	20345	20301
12/12/94	223	9956	5970	522	7767	7697	532	2753	6747	73	8	66	1	0	57	19	0	0	1370	20483	20537
12/17/94	223	9956	5970	536	7981	8000	532	2753	6747	73	8	66	1	0	57	19	0	0	1384	20698	20840
12/22/94	223	9956	5970	544	8094	8218	532	2753	6747	73	8	66	1	0	57	19	0	0	1392	20811	21058
12/27/94	223	9956	5970	548	8179	8296	532	2753	6747	73	8	66	1	0	57	19	0	0	1396	20896	21136
1/1/95	223	9956	5970	555	8290	8422	532	2753	6747	73	8	66	1	0	57	19	0	0	1403	21007	21262
1/6/95	223	9956	5970	564	8439	8631	532	2753	6747	73	8	66	1	0	57	19	0	0	1412	21155	21471
1/11/95	223	9956	5970	570	8475	8729	532	2753	6747	73	8	66	1	0	57	19	0	0	1418	21191	21569

Table B.4—continued

	C-5			C-141			C-130			KC-135 A/L			C-9			KC-10 A/L			Total		
Date	Fln	Cargo	PAX	Fln	Cargo	PAX	Fln	Cgo	PAX	Fln	Cgo	PAX	Fln	Cgo	PAX	Fln	Cgo	PAX	Flown	Cargo	PAX
1/16/95	223	9956	5970	574	8510	8786	537	2773	6951	73	8	66	1	0	57	19	0	0	1427	21246	21830
1/21/95	223	9956	5970	580	8566	8984	545	2788	6963	73	8	66	1	0	57	19	0	0	1441	21317	22040
1/26/95	223	9956	5970	596	8655	9064	551	2802	7165	73	8	66	1	0	57	19	0	0	1463	21420	22322
1/31/95	223	9956	5970	620	8773	9654	553	2815	7239	73	8	66	1	0	57	19	0	0	1489	21551	22986
2/5/95	223	9956	5970	633	8865	9817	557	2832	7285	73	8	66	1	0	57	19	0	0	1506	21660	23195
2/10/95	223	9956	5970	639	8925	9949	561	2850	7321	73	8	66	1	0	57	19	0	0	1516	21738	23363
2/15/95	223	9956	5970	647	9035	10137	566	2868	7446	73	8	66	1	0	57	19	0	0	1529	21866	23676
2/20/95	223	9956	5970	657	9185	10145	567	2860	7430	73	8	66	1	0	57	19	0	0	1540	22008	23668
2/25/95	223	9956	5970	664	9270	10200	570	2870	7458	73	8	66	1	0	57	19	0	0	1550	22103	23751
3/2/95	223	9956	5970	671	9364	10306	575	2904	7466	73	8	66	1	0	57	19	0	0	1562	22231	23865
3/7/95	223	9956	5970	671	9368	10334	580	2908	7550	73	8	66	1	0	57	19	0	0	1570	22240	23977
3/12/95	223	9956	5970	671	9369	10336	590	2941	7723	73	8	66	1	0	57	19	0	0	1581	22273	24152
3/17/95	223	9956	5970	675	9369	10336	590	2941	7723	73	8	66	1	0	57	19	0	0	1581	22273	24152
3/22/95	223	9956	5970	675	9369	10336	590	2941	7723	73	8	66	1	0	57	19	0	0	1581	22273	24152
3/27/95	223	9956	5970	675	9369	10336	590	2941	7723	73	8	66	1	0	57	19	0	0	1581	22273	24152
4/1/95	223	9956	5970	675	9369	10336	590	2941	7723	73	8	66	1	0	57	19	0	0	1581	22273	24152
4/6/95	223	9956	5970	675	9369	10336	590	2941	7723	73	8	66	1	0	57	19	0	0	1581	22273	24152
4/11/95	223	9956	5970	675	9369	10336	590	2941	7723	73	8	66	1	0	57	19	0	0	1581	22273	24152

NOTES: Fln = sorties flown; cargo = cargo delivered (in short tons); PAX = passengers delivered; A/L = airlifter.

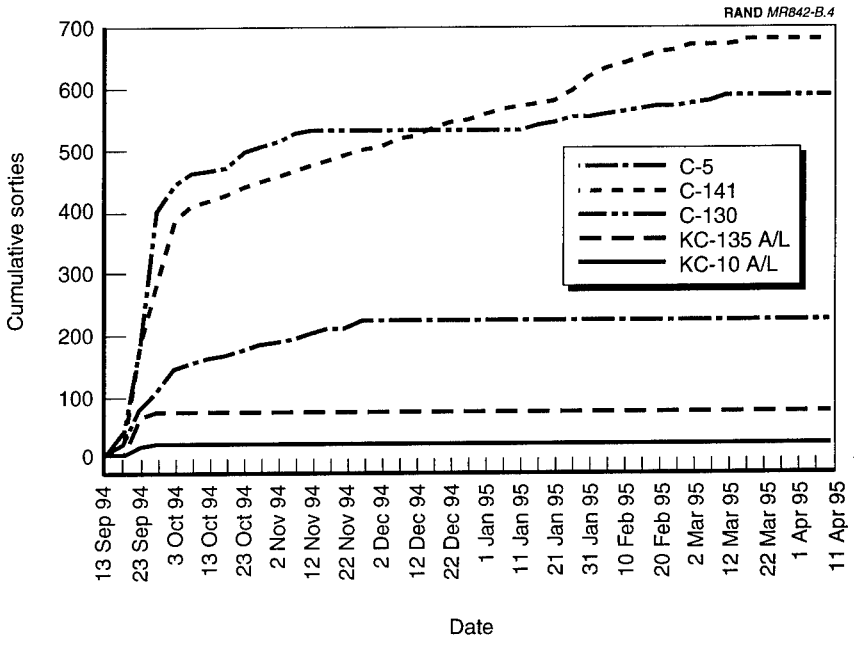
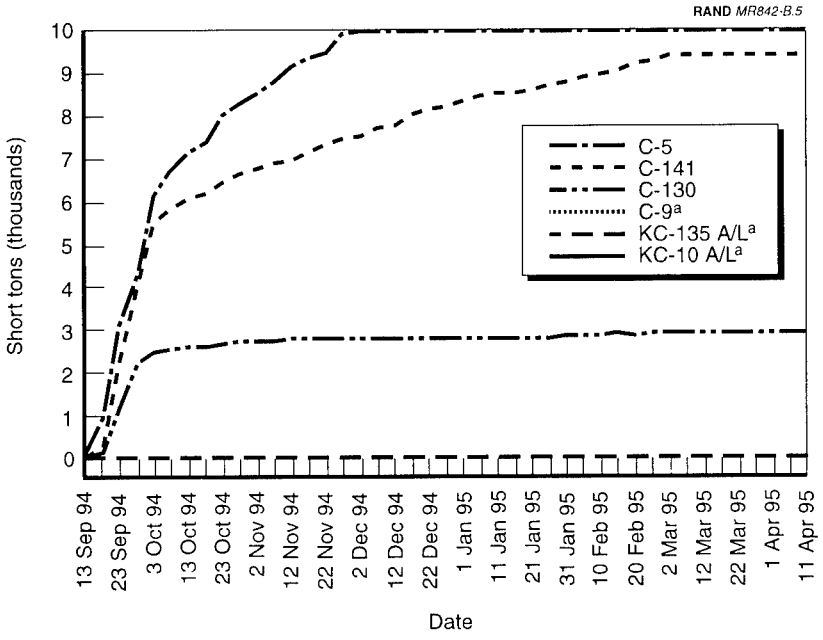
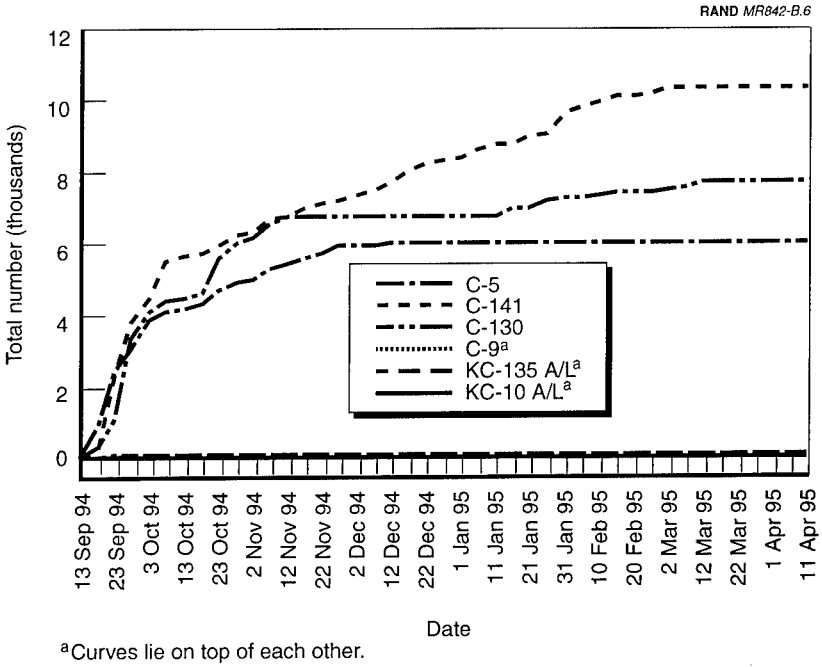


Figure B.4—Cumulative USAF Airlift Deployment Sorties for Operation Uphold Democracy, by Aircraft Type



[a]Curves lie on top of each other.

Figure B.5—USAF Cargo Delivered (short tons) in Operation Uphold Democracy



[a]Curves lie on top of each other.

Figure B.6—USAF Passengers Delivered in Operation Uphold Democracy

Table B.5

Cumulative USAF Sorties Flown (Except Deployment) in Operation Uphold Democracy

Date	A-10	F-15 C/D	KC-10	KC-135	C-130 Theatr	AWACS	EC-130 (CC)	EC-135	RJ	EC-130 (CS)	ABCCC	MH-53	MH-60	MC-130	130 Ardp	AC-130	HC-130	U-2	TOT
9/13/94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9/18/94	0	0	0	0	0	2	1	1	1	0	0	0	0	0	60	4	2	1	76
9/23/94	0	24	11	3	0	12	1	4	12	1	4	34	3	18	60	20	12	10	161
9/28/94	0	24	94	24	6	21	1	4	16	12	6	44	3	22	60	27	17	11	214
10/3/94	0	24	104	24	22	23	1	5	20	20	10	71	3	26	60	51	25	11	312
10/8/94	0	24	106	28	30	23	2	5	20	23	10	110	6	37	60	65	44	11	410
10/13/94	0	24	106	28	43	23	2	5	20	28	10	135	21	42	60	77	52	11	493
10/18/94	0	24	106	28	76	23	2	5	20	31	10	157	21	44	60	88	61	11	573
10/23/94	0	24	106	28	81	23	2	5	20	31	10	157	28	44	60	89	61	11	586
10/28/94	0	24	106	28	81	23	2	5	20	31	10	157	29	44	60	93	61	11	591
11/2/94	0	24	106	28	81	23	2	5	20	31	10	157	29	44	60	103	61	11	601
11/7/94	0	24	106	28	81	23	2	5	20	31	10	157	29	44	60	107	61	11	605
11/12/94	0	24	106	28	265	23	2	5	20	31	10	157	29	44	60	111	61	11	793
11/17/94	0	24	106	28	267	23	2	5	20	31	10	157	29	44	60	112	61	11	796
11/22/94	0	24	106	28	288	23	2	5	20	31	10	157	29	44	60	114	61	11	819
11/27/94	0	24	106	28	297	23	2	5	20	31	10	157	29	44	60	118	61	11	832
12/2/94	0	24	106	28	305	23	2	5	20	31	10	157	29	44	60	120	61	11	842
12/7/94	0	24	106	28	307	23	2	5	20	31	10	157	29	44	60	120	61	11	844
12/12/94	0	24	106	28	314	23	2	5	20	31	10	157	29	44	60	120	61	11	851
12/17/94	0	24	106	28	325	23	2	5	20	31	10	157	29	44	60	120	61	11	862
12/22/94	0	24	106	28	330	23	2	5	20	31	10	157	29	44	60	120	61	11	867
12/27/94	0	24	106	28	334	23	2	5	20	31	10	157	29	44	60	120	61	11	871

Table B.5—continued

Date	A-10	F-15 C/D	KC-10	KC-135	C-130 Theatr	AWACS	EC-130 (CC)	EC-135	RJ	EC-130 (CS)	ABCCC	MH-53	MH-60	MC-130	130 Ardp	AC-130	HC-130	U-2	TOT
1/1/95	0	24	106	28	340	23	2	5	20	31	10	157	29	44	60	120	61	11	877
1/6/95	0	24	106	28	345	23	2	5	20	31	10	157	29	44	60	120	61	11	882
1/11/95	0	24	106	28	347	23	2	5	20	31	10	157	29	44	60	120	61	11	884
1/16/95	0	24	106	28	348	23	2	5	20	31	10	157	29	44	60	120	61	11	885
1/21/95	0	24	106	28	351	23	2	5	20	31	10	157	29	44	60	120	61	11	888
1/26/95	0	24	106	28	358	23	2	5	20	31	10	157	29	44	60	120	61	11	895
1/31/95	0	24	106	28	359	23	2	5	20	31	10	157	29	44	60	120	61	11	896
2/5/95	0	24	106	28	363	23	2	5	20	31	10	157	29	44	60	120	61	11	900
2/10/95	0	24	106	28	367	23	2	5	20	31	10	157	29	44	60	120	61	11	904
2/15/95	0	24	106	28	369	23	2	5	20	31	10	157	29	44	60	120	61	11	906
2/20/95	0	24	106	28	371	23	2	5	20	31	10	157	29	44	60	120	61	11	908
2/25/95	0	24	106	28	375	23	2	5	20	31	10	157	29	44	60	120	61	11	912
3/2/95	0	24	106	28	378	23	2	5	20	31	10	157	29	44	60	120	61	11	915
3/7/95	0	24	106	28	382	23	2	5	20	31	10	157	29	44	60	120	61	11	919
3/12/95	0	24	106	28	387	23	2	5	20	31	10	157	29	44	60	120	61	11	924
3/17/95	0	24	106	28	397	23	2	5	20	31	10	157	29	44	60	120	61	11	934
3/22/95	0	24	106	28	400	23	2	5	20	31	10	157	29	44	60	120	61	11	937
3/27/95	0	24	106	28	406	23	2	5	20	31	10	157	29	44	60	120	61	11	943
4/1/95	0	24	106	28	411	23	2	5	20	31	10	157	29	44	60	120	61	11	948
4/6/95	0	24	106	28	428	23	2	5	20	31	10	157	29	44	60	120	61	11	965
4/11/95	0	24	106	28	428	23	2	5	20	31	10	157	29	44	60	120	61	11	965

NOTES: CC = Compass Call; RJ = Rivet Joint; CS = Commando Solo; ABCCC = Airborne Command and Control Center.

Appendix C

FLIGHT HOURS FOR SELECTED AIRCRAFT, 1988–1995

In this appendix, we describe our calculation of the "Cold War Standard" used in Chapter Three and present data for aircraft not included in that chapter. The data in this appendix are similar to the F-16 data presented in Chapter Three. We used flight-hour data from the USAF Reliability and Maintainability Information System (REMIS) and information on the number of crews assigned to a given command from the Air Force Personnel Center (AFPC) to determine the number and type of flight hours that crews in different commands and components logged, on average, from 1988 through 1995. We then set a "Cold War Standard" number of flight hours for each command or component as the average number of operational-training flight hours flown in a specific command during 1988 and 1989. We chose to normalize by these years, because we know that U.S. Air Force crews performed exceptionally well in Operation Desert Storm, and this performance is due, in part, to the combat skills honed during the final years of the Cold War.[1]

We excluded 1990 data when establishing our standard. The aircraft types of greatest interest to us flew large-scale, 15–20-hour deployments to Southwest Asia and logged extensive combat support time during the opening months of Operation Desert Shield, which distorted the amount of operational training accomplished during 1990. To control for the variation in responsibilities across commands and, therefore, increase comparability of our results, we

[1]An additional, but probably less significant, factor contributing to the impressive performance of Air Force combat crews during the Gulf War was the extensive in-theater preparatory training some crews received during Operation Desert Shield.

chose to normalize by command or component. For example, because the Air Combat Command (ACC) (and the Tactical Air Command [TAC] before it) were responsible for training all new fighter crews until 1993, the number of aircrew assigned to a given ACC weapon system is quite large relative to the number of operational-training hours flown. The reason is that, for our purposes, instructors count as aircrew but log relatively few operational-training flight hours. For consistency, we added to the ACC totals the crews and hours flown by Air Education and Training Command (AETC) personnel for such aircraft as the F-16s, for which the initial qualification training units changed commands after 1993.

For most aircraft types, the same pattern described in Chapter Three for F-16s emerges. In general, through the end of FY 1995, active-duty crews shouldered a larger share of the peace-operations burden than did Reserve Component (AFRES) crews. Within the active component, U.S. Air Force in Europe (USAFE) crews generally were the most heavily committed to peace operations, followed by ACC, and then Pacific Air Forces (PACAF) crews. Since late 1995, these imbalances have been addressed somewhat; however, for reasons outlined in Chapter Three (the difficulty of long, routine Reserve deployments, and the need for PACAF forces to focus on the Korean contingency), some imbalances are likely to remain.

Finally, it is important to note that, because of data limitations, all RC-135 and E-3 operational missions show up as peace-operations missions. Thus, the missions these aircraft flew during the late 1980s and early 1990s against targets in the former Soviet bloc and in support of the Kuwaiti tanker reflagging show up as peace-operations missions. The important information to draw from Figures C.1 throuch C.31 is that the end of the Cold War did not decrease demand for these platforms and that the increased emphasis on peace operations, counterdrug missions, and residual requirements to keep tabs on the United States' former Cold War adversaries may actually have increased demand for these systems.[2]

[2]To measure peace operations flown, look at the difference between "operational training" and "ops training plus peace ops." The wider the gap between the latter and the former, the more training is being degraded.

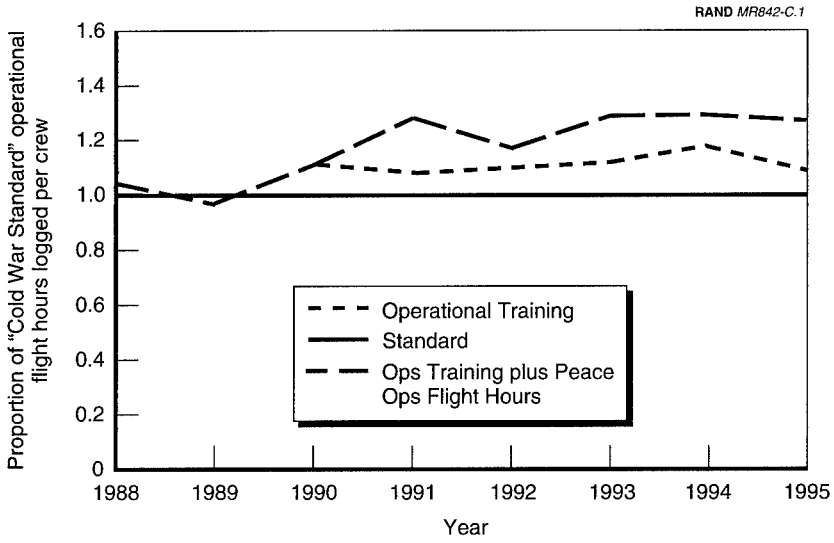


Figure C.1—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All F-15s

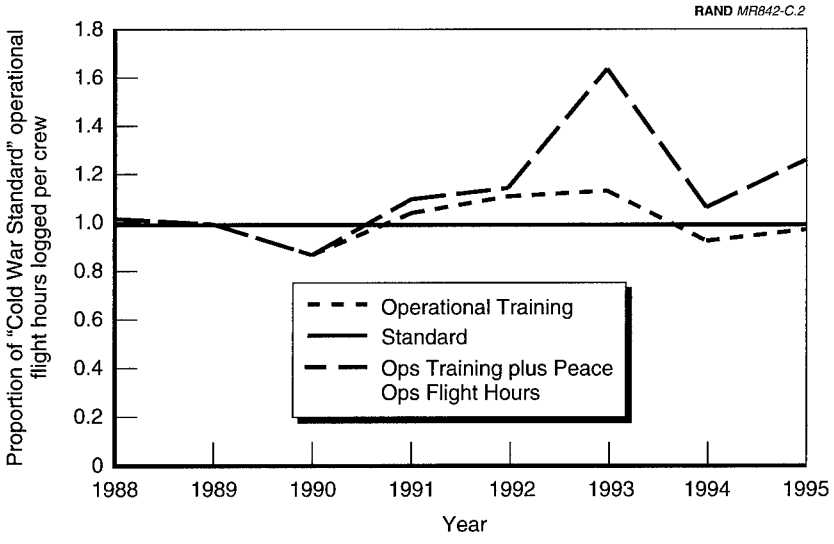


Figure C.2—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: USAFE F-15s

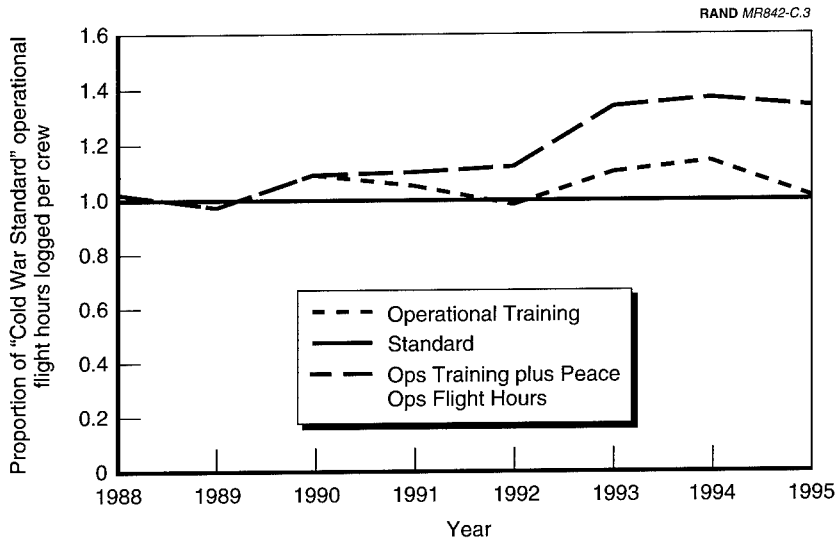
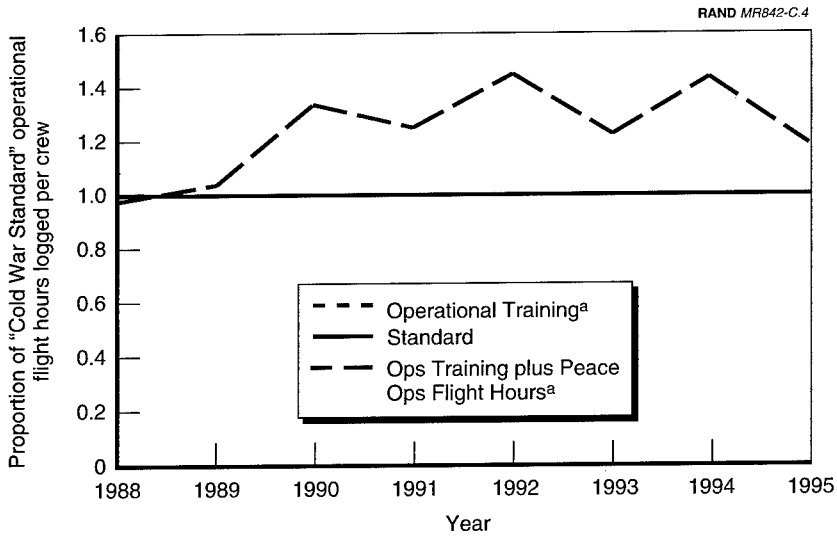


Figure C.3—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: ACC F-15s



[a]Curves lie on top of each other.

Figure C.4—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: PACAF F-15s

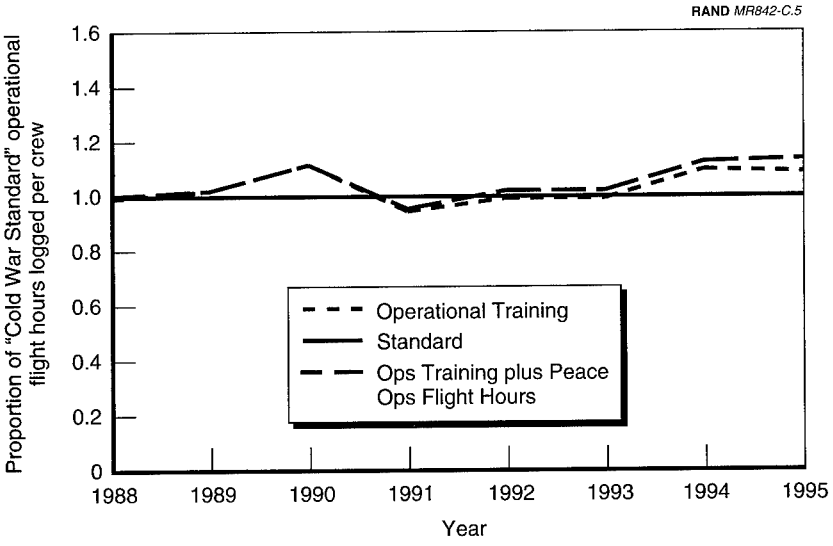


Figure C.5—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: Air National Guard and Air Force Reserves (ANG/AFRES) F-15s

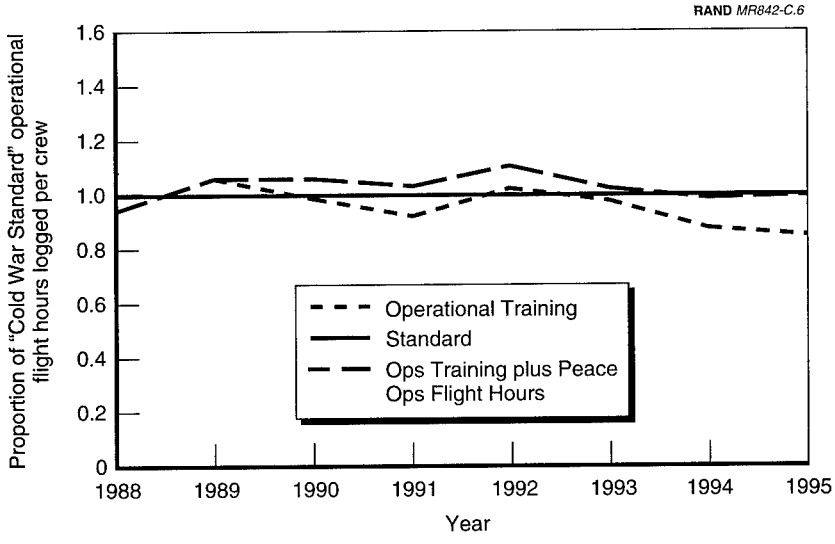


Figure C.6—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All A-10s

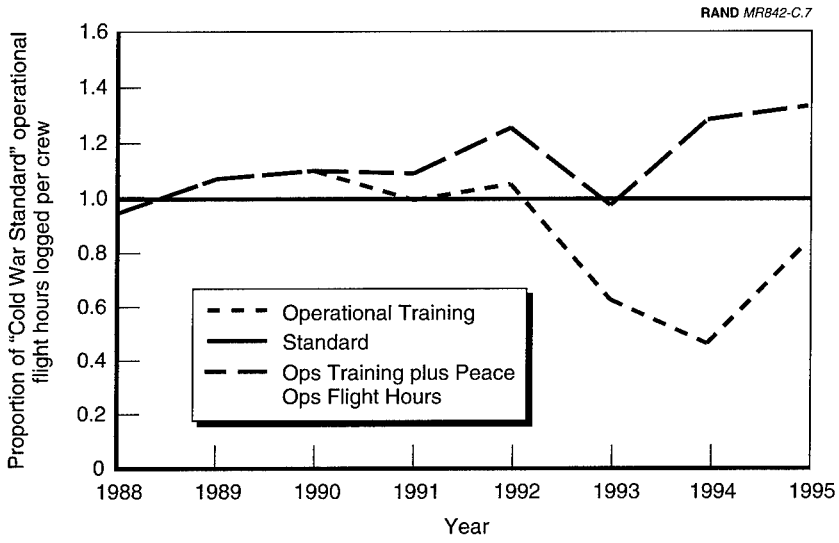


Figure C.7—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: USAFE A-10s

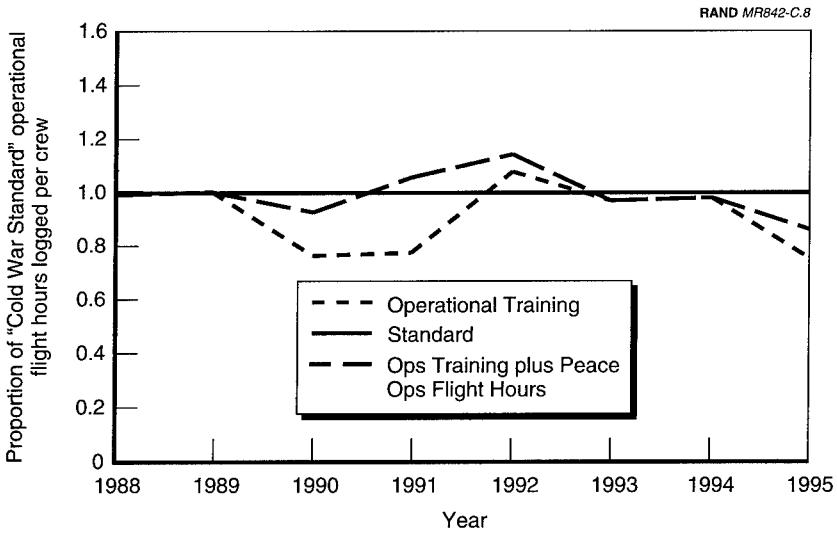
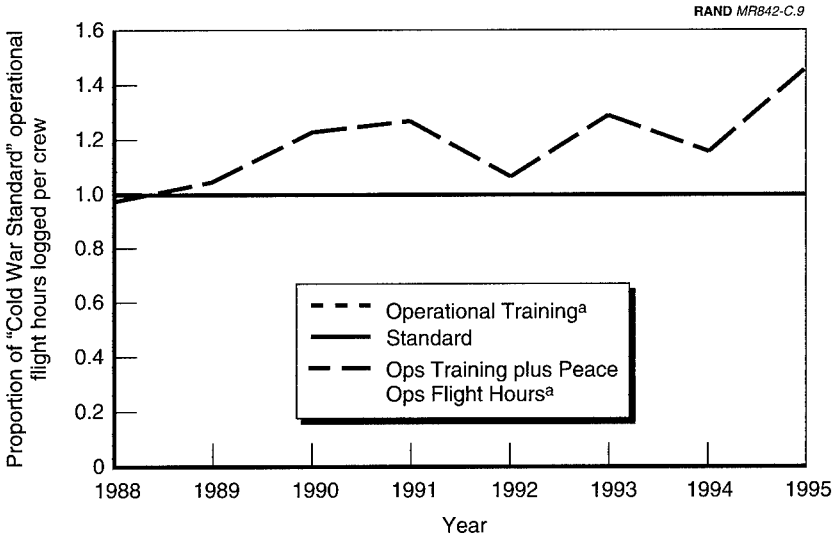


Figure C.8—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: ACC A-10s



[a]Curves lie on top of each other.

Figure C.9—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: PACAF A-10s

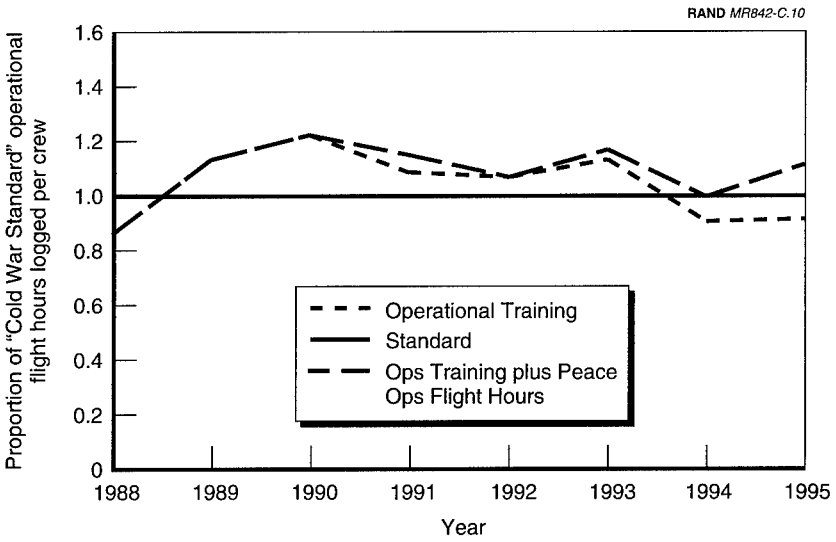


Figure C.10—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: ANG/AFRES A-10s

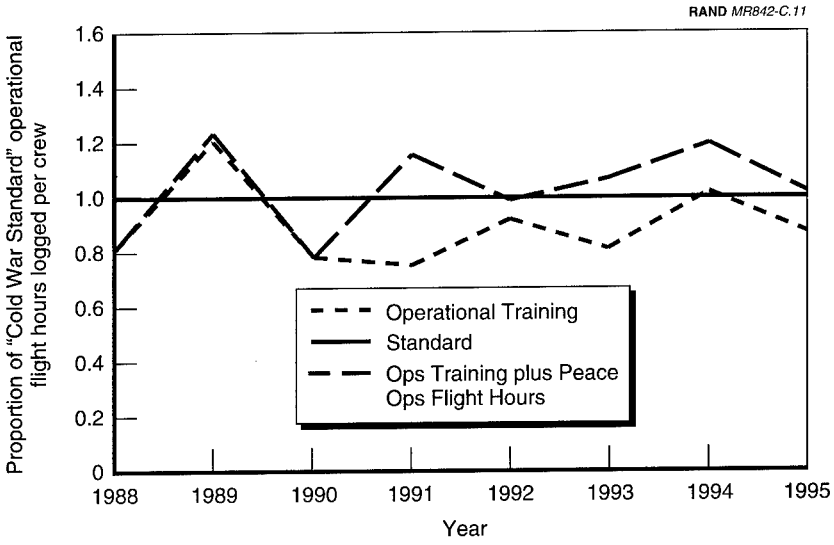


Figure C.11—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All KC-10s

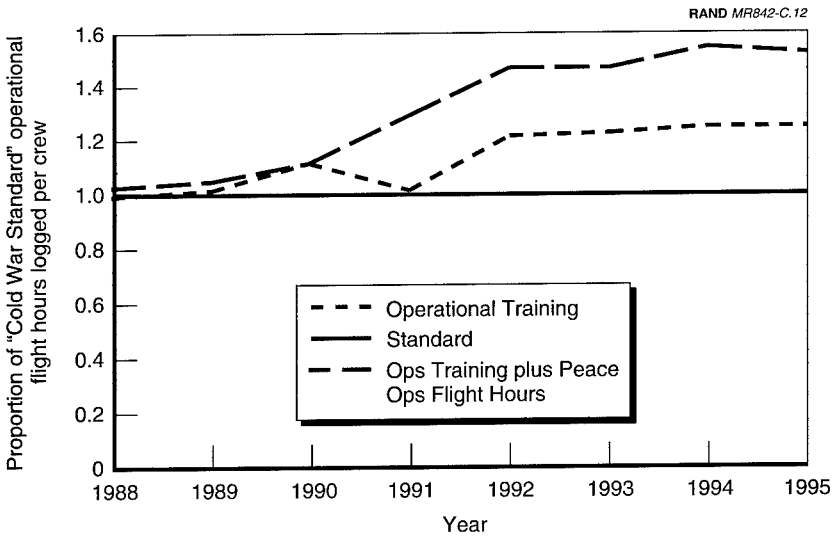


Figure C.12—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All KC-135s

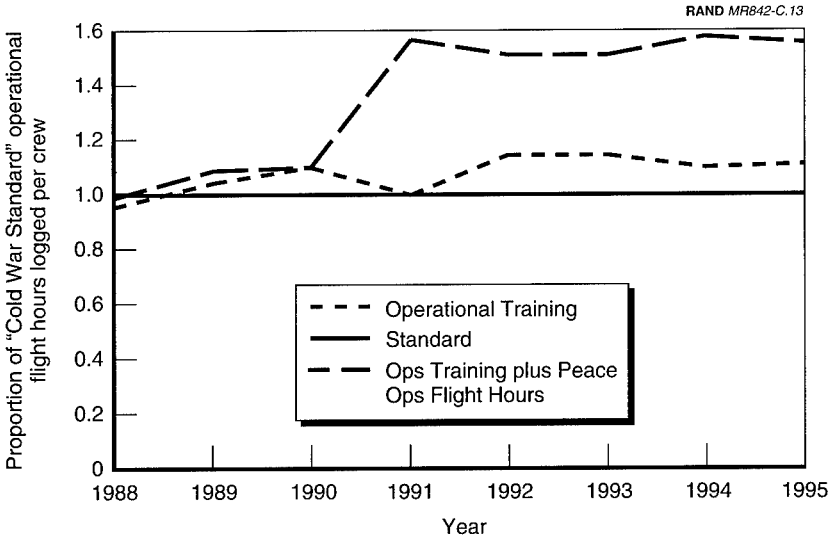


Figure C.13—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: Active-Duty KC-135s

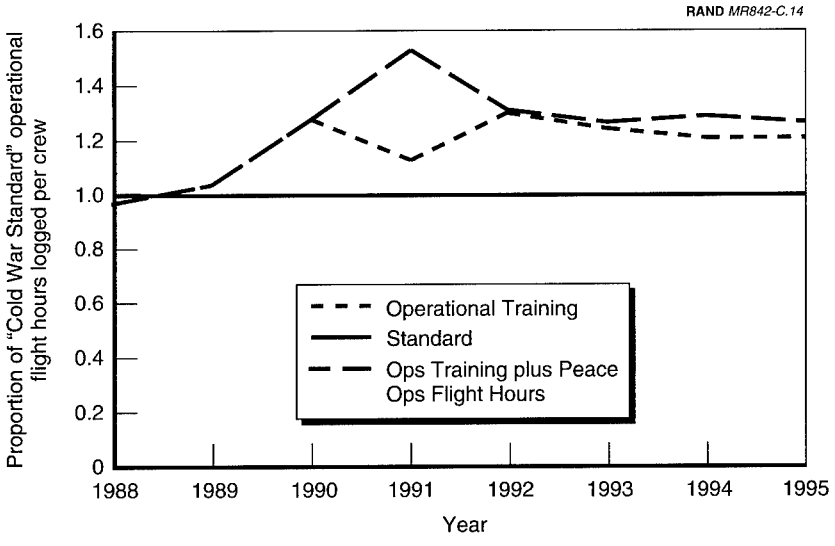


Figure C.14—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: ANG/AFRES KC-135s

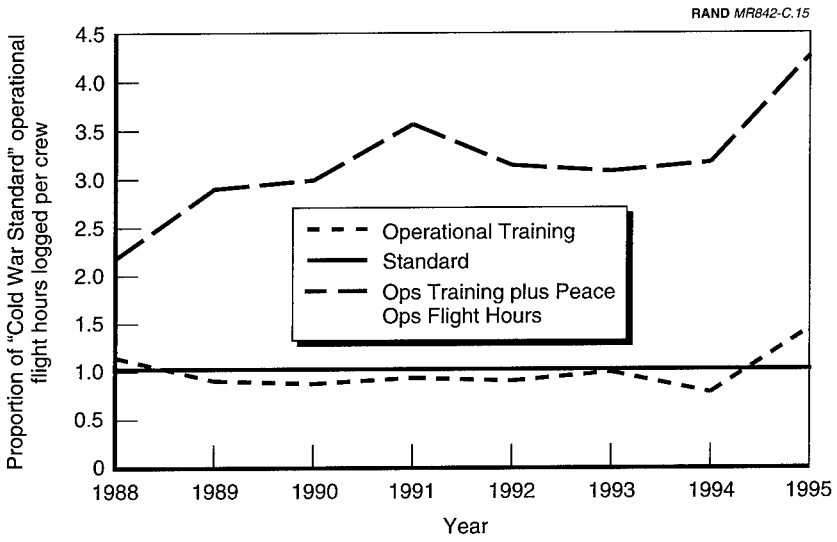
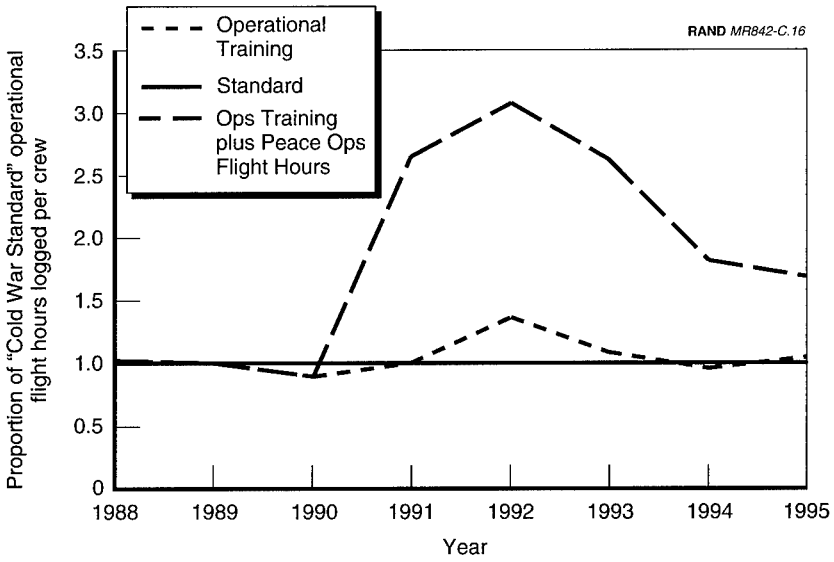
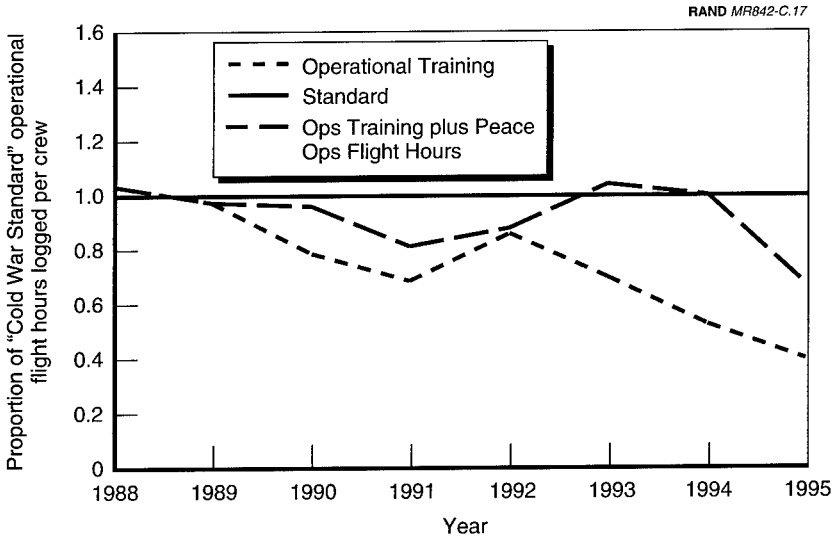


Figure C.15—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All RC-135s



NOTE: The dramatic decrease in E-3 peace-operations tempo per crew from 1992 through1994 reflects a dramatic (30 percent) increase in the number of E-3 crews between these years rather than a decrease in the demand for the platform. Manpower was increased to lessen the extraordinary temporary-duty (TDY) rate that E-3 crews experienced from 1991 through 1993.

Figure C.16—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All E-3s



NOTE: The dramatic decrease in both curves between 1992 and 1995 reflects the transition to AC-130Us.

Figure C.17—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All AC-130s

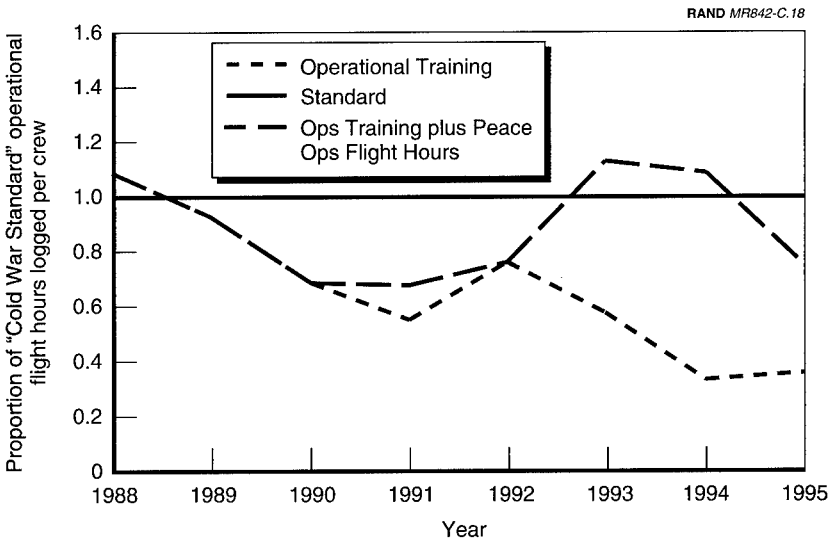


Figure C.18—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: Air Force Special Operations Command (AFSOC) AC-130s

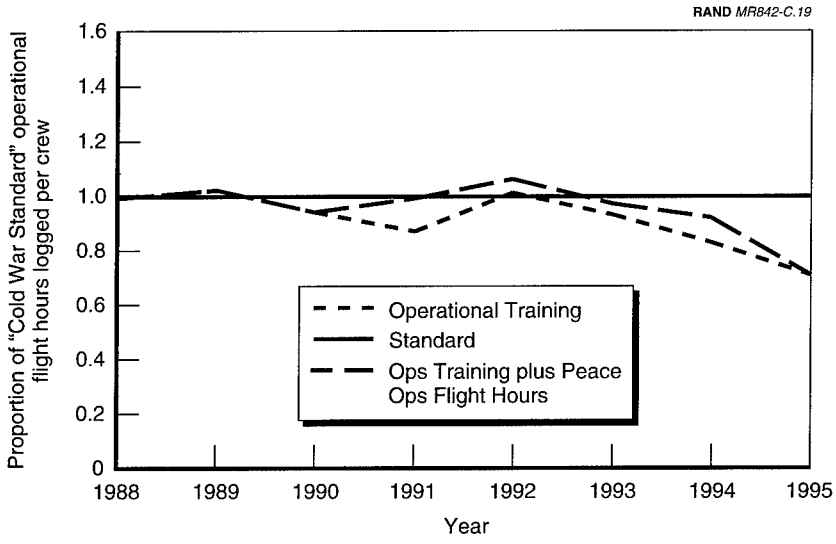


Figure C.19—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: AFRES AC-130s

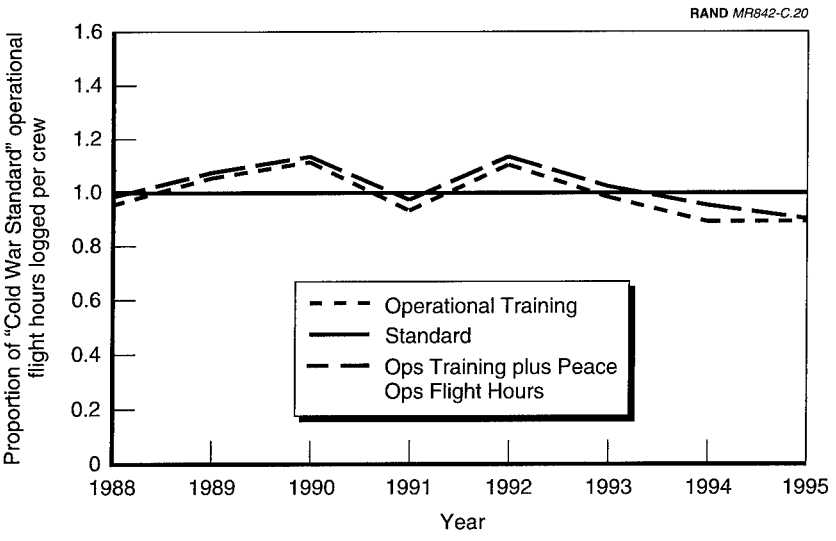


Figure C.20—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All C-130s

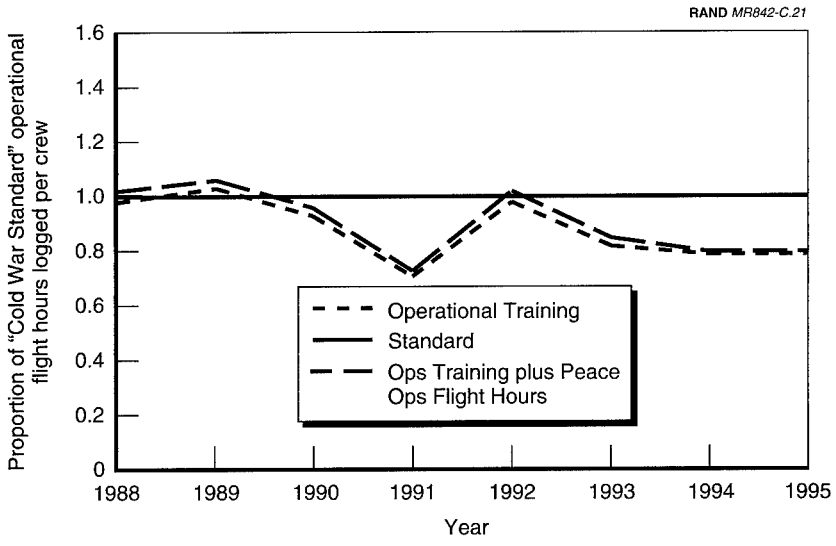


Figure C.21—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: Active-Duty C-130s

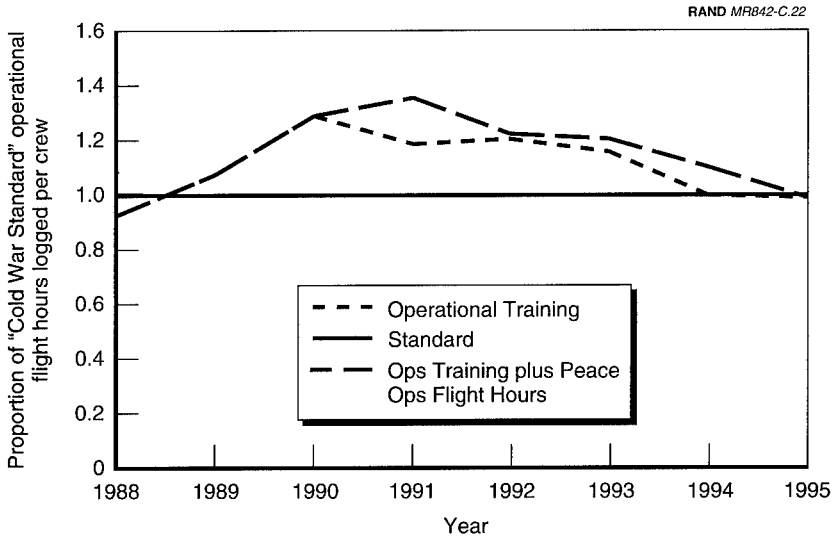


Figure C.22—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: ANG/AFRES C-130s

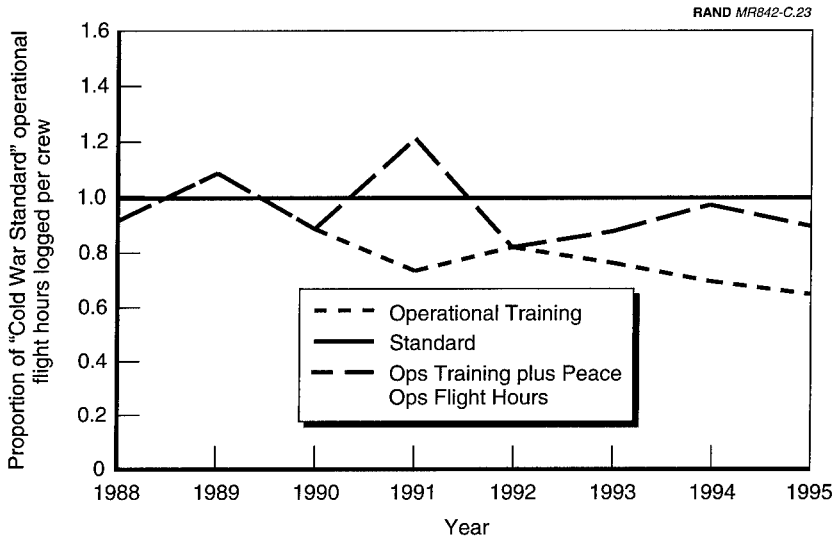


Figure C.23—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All EC-130s

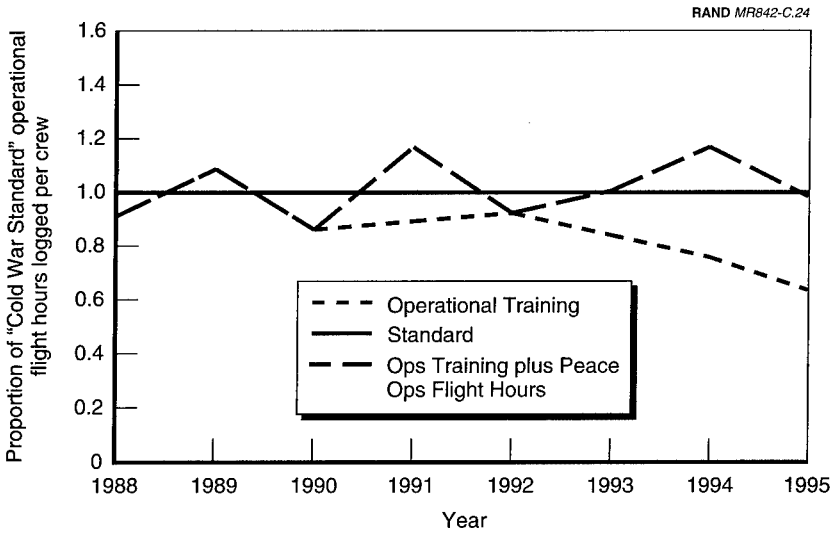


Figure C.24—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: Active-Duty EC-130s

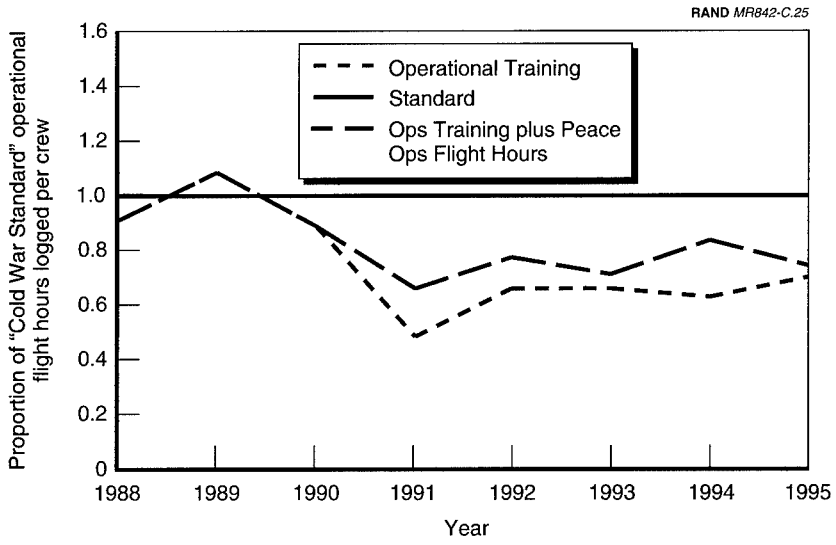


Figure C.25—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: ANG/AFRES EC-130s

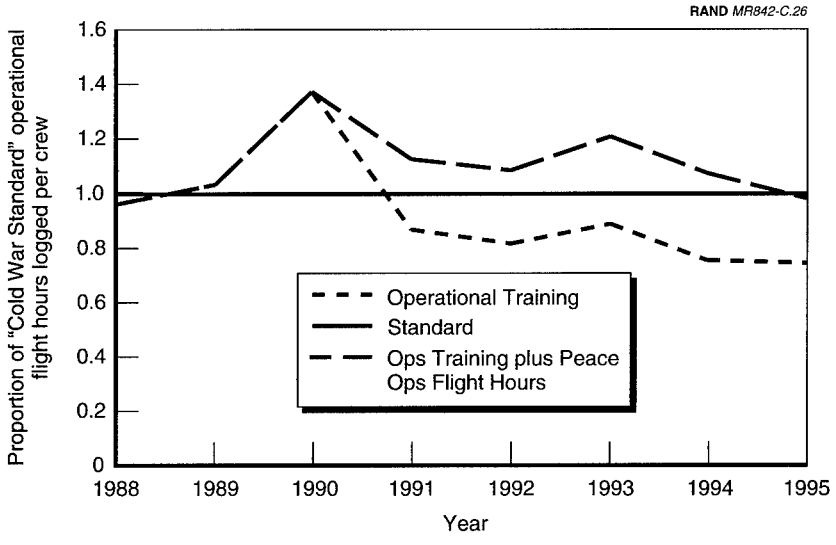


Figure C.26—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All HC-130s

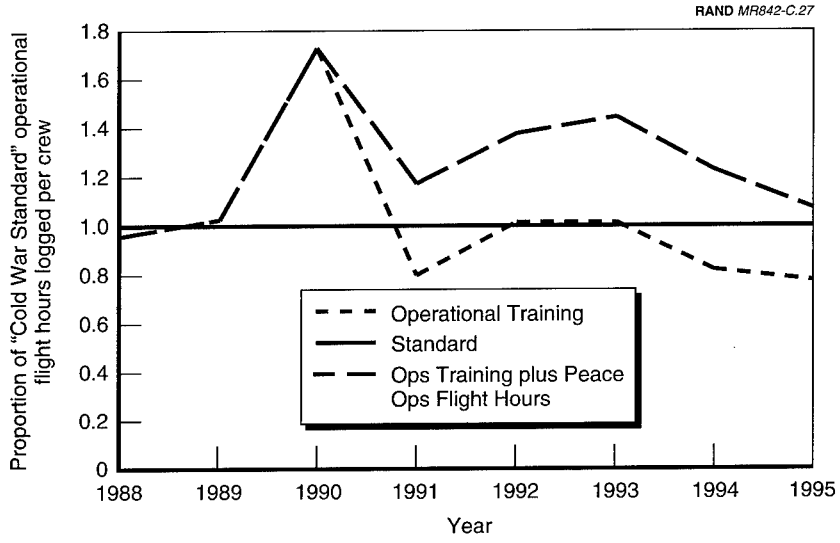


Figure C.27—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: Active-Duty HC-130s

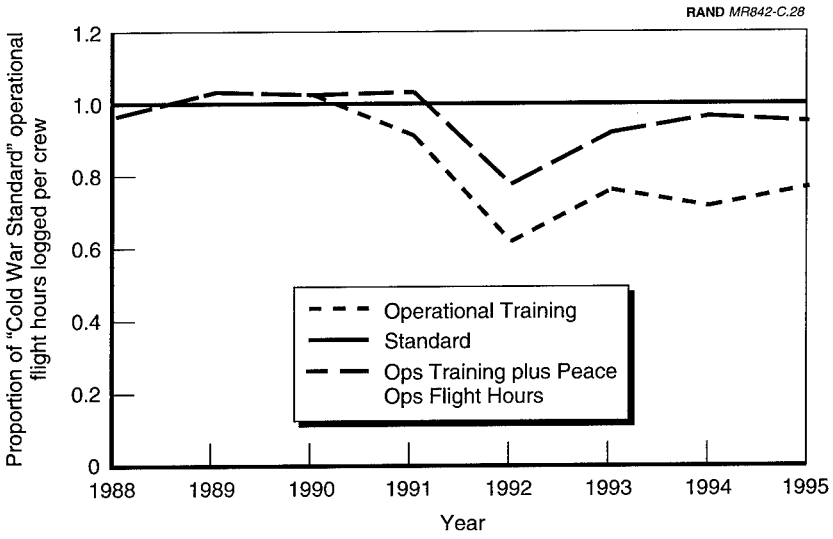


Figure C.28—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: AFRES HC-130s

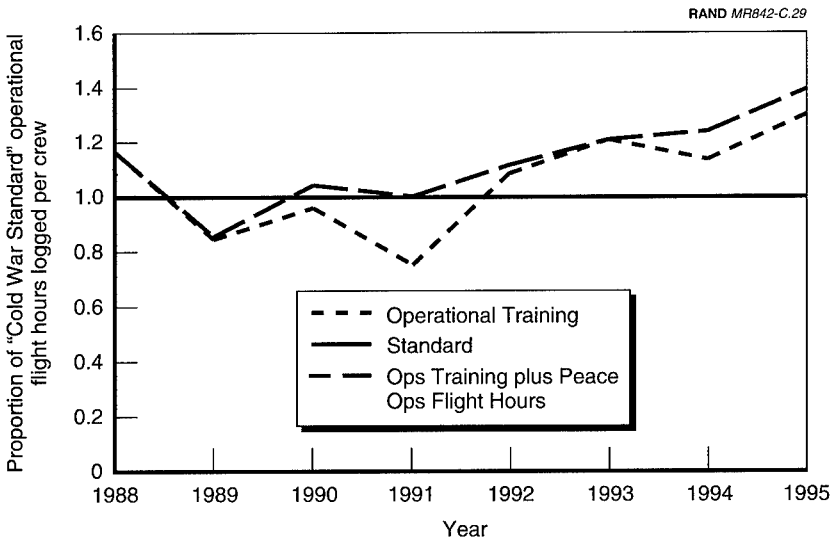


Figure C.29—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All MC-130s

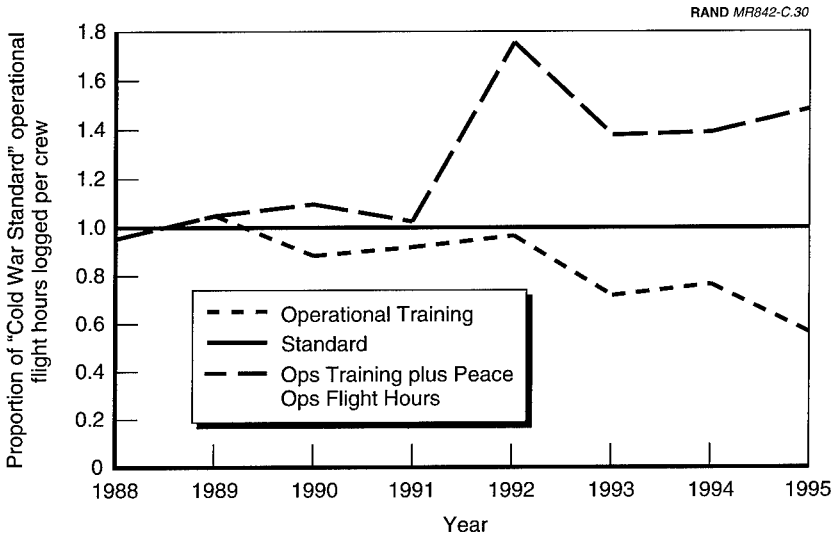


Figure C.30—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All EF-111s

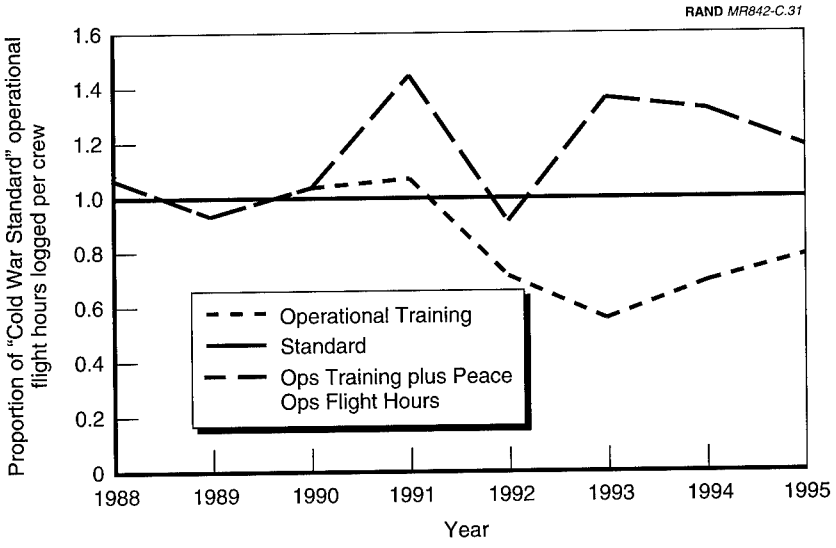


Figure C.31—Flight Hours for Operational Training and Peace Operations Relative to Those for the Cold War Standard: All F-4Gs

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INTERVIEW

Col. William Cato, USMC, on March 27, 1996. Col. Cato was a USMC helicopter commander during Operation Fiery Vigil.