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Project AIR FORCE Assessment of Operation Desert Shield

The Buildup of Combat Power

Project AIR FORCE Desert Shield Assessment Team

Project AIR FORCE

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Project AIR FORCE Desert Shield Assessment Team

Prepared for the United States Air Force

Project AIR FORCE

Approved for public release; distribution unlimited

Preface

This monograph is a declassified version of an earlier Project AIR FORCE report, R-4147-AF, describing the RAND assessment of the buildup of combat power in the Persian Gulf region by the U.S. Air Force during Phase I of Operation Desert Shield. Following the initial research, two classified volumes, R-4147-AF and N-3427-AF, were produced to give a detailed description and analysis of the buildup of airpower during the early stages of Desert Shield.

After the initial publication of these volumes, a change in the security guidance contained in *DoD Security Classification Guidance for Post-Operation Desert Storm Information* made it possible to reissue this report in this unclassified monograph.

The purpose of this assessment was to examine the events and actions that occurred in six areas: policy, deployment, operations, C3I, support, and manpower and personnel. The assessment provides a comprehensive overview of the conduct of this important contingency operation, identifying successes, problems encountered, and implications for the conduct of future contingency operations. Research teams from the RAND Project AIR FORCE staff collected data and interviewed Air Force personnel in the continental United States who participated in the conduct of the initial phase of this extensive undertaking. In conducting this assessment, the teams did not have access to operational plans, personnel in the area of operations, or agencies outside the Air Force.

This research was conducted at the request of the U.S. Air Force Vice Chief of Staff. The sponsor of this assessment was the Exercise Division of the Headquarters USAF Directorate of Plans. This division coordinated trips, provided access to the data contained in this document, and arranged for interviews.

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Summary

Background

The invasion of Kuwait by Iraq on 2 August 1990 caused the United States to begin Operation Desert Shield (ODS). This force deployment differed in many ways from that planned for the European scenarios U.S. defense planners had concentrated on for years. Because ODS is likely to represent future large-scale deployments, it is important to determine how its lessons might apply to major regional contingencies.

Objectives

This study had four primary objectives:

- Gather detailed and comprehensive data about Air Force participation in ODS.
- Assess the responsiveness, flexibility, and capabilities of the Air Force.
- Provide initial findings that recognize successes and problems.
- Suggest ways to deal with the problems.

Major Observations About ODS

By any standard, ODS was a very large deployment. Many aspects of it proceeded very well. Three favorable factors affected the success of the deployment and must be kept in mind. First, hostilities did not occur early in the deployment. If the coalition forces had had to fight on or soon after arrival, the story would have been very different. Second, the United States enjoyed wide international support and base access. And third, the United States was able to use the well-developed physical infrastructure and logistical support available on the Arabian Peninsula.

The major observations suggested by our analysis can be divided into four categories:

- Planning and execution of ODS.
- Deployment.
- Command, control, communications, and intelligence (C3I).
- Force capabilities.

Planning and Execution of ODS

The political context of the crisis shaped both the strategic and operational conditions of the operation. The political effects were cascading: they minimized strategic warning of the invasion of Kuwait and effectively precluded many unilateral and collective deterrence and defense options. Then, post-invasion regional political pressures to resist U.S. assistance compounded the effect of the lack of warning and limiting of options. These effects, coupled with denial of access to the area, in turn forced ODS planning into a compressed, uncertain, and restrictive mode. This mode set the stage for many of the deployment difficulties the Air Force faced once the execution order came. Plans required extensive modification to compensate for the effects of these initial and largely unavoidable political conditions. Political constraints of various types must be considered normal; the ODS deployment demonstrated the need for war planning to be sensitive to larger political constraints.

Existing contingency plans did not precisely match the situation. However, they provided a basis for the actual deployment, and the planning process prepared the personnel for the operation. A draft plan, U.S. Central Command Contingency Plan 1002-90, existed for this situation and was reviewed in the month prior to the invasion of Kuwait. However, the assumptions, planning factors, and basing outlined in the plan did not fit the actual situation. Nor was there a validated time-phased force deployment list (TPFDL). Thus, the initial deployment occurred without benefit of an existing TFPDL and with basing uncertainties and shifting priorities.

It is likely that future contingencies will also differ from existing plans. In the ODS situation, the computer planning system for deployment operations proved to be unwieldy and difficult to use. The Joint Operations Planning and Execution System (JOPES), which had only been introduced in the year prior to ODS, needed an established and stabilized time-phased force deployment data base to function effectively. Additionally, not many people were fully trained on the system. Some units and organizations did not even have it installed when the crisis began, and complex protocols made it difficult to use. Without an effective computer-aided deployment planning system, it was difficult to conduct efficient

operations, and an operation of this scope was only possible through manpower-intensive planning workarounds. An efficient, user-friendly verson of JOPES will become more important in the future when manpower reductions reduce staffs.

Deployment

The en route staging bases in Europe—specifically those in Spain and Germany—were critical for the airlift into the area of responsibility (AOR). If access to these bases is lost as planned and compensatory measures are not taken, deployments to the Middle East and Southwest Asia will be slower and more difficult. Replacement of these bases is not simply a matter of runways. The infrastructure—ramp space, refueling capability, cargo handing equipment, crew rest facilities, and so forth—is critical.

Aircrew availability limited airlift capacity. The availability of reserve forces directly affects aircrew availability, and the proposed transfer of more airlift to the reserves imposes a greater reliance on reserve volunteers or early activation to support large-scale contingency operations. The large number of reserve volunteers who came forward before the President invoked the call-up of 200,000 reservists alleviated aircrew availability problems. Had the volunteers not come in such numbers, the Air Force would have faced substantial crew shortages.

C3I

Planning for major contingencies must take into account the need for a headquarters to serve as a rear command element for the deployed force. The early decision to move the U.S. Central Command Air Force Rear to Tactical Air Command (TAC) Headquarters was necessary and beneficial. The TAC battle staff had the needed expertise and communications, and it played a critical role in the deployment. The need for a U.S.-based rear command post with communications and access to national intelligence systems will likely continue for future contingencies.

The multinational character of the ODS force reemphasizes the need for and benefit of interoperable equipment and standards. The United States will likely continue to find multinational military operations attractive ways to address serious international crises. The Air Force should actively develop a data base of the technical capabilities and operating practices of potential allies and train personnel to participate in such operations. More joint and combined exercises and personnel exchanges might be one way to address this need. Finally, the

DoD may wish to review foreign military sales policy with regard to interoperability. Although such areas as cryptographics will require considerable care, enhanced interoperability should be pursued.

Force Capabilities

The buildup of balanced air combat power took place over a matter of weeks. The first Air Force combat units closed in one day. Within a week, 5 fighter squadrons and 14 conventional bombers deployed to the AOR. Other elements required for sustained air operations—munitions, logistics, and C3I—followed a number of weeks later. By mid-September, a balanced capability was present in the AOR.

At the end of ODS Phase I (8 November 1990) and even Phase II (15 January 1991), the Air Force possessed a strategic reserve force capable of operations elsewhere. Although it had this capability, it did have shortages of specific capabilities: long-range attack, defense suppression, and command and control.

Acknowledgments

The RAND Project AIR FORCE assessment of Operation Desert Shield (ODS) was a collective, cooperative effort. The RAND research teams received extensive assistance from personnel throughout the Air Force, not only in the form of data, but also in the sharing of insights and ideas concerning the problems and innovations required to execute ODS. The coordination and cooperation of the Exercise Division of the Headquarters USAF Directorate of Plans were critical in arranging interviews and access to the data from which this document was derived. Additionally, the staffs at the Strategic Air Command, Tactical Air Command, and Military Airlift Command provided invaluable help in understanding and analyzing the problems encountered in ODS.

The writing of this report was also a cooperative effort. The six team chiefs for the different functional research areas authored their respective sections and provided the data, assistance, and advice needed to complete this document. Bruce Nardulli served as team chief for Policy, John Lund for Deployment, Ted Parker for Operations, Leland Joe for C3I, Ray Pyles for Support, and Marygail Brauner for Manpower and Personnel. To integrate this project and extract the more important messages from the large amount of data collected, Paul Killingsworth, Kevin Lewis, Don Lewis, Patrice Moore, and Jerry Sollinger were invaluable. The Air Force Fellows at RAND were also an essential part of this project from the outset; the operational knowledge and experience they added to this effort once again proved their unique value to RAND.

The people who made up the six teams that did the research and produced this report were as follows (the asterisk denotes U.S. Air Force fellows):

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Acronyms and Abbreviations

A/A	air to air
A/S	air to surface
ABCCC	airborne battlefield command and control center
ABO	air base operability
ACL	allowable cabin load
ADP	automated data processing
ADSI	Air Defense Space Interface
AEW	airborne early warning
AFB	Air Force Base
AFR	Air Force Reserve
AGL	above ground level
AGM	air-to-ground missile
AIF	airfield identification file
AIM	air intercept missile
ANG	Air National Guard
AOR	area of responsibility
APOD	aerial port of debarkation
APOE	aerial port of embarkation
ASARS	Advance Synthetic Aperture Radar System
ATO	air task order
AWACS	Airborne Warning and Control System
BAI	battlefield air interdiction
BAS	basic allowance for subsistence
C-1	fully mission capable
C3I	command, control, communications, and intelligence
CAFMS	computer-aided force management system
CAS	close air support
CAT	crisis action team
CBPO	consolidated base personnel office
CBU	cluster bomb unit
CINCCENT	Commander in Chief, Central Command
CINCMAC	Commander in Chief, Military Airlift Command
COA	course of action
COMALF	Commander of Airlift Forces
COMUSCENTAF	Commander, U.S. Central Command Air Force
CONPLAN	contingency plan

CONUS	continental United States
CRAF	Civil Reserve Air Fleet
DGZ	designated ground zero
DIA	Defense Intelligence Agency
DSCS	Defense Satellite Communications System
EARFLAP	emergency action report for logistics action programming
EC	electronic combat
ECM	electronic countermeasure
EW	electronic warfare
FMS	Foreign Military Sales
GBU	guided bomb unit
GCC	graduated combat capability
HARM	high-speed antiradiation missile
HF	high frequency
IFF	identification, friend or foe
IMOM	Improved Many-on-Many
JCS	Joint Chiefs of Staff
JOPES	Joint Operations Planning and Execution System
JS	Joint Staff
KTO	Kuwait theater of operations
LENSCE	Limited Enemy Situation Correlation Equipment
LIMDIS	limited distribution
Log C2	logistics command and control
MAC	Military Airlift Command
MAJCOM	major command
MAP	mobile aerial port
MAPS	mobile aerial port squadron
MC&G	mapping, charts, and geodesy
MHE	material-handling equipment
MOB	main operating base
MOG	maximum on ground
MTM	million ton miles
NAVCENT	U.S. Central Command, Naval Forces
NCA	National Command Authority
NGB	National Guard Bureau
NSA	National Security Agency
ODS	Operation Desert Shield
OPEC	Oil and Petroleum Exporting Countries
OPLAN	operations plan
PAA	primary assigned aircraft

PAF	Pacific Air Force
PDS	personal data system
PERSCO	Personnel Support of Contingency Operations
QRP	quick reaction packet
RFCOH	refueling complex overhaul
SAC	Strategic Air Command
SAM	surface-to-air missile
SAO	security assistance officer
SCI	sensitive compartmented information
SEAD	suppression of enemy air defense
SECDEF	U.S. Secretary of Defense
SHF	super-high frequency
SIGINT	signal intelligence
SIOP	single integrated operations plan
SITREP	situation report
SLEP	service life extension program
SOF	special operations force
SPECAT	special category
TAC	Tactical Air Command
TACC	Tactical Air Control Center
TACP	tactical air control party
TAF	tactical Air Force
TDF	Tactical Digital Facsimile
TDY	temporary duty
TFS	tactical fighter squadron
TFSE	tactical fighter squadron equivalent
TFW	tactical fighter wing
TIBS	Tactical Information Broadcast System
TPFDD	time-phased force deployment data base
TPFDL	time-phased force deployment list
UAE	United Arab Emirates
UIC	unit identification code
USAF	U.S. Air Force
USAFE	U.S. Air Force, Europe
USCENTAF	U.S. Central Command Air Force
USCENTCOM	U.S. Central Command
USMC	U.S. Marine Corps
USN	U.S. Navy
USTRANSCOM	U.S. Transportation Command
UTC	unit type code

WBEL	wide-body elevator loader
WRSK	war reserve spares kit

1. Introduction

Background

On 2 August 1990, Iraqi armed forces attacked the Persian Gulf Sheikdom of Kuwait and conquered it, virtually in a matter of hours. In response, the United States began a deployment operation named Desert Shield. This operation offered an unparalleled opportunity to evaluate the policies, procedures, and organizations associated with such a deployment. At the direction of the Vice Chief of Staff of the Air Force, RAND's Project AIR FORCE was asked in early September 1990 to assemble a team of analysts to assess Operation Desert Shield (ODS).

ODS faced a different set of challenges from those of the NATO and Korean scenarios that had dominated defense planning in past decades. The political context in which the crisis unfolded delayed strategic warning and precluded both effective unilateral or collective deterrence and defense options prior to the invasion. The context thus forced ODS planning into a compressed, uncertain, and restrictive mode. Though plans had been developed for Southwest Asian contingencies, the plan for the scenario that developed existed only in draft form and did not have a time-phased force deployment list (TPFDL), which is essential for efficient deployment.

The characteristics and facilities of the region also differed from those of the dominant scenarios of past decades. The region has many modern air bases suited for military operations. However, access to specific bases was not obtained until units were ready to deploy. Distances between bases and across the region mandated extensive air refueling to conduct air operations. Prepositioned munitions and bare base kits were located in the area of responsibility (AOR), but permission was not received to move the prepositioned stocks until forces began deploying. Additionally, the munitions located in the AOR were principally general-purpose bombs and older cluster bomb units (CBUs). Modern, preferred munitions had to be moved into the theater in conjunction with the forces. Finally, a command, control, communications, and intelligence (C3I) system connecting bases, headquarters, and surveillance assets did not exist for the region prior to the initiation of ODS.

Objectives

ODS provided a rare opportunity to document the performance of Air Force organizations and systems during the deployment of a large force overseas. Unquestionably, the operation taught numerous lessons that will have far-reaching effects on how the Air Force structures itself in the post–Cold War era. This study had the following objectives:

- Gather detailed and comprehensive data on Air Force participation in ODS.
- Assess the responsiveness, flexibility, and effectiveness of the Air Force in this type of operation.
- Provide initial findings that recognize both successes and problems.
- Suggest ways to deal with the problems.

As the assessment drew to a close, questions arose about the United States' ability to contend with other crises. Therefore, the assessment expanded to include "strategic reserves," or the capability of remaining forces.

Approach

A RAND research team of approximately 30 people was assembled and divided into six functional teams. Team members visited a number of organizations in the Air Force and other defense organizations, as well as joint headquarters such as the U.S. Central Command (USCENTCOM) and the U.S. Transportation Command (USTRANSCOM). The primary research areas of these teams were as follows:

- The Policy team examined the political backdrop of the operation, searching for constraints and decisions affecting Air Force operations.
- The Deployment team evaluated the mobilization and deployment of air forces into the AOR. It focused primarily on unit mobility and strategic airlift.
- The Operations team studied the potential combat effectiveness of the deployed fighters, bombers, and electronic combat aircraft.
- The C3I team collected information on the structure and performance of C3I systems.
- The Support team analyzed the planning and execution of the logistics support for the operation.

- The Manpower and Personnel team focused on manpower and personnel, placing special emphasis on the role of the Reserve components.

The events and activities associated with ODS were seen as a series of phases. One phase, which the research team called the *movement to crisis*, included events throughout July and up to the invasion on 2 August 1990. The period between the 2 August invasion and the issuance of the ODS execution order on 7 August (C-day) was called the *crisis action* phase. Phase I of ODS began on 7 August and lasted through the 8 November decision to deploy additional forces to gain sufficient power for offensive operations. Phase II covered the ongoing buildup of forces in the November through 15 January time frame.

The focus of the RAND Project AIR FORCE ODS assessment was on the period extending from the Movement to Crisis until completion of Phase I. The data collection effort specifically aimed at the period up to early October 1990. The Phase I buildup lasted through early November, but a balanced Air Force capability for conducting sustained defensive air operations was realized in about mid-September. The remainder of Phase I was devoted to training the U.S. Air Force forces in place, moving heavier ground forces into the region, and building up sustainment assets.

Scope

A number of different limitations affected the scope of this study. In general, these divide into three categories: time, access, and method of data collection. As stated above, the observations of this report deal generally with ODS activities up until 1 October 1990 (C+55), even though Project AIR FORCE did continue to collect and analyze information beyond that date. The team members had no access to special category (SPECAT) material or sensitive compartmented information (SCI), or to operations plans (OPLANs), contingency plans (CONPLANs), and USCENTCOM employment plans. Discussions with Air Force personnel were limited to individuals in the continental United States (CONUS). The research did not include in-theater interviews, although USCENTCOM and U.S. Central Command Air Force (USCENTAF) situation reports did provide some in-theater perspectives. Furthermore, no members of the Joint Staff (JS) were interviewed.

Report Organization

Section 2 is an overview of ODS, including the events leading up to it. Sections 3 through 8 are separate, abbreviated accounts of the observations of the six

functional teams; Section 9 is a short discussion of the issue of the U.S. Strategic Reserve.[1] Section 10 contains summary observations about ODS from all of the functional areas.

[1]A companion volume, Vol. II, consists of eight appendices: six containing the detailed team assessments, one covering our assessment of the strategic reserve issue, and one containing our major ODS observations in a JCS-designed format requested by the Air Force in connection with the Joint Uniform Lessons Learned (JULLS) project. Cross-references to related sections/appendices are provided in both volumes.

2. Overview of Operation Desert Shield

Events Leading to ODS

The massing of Iraqi forces near the Kuwait border foreshadowed subsequent events. But the course of these events was uncertain, and the indications available painted an ambiguous picture that was interpreted by different observers in different ways. Even if U.S. leaders had had perfect knowledge of what was to occur, it is doubtful that U.S. forces would have been granted access to bases in the Gulf region. However, to understand the problems associated with planning for contingency operations, it is helpful to review the events that led to the invasion and the initiation of ODS. Figure 2.1 outlines those events, which are summarized next.

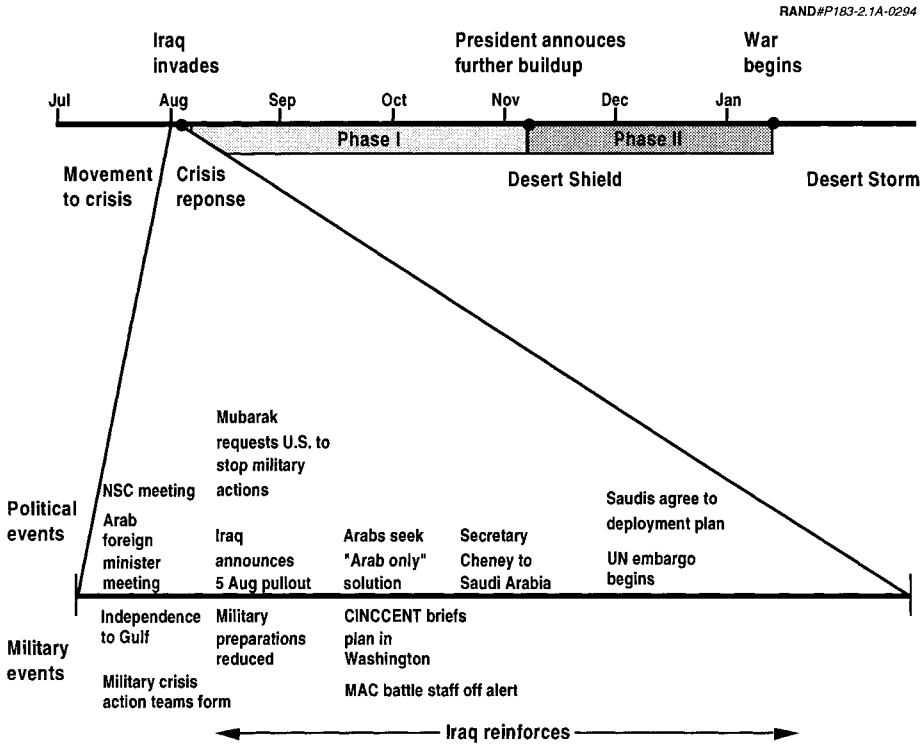


Figure 2.1A—Movement to Crisis Was Rapid

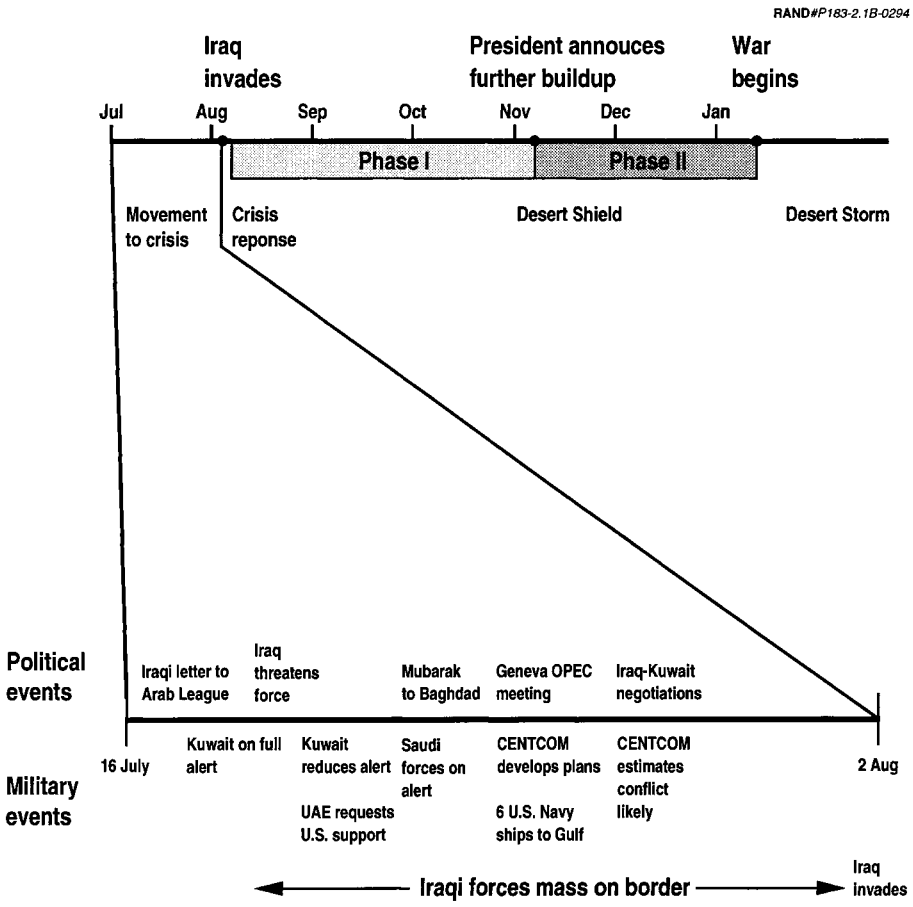


Figure 2.1B—Crisis Response Was Mixed

Movement to Crisis

On 16 July 1990, Iraq sent a letter to the Arab League protesting Kuwaiti oil production and pricing policies. The next day, Saddam Hussein threatened force to resolve those grievances. Increased air activity and the possible movement of two Iraqi divisions were noted on 18 July. At that point, the *movement to crisis* had begun.

Actions taken by the Gulf states in the week following Iraq's first threats to use force and the corresponding Iraqi troop movements were ambiguous. Saudi and Kuwaiti forces first increased their alert status in reaction to the Iraqi military actions. This alert status was raised and lowered in reaction to different events in the period before the invasion. The competing objectives of responding to the

Iraqi troop buildup and of not wanting to appear provocative caused the ambuiguity, and produced mixed signals to be sent.

The Oil and Petroleum Exporting Countries (OPEC) oil ministers met on 26 July. The outcome of their talks was viewed by many of the Arab nations as an optimistic sign that the building crisis could be resolved peacefully. Nevertheless, on the following day it was reported that six Iraqi divisions were located on the border adjacent to Kuwait. Meetings were scheduled between Iraq and Kuwait to resolve their differences but were ultimately postponed until 31 July. Diplomatic efforts by various Arab leaders occurred between the OPEC meeting and the talks between Iraq and Kuwait on 31 July.

The talks between Iraq and Kuwait began on 31 July under the sponsorship of Egyptian President Mubarak and broke down on 1 August. In the early morning hours of 2 August, Iraq invaded Kuwait. Throughout the movement to crisis that initiated ODS, several factors constrained the consideration of U.S. military options. First, many thought Iraq was merely posturing to influence negotiations. The Arab nations thus lacked a consensus, which led to a reluctance to ask for or accept U.S. assistance. Also, Arab states desired to keep the problem an Arab affair and minimize Western intervention.

Initial Response to Invasion

Soon after the invasion, the decision was made to deploy U.S. forces to the region, but the problem of gaining access to the Arabian Peninsula still had to be resolved. Battle staffs were convened to develop options and make preparations, but, in the absence of concrete guidance, only planning and limited mobilization initiatives were taken until the deployment order was received. A detailed account of the events leading to ODS is contained in Vol. II, App. A.

Following a short period for consultation with Arab governments, the deployment order for ODS was transmitted on 7 August at 0050Z. The next day, a squadron of F-15Cs landed at Dhahran Air Base in Saudi Arabia. Within a week of the issuance of the deployment order, five squadrons consisting of 112 fighter aircraft, 14 B-52G bombers, 70 tanker aircraft, and the lead elements of the theater command and control structure were in place in the AOR.

The principal observation from the sequence of events that led to ODS is that, though signals of the impending crisis were available, they were ambiguous. Especially when combined with the existing constraints, these signals were insufficient for prompting the military action—either by the states of the Gulf region or by the United States—needed to deter Iraqi aggression or to defeat it

when it came. As was true for earlier contingency actions, the time for precise deliberate planning was quite short.

ODS Deployment

Airpower

Figure 2.2 depicts the buildup of USAF airpower from C-day until 5 September. A review of the battle staff logs at the Tactical Air Command (TAC) and the Military Airlift Command (MAC) shows that options for deployment to the Arabian Peninsula were developed between 2 and 6 August. These options ranged from sending 8 F-15Cs or 12 F-16Cs plus 3 E-3 Airborne Warning and Control Systems (AWACSs) and 1 Rivet Joint (RC-135) aircraft to a balanced deployment of three tactical fighter squadrons. The Strategic Air Command (SAC) was also planning for deployment of B-52G and tanker aircraft. The largest of these options required 395 C-141 equivalent sorties. These planning estimates were surpassed after five days into the actual deployment.

The deployment order of 7 August launched a major deployment operation. Requirements and deployment priorities changed frequently as needs unfolded for balanced combat power in the theater. The major priority in the early days was to deter or defend against a possible Iraqi invasion of Saudi Arabia.

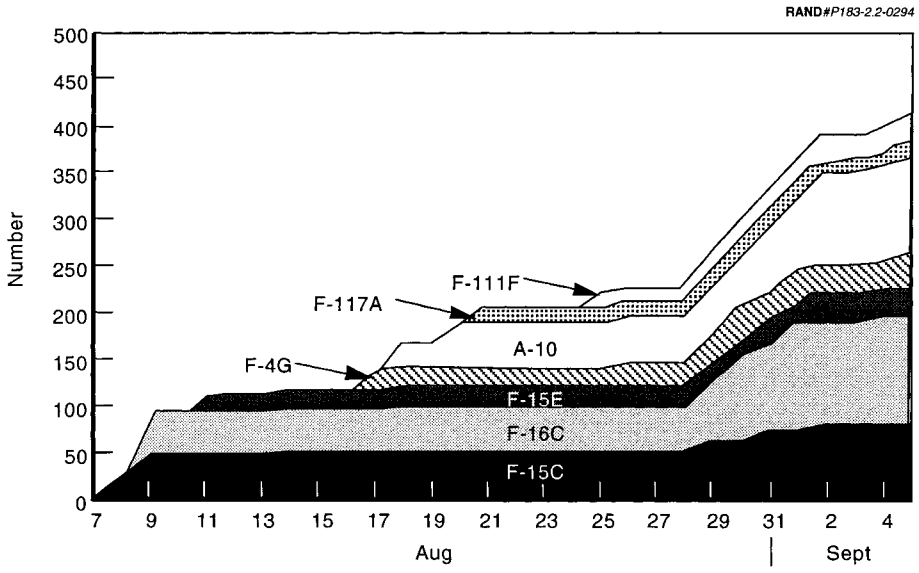


Figure 2.2—Fighter Deployments

Management of the deployment was complicated by the fact that access to bases in the theater of operations was being negotiated while the deployment was in progress.

Preliminary planning actions facilitated the rapid deployment of TAC and SAC combat and support aircraft. Four days after transmission of the deployment order, five USAF squadrons—two F-15Cs, two F-16Cs, and one F-15E—were in place in the AOR. Additionally, seven B-52G aircraft arrived at Diego Garcia on 11 August, and the B-52G force built to 20 aircraft by 15 August. After the initial surge of fighter aircraft, airlift priorities were changed to move the 82nd Airborne Division into the theater. The flow of aircraft resumed at a moderate pace after 16 August, and from 28 August through September a surge completed the Phase I fighter deployments at a rate of two-and-one-half to three squadrons per day. More detailed accounts of the buildup of combat power for ODS appear in App. B (Deployment) and App. C (Operations) of Vol. II.

ODS required that the C3I system necessary for the conduct of sustained combat operations be built from scratch. In mid-August, airlift priorities shifted toward deployment of C3I systems to support operations for the deployed fighter and bomber force. Figure 2.3 depicts the arrival of reconnaissance, surveillance, command and control, and communications systems in the AOR. The deployment of the C3I systems complemented the buildup of air combat and support forces. A detailed account of the challenges and innovations of the establishment of a C3I system for ODS is contained in App. D of Vol. II.

The combat power of a deployed force is best measured by capabilities against the threat. Although we did not have access to OPLANs in this assessment, we did attempt to assess the capability of arriving USAF forces over time against the existing Iraqi forces for various air-to-air (A/A) and air-to-surface (A/S) missions. With respect to A/A missions, the F-15Cs carried one load of air intercept missiles (AIMs) on deployment, and additional AIMs were available four days later. Thus, effective A/A combat capabilities were established within about one week. F-15Es at Thumrait and the B-52Gs at Diego Garcia had immediate access to prepositioned munitions stocks. Except for the munitions they deployed with, the other combat units had to await delivery of munitions to their beddown bases. This delivery was subject to various transportation constraints. However, had hostilities broken out early, transportation priorities could have been shifted to match munitions with forces. Figure 2.4 shows the buildup in kill potential of the USAF F-15C force to contend with the Iraqi offensive air threat through the end of September. Note that by early September, the USAF had the potential to destroy all of the Iraqi air assets that constituted a threat to the USCENTCOM AOR.

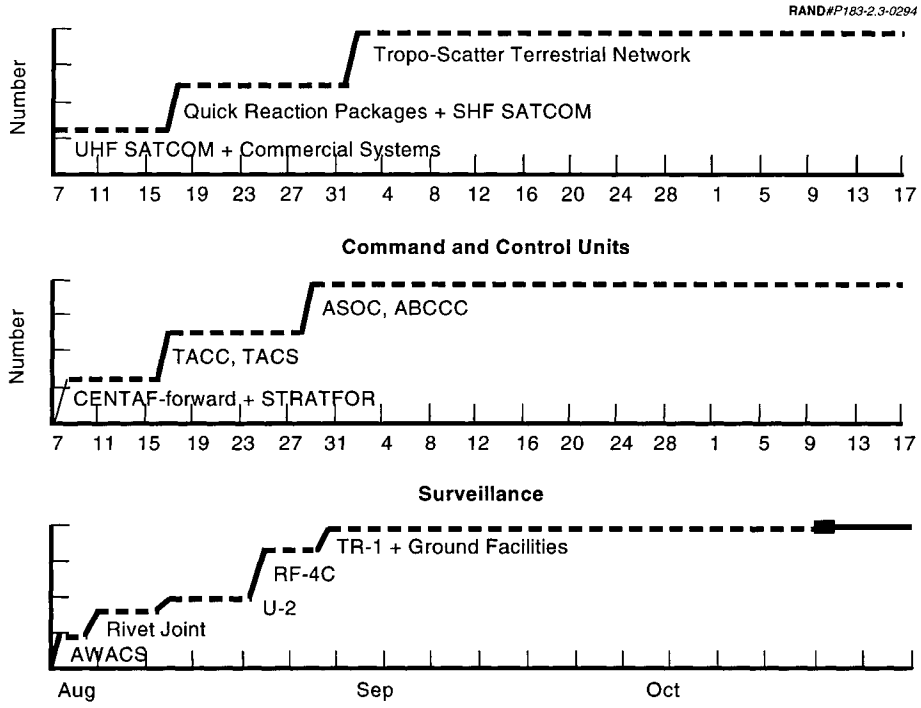
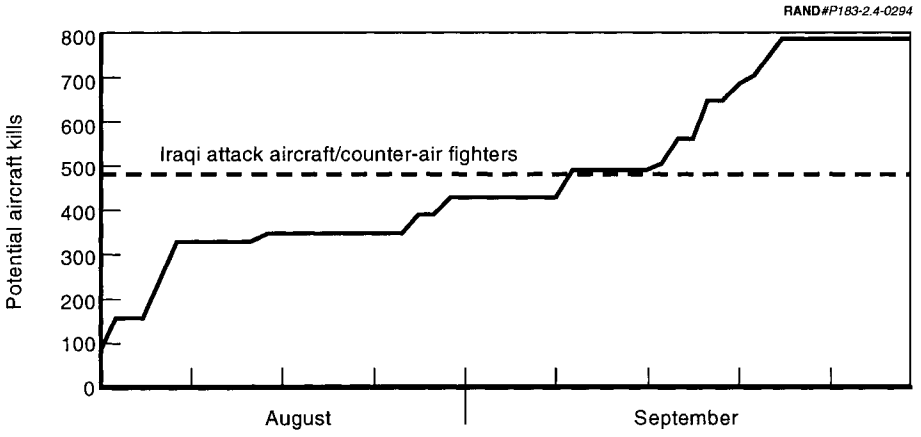


Figure 2.3—Buildup of Combat Power C3I



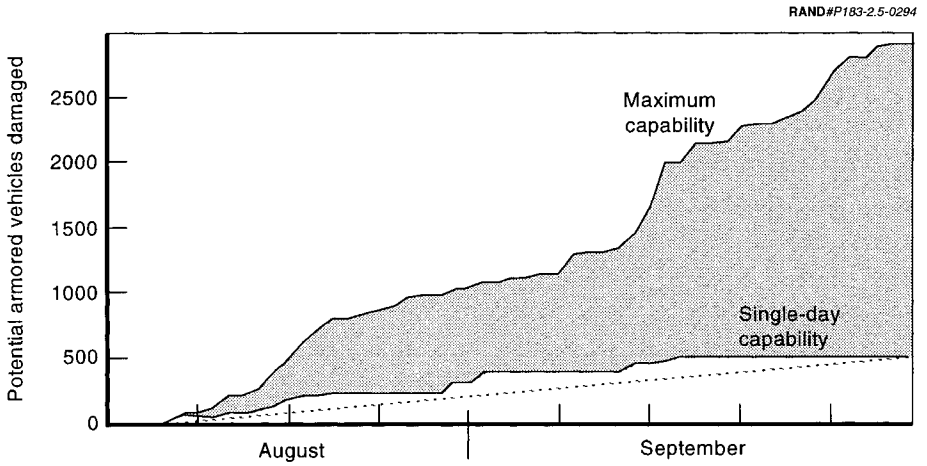
NOTE: Based on numbers of USAF AIMs available at Dhahran and Tabuk.

Figure 2.4—Total A/A Kill Potential of USAF F-15Cs

For a wide range of A/S missions, we assessed the potential capabilities of forces in the AOR to engage and damage armor, trucks, point targets, and infantry units in defensive positions. Figure 2.5 contains one of the series of assessments of force potential in the A/S mission. Specifically, this figure shows the number of armored vehicles that could have been damaged on a single day by using all of the munitions available at A-10, F-15E, and F-16 bases on any given day. The "D-day" kill potential is based upon these aircraft flying at surge sortie rates and average munitions effectiveness calculations. The number indicated by the total-kill-potential curve shows the potential capability of the forces in the theater at a point in time if these aircraft flew repeatedly until all munitions in the theater at that point were expended. We see from these assessments that the in-theater capability was limited by munitions availability until the middle of September.

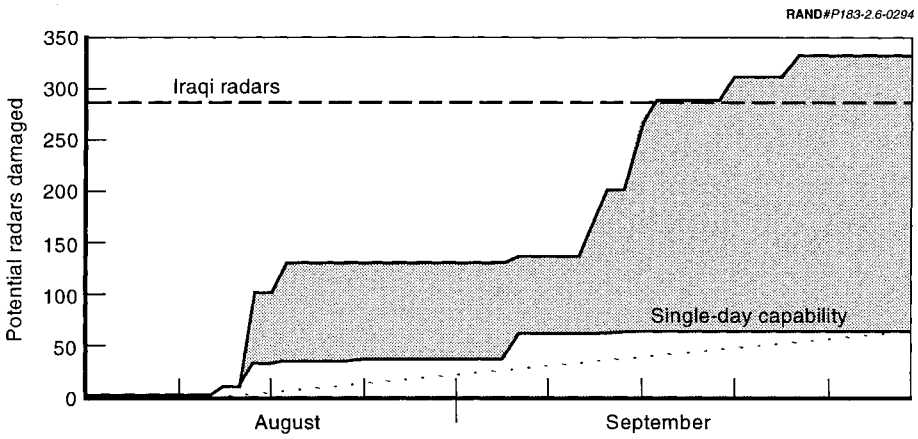
An important element of the USAF capability to sustain combat operations in this situation is the potential to suppress surface-to-air defenses. USAF suppression of enemy air defense (SEAD) assets were limited in number and arrived slightly behind other force elements. Figure 2.6 shows our estimate of the rate at which the USAF deployed the capabilities to suppress fire control radars.

These figures are a portion of our assessment of the buildup of air combat power in the AOR. The details of the assessment and estimates of other capabilities through the end of September appear in App. C of Vol. II. It is important to keep



NOTES: 1. 5100 Iraqi armored vehicles in Kuwait by late September.
2. Single-day potential capability based on numbers of F-15Es, F-16Cs, and A-10s and antiarmor weapons (excluding MK-82s) available at Thumrait, Al Dhafra, Doha, and King Fahd International.

Figure 2.5—USAF Antiarmor Kill Potential



NOTE: Based on numbers of F-4Gs and AGMs available at Shaikh Isa.

Figure 2.6—USAF Antiradar Kill Potential

in mind that these are only **potential** capability estimates. Actual force effectiveness would depend on such specifics as how the forces were employed and the proficiency of the aircrews. Such caveats are discussed in App. C.

Ground Forces

By mid-August, airpower had given the United States important capabilites for defending against an Iraqi invasion of Saudi Arabia or for coercing Iraq. However, a balanced deterrent, defensive, and eventually offensive capability to counter the Iraqi threat required larger and more diverse forces. Figure 2.7 depicts the closure of U.S. Army and Marine combat maneuver units in the AOR. Only the arrival of major units is shown. Assets are measured in "division equivalents," in which a full division scores as one and separate brigade or armored cavalry regiments count as one-third.

These units arrived by both air and sea. Not surprisingly, the first units arriving were the air-transportable 82nd Airborne Division and the Marine expeditionary brigades. The 82nd Division moved the bulk of its assets into the AOR in the last two weeks of September. By the end of the month, a balanced air-ground force existed in theater, albeit one with only light forces in the ground component.

Heavier forces moved by sea. The 24th Mechanized Division, which moved by fast sealift, arrived next, followed by the remaining units transported by slower vessels. Figure 2.8 shows the same deployment using a different measurement: armored division equivalents. This measure captures the combat power of a unit

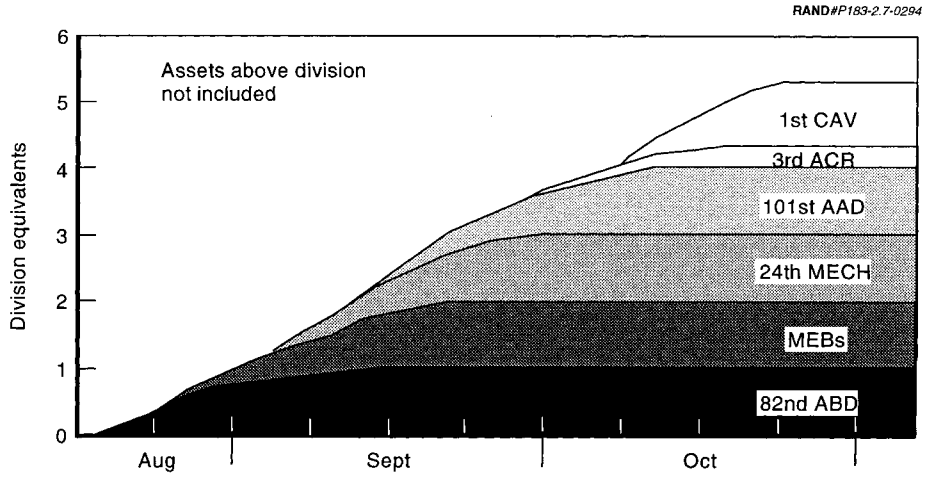


Figure 2.7—Army Unit Deployment over Time (in Division Equivalents)

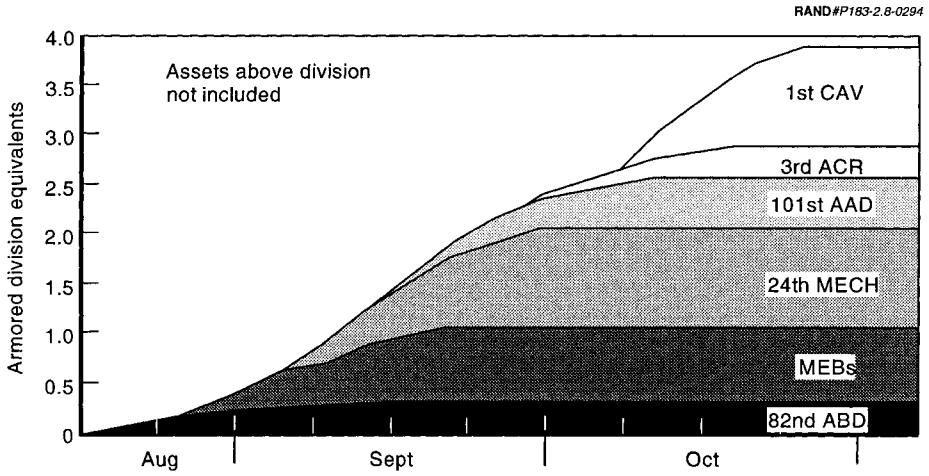


Figure 2.8—Army Unit Deployment over Time (in Armored Division Equivalents)

by assigning scores based on its equipment. A U.S. Army armored division has a value of 1.0. Scores assigned appear in Table 2.1.

This scoring system paints a somewhat different picture. It shows a dominance of heavy, armored units in the U.S. ground force capabilities. Naturally, these took longer to deploy to the theater than their lighter counterparts. Thus, the picture here shows an evolving ground force, light initially, then transitioning to a heavy armored force.

Table 2.1

Scoring for Armored Division Equivalents

Unit	Score
82nd Airborne (ABD)	0.30
Three Marine expeditionary brigades (MEBs)	0.75
24th Mechanized Infantry(MECH)	1.0
101st Airborne (AAD)	0.50
3rd Armored Cavalry Regiment (ACR)	0.33
lst Cavalry (CAV)	1.0

Airlift

The airlift operation for ODS was the largest airlift ever conducted. Figure 2.9 shows the flow of cargo and passengers to support the Army and Air Force deployment in Phase I. By 30 September, 3800 missions had been flown using military and civilian aircraft (Civil Reserve Air Fleet [CRAF] and volunteer). These missions moved more than 130,000 passengers and almost 124,000 short tons of cargo. These deliveries translate into a daily average of 2486 passengers and 2285 short tons of cargo.

Yet, despite these substantial amounts, the airlift system provided less capability than anticipated. In this period, airlift moved approximately 17 million-ton-

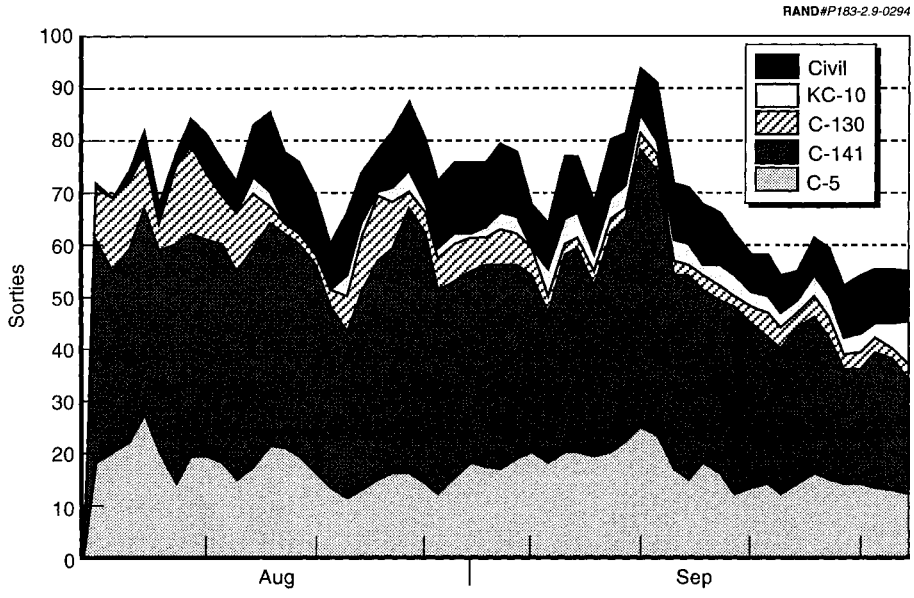


Figure 2.9—Phase I Airlift Flow

miles per day (MTM/d) on average. This is short of the 23 MTM/d capability projected in a congressionally mandated DoD mobility study. Appendix B in Vol. II addresses in detail some of the constraints affecting airlift capability.

Buildup of Force Capability

Figure 2.10 depicts the buildup of force capability order until mid-January. We have divided the period into two phases. Phase I represents the initial buildup, and Phase II begins with the President's decision to expand the U.S. military presence in the region. Although precise transition points are not possible to determine, the major subdivisions suggest generalized capabilities.

The operational objectives of U.S. and allied forces in ODS evolved in concert with the ongoing buildup of U.S. military capabilities in the theater. The relationship between strategic goals and force potential is interactive and variable over time. For instance, the initial buildup of military capabilities was intended to deploy the forces required to deter subsequent Iraqi aggression, particularly against Saudi Arabia, and to support diplomatic and other measures to induce Iraq to cease its occupation of Kuwait. Within that interplay of force deployments and strategic aims, it is possible to identify shifts in the operational capabilities and aims of U.S. forces. Thus, with relatively few combat units in the region early on, the ability of allied forces to mount a credible defense against the sizable forces Iraq had mobilized was acknowledged to be insufficient.

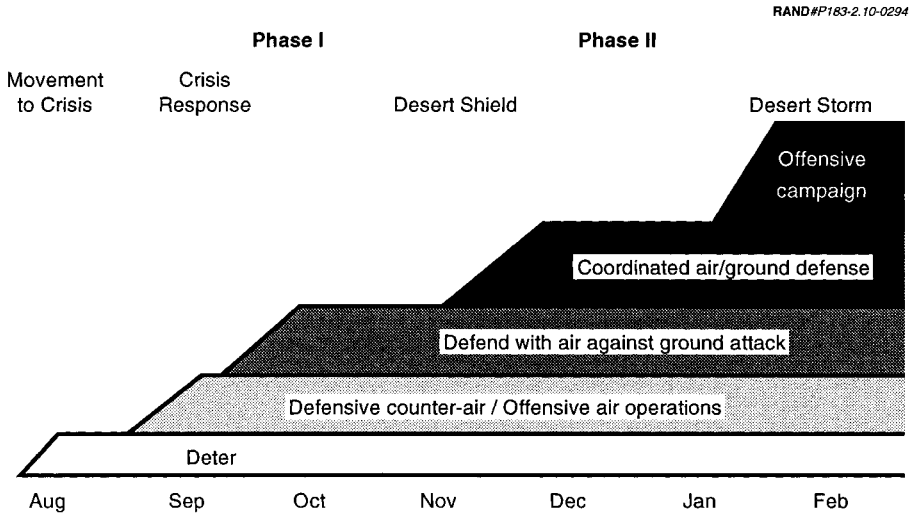


Figure 2.10—Buildup of Force Capability

Accordingly, early-deploying forces played more of a deterrent than a defensive role. Their presence had substantially "upped the ante" on Iraq—raising the immediate price of aggression and making it clear to Baghdad that further aggression would entail war with the most powerful nation on earth.

As the U.S. buildup continued and the allied defensive positions were consolidated, a broader range of military options to enhance both deterrence and defensive prospects became possible. With the change of strategic objectives signaled by the announcement on 8 November of the Phase II reinforcements, allied objectives and capabilities shifted toward offensive options. Throughout the process, other considerations influenced U.S. options in light of available capabilities. For instance, the Iraqis undertook a massive ground reinforcement of their own and prepared defensive positions. Considerations such as the establishment of logistics support and command and control in the theater also affected our options and capabilities.

Figure 2.10 depicts this gradual increase in force capabilities. Even during the movement to crisis in July and early August, some deterrent capability existed, though in conjunction with U.S. declaratory policies it proved inadequate to deter Iraq from invading Kuwait. U.S. naval forces and USAF tankers, which had been deployed in response to a request from the UAE (Operation Ivory Justice), were present in the region. Following the invasion of Kuwait, the rapid deployment of fighter squadrons and conventional B-52s to the region provided a deterrent to the possible movement of Iraq into Saudi Arabia. One can only guess whether the building presence of USAF forces deterred further Iraqi military moves. From mid-August through mid-September, ODS forces achieved the capability to attain air superiority in the region and to blunt Iraq's military capability through a limited air campaign. We believe that a defense with air and light ground forces became feasible by mid-September. This defense would have attrited Iraqi forces at the sacrifice of territory. With the further arrival of ground forces through October, the defensive potential of the allied forces was more fully realized.

Finally, the Phase II buildup beginning in early November assured a successful defense and opened a range of offensive options.

The First 60 Days: What Was Accomplished?

In summary, the first 60 days of dynamic deployment conditions accomplished the following:

Deployed:

- 18 tactical fighter squadrons (TFSs) with 398 aircraft
- 20 B-52Gs
- 99 KC-135 tankers
- 96 C-130 transports
- 31 special operations force (SOF) aircraft
- 20 electronic combat (EC) support aircraft
- 6 KC-10s
- 14 C-12s, -20s, and -21s
- 6 E-3 AWACSs
- 6 EC-130 airborne battlefield command and control centers (ABCCCs)
- Other surveillance and intelligence systems (e.g., TR-1, U-2, RF-4C, Rivet Joint)
- 3 U.S. Army divisions, 3 Marine MEBs, 3 carrier battle groups

Transported on 3839 strategic airlift sorties:

- 123,999 short tons of cargo
- 134,215 passengers

Distributed to deployment bases:

- 21,290 tons of GP bombs, CBUs, AIMs, air-to-ground missiles (AGMs), and guided bomb units (GBUs).

3. Policy

This section identifies and examines political factors affecting USAF activities in ODS. The analysis addressed political factors affecting broad military and USAF strategy, as well as political factors bearing on operational-level USAF activities. More complete information on the Policy team assessment is provided in App. A of Vol. II.

Approach

In planning its approach, the Policy team concluded that relevant political-military issues could be most productively explored by first visiting the Air Force major commands (MAJCOMs) to get the "view from the field" regarding challenges encountered having possible political roots. With this background in hand, the effort would then shift to the policy community in Washington for clarification of these issues and pursuit of a range of other political-military factors confined to and largely resolved within the policy community itself.

The information presented here is incomplete in that it is solely based on discussions with personnel at SAC, MAC, TAC, and the 9th Air Force (Shaw AFB) headquarters, discussions with some members of the Air Staff and other policy community members, and supplementary documents from those organizations. In several cases, information and perspective were provided by a single organizational source and there was limited opportunity to cross-compare for purposes of verification.

Observations and Implications

Movement to Crisis (Mid-July to 2 August) and Predeployment Crisis Action (2 to 7 August)

Until the actual initiation of ODS on 6–7 August, political factors set severe limits on military preparations and available options and were the dominant constraints encountered. These factors played a major role in invalidating peacetime planning assumptions of available warning and deployment time. The types of political constraints faced were rooted in the complexity of events and could not be considered exceptional or, in many respects, preventable. Future contingency planning must have the flexibility to adjust to these enduring

political impediments and the planning uncertainty and constrictions they engender.

In the weeks preceding Iraq's 2 August invasion of Kuwait, there was a pervasive perception both within much of the U.S. policy-making community and among Gulf state leaders that Iraq's hostile rhetoric and military activities represented posturing designed to politically intimidate Kuwait and the UAE. Direct military action by Iraq was viewed as unlikely or was expected to be of a very limited, punitive nature, well short of a major invasion. This perception apparently prevailed virtually up to the 2 August invasion. Consequently, military preparations and actions both by the United States and the Gulf states were extremely limited in scope. While Commander in Chief, Central Command (CINCCENT) expectations of an Iraqi attack were high by the end of July, views among the leaders of the Gulf states make it doubtful that major military preparations could have been made prior to the actual invasion, regardless of the expectations of U.S. policymakers.

Prior to Iraq's invasion, there was considerable division among the Gulf states over the legitimacy of the issues raised by Saddam Hussein in his dispute with Kuwait and the UAE. To this division was added distrust among the Gulf states over the extent to which each could depend upon the others for assistance in the event of a direct confrontation with Iraq. This mixed-motive Gulf-state policy agenda and mutual suspicion, coupled with the perception that Iraq was merely posturing, severely limited the ability of the Gulf states to develop a consensus on unfolding events and to engage in any collective security preparations. The absence of such preparations placed severe constraints on the ability of the United States to provide outside assistance until the invasion occurred.

Prevailing regional politics led the Gulf states to seek an "Arab-only" solution to the July crisis. U.S. intervention, political or military, was widely viewed as detrimental to ongoing negotiations, setting severe limits on the level of political-military cooperation possible with the United States. Iraq reinforced these concerns by verbal assaults linking Kuwaiti and UAE (and later Saudi) defense preparations to efforts to draw in outside powers acting against Arab interests, thereby applying popular political pressure to deter the regimes from doing so. To this was further added the fear of military escalation should Gulf states turn to outside powers, in the process bringing about the very conflict all hoped to avoid.

Regional fears of further antagonizing Saddam or giving credence to his claims of Gulf-state collaboration with the United States curbed what could be done on a cooperative basis. Consequently, the political concerns of the regional leadership

again were key factors in determining the range of available U.S. options and the extent to which U.S. forces could "lean forward," even if greater U.S. expectations of an invasion existed.

Formal JCS-initiated course-of-action (COA) development did not begin until the actual invasion of Kuwait. This delay set severe limits on the extent of preinvasion planning and preparations by the USAF MAJCOMs. The precise reasons for waiting until this time lie beyond the scope of this study. But given the sensitivity of ongoing negotiations, regional resistance to U.S. involvement, and possible fears of further escalation, such a delay should not be considered unusual. Indeed, uncertainties, constraints on action, and delays in planning of the type seen in the Gulf crisis should be anticipated in future crises.[1]

Despite the actual invasion of Kuwait, the Gulf states initially continued to seek a negotiated, Arab solution to the problem without involving direct U.S. intervention. Iraq's assertions of its imminent withdrawal from Kuwait lent further weight to these efforts, as did its threats of the consequences of any outside interference. Key U.S. decisionmakers appear to have decided as early as 2 August that an American intervention was required. The uncertainties over access resulting from these continuing regional political factors limited both deployment planning specifics and expectations of scale, with the critical question of Saudi participation remaining unresolved until 6 August.

Planning uncertainties were compounded by the limited distribution of the 2 August JCS warning order (again, partly due to concerns over political sensitivities surrounding formal military preparations) and its reference to the 1307-88 COAs, suggesting to the USAF MAJCOMs that a limited deployment was foreseen. This expectation apparently prevailed at the USAF MAJCOMs until about 5 August, further constricting the time available to prepare for execution of the 1002-90 CONPLAN. The extent to which CINCCENT and the Commander, U.S. Central Command Air Force (COMUSCENTAF) planned on the basis of 1002-90 from the outset was not adequately conveyed to the supporting commands, with serious planning and initial deployment consequences.

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[1]This view is supported by the decision to place warning order and deployment planning information in compartmented channels (TS/SPECAT or LIMDIS) even after the invasion, in part because of concerns over regional political sensitivities.

Force Generation, Deployment, and Initial Theater Operations (7 August to 7 October)

Strategic access to the Arabian Peninsula was unaccompanied by detailed operational aircraft beddown specifics. Although COMUSCENTAF apparently took a desired beddown list with him to Saudi Arabia on 5 August, specific airfields had to be negotiated on a case-by-case basis throughout the peninsula. While some beddown restrictions and changes were probably linked to evolving CINCCENT priorities, in many cases host nation political factors appeared to be principally responsible. Local political leaders had a say in the decision and timing to use their facilities, and custom required that this issue be worked through personally with U.S. authorities. This process led to deployment planning frustrations and delays already exacerbated by lack of a TPFDL and changing CINCCENT requirements. It appears that gaps did develop between the MAJCOMs' desires to "push" aircraft to the theater and the theater commander's ability to "pull" those forces, again partly due to the political delays imposed on the latter by these negotiations. The need to negotiate also led to the involvement of several U.S. organizations in the process, at times resulting in conflicting signals and misunderstandings as to what had actually been agreed to by host nations.

Acquiring B-52 bomber bed-downs in theater was from the outset a serious problem, largely if not exclusively due to regional political concerns. The symbolism of a nuclear-capable platform or even a heavy conventional bomber proved difficult to overcome, especially when those platforms were to be deployed near the holy site of Mecca. Similar impediments were encountered in Egypt. As a result, SAC was forced to rely on distant locations, further taxing tanker assets and reducing the number of combat sorties that could be generated.

The planning and execution of the deployment of tactical aircraft to Saudi Arabia were conducted almost exclusively according to standard international rules and regulations. USAF tactical aircraft flew "Due Regard" from the Atlantic to Egyptian airspace in accordance with standard rules of international flight. With the exception of A-10s and a handful of other specialized aircraft, virtually all TAC aircraft flew directly from CONUS or Europe to the theater. While the use of nonstop flights was driven by the need to get assets into the AOR as rapidly as possible, it yielded the additional benefit of minimizing diplomatic clearance requirements. The USAF operational flexibility provided by a robust tanker fleet permitted direct flights and thus proved to be a major deployment asset from the policy perspective.

Approval of diplomatic clearances suffered most from the number of taskings and time demands imposed rather than from any fundamental structural flaws. The defense attaché offices at the various embassies and the cognizant offices in Washington were heavily taxed because staffs were not equipped to process requests on the scale associated with ODS. Blanket flight clearances reduced this demand, as did more restrictive but still preferable "same-way, same-day" stream clearances. Countries in the AOR also helped to alleviate problems. On the negative side, frequent changes in the flow schedule led to clearance problems by changing timing or aircraft type, either of which could invalidate a previous approval. In Europe, Spanish sensitivities to the increasing arrival of aircraft in Spain caused some difficulty. Spanish authorities did encounter political opposition to the use of Spanish airfields, and MAC operations at Torrejon were limited to reduce visibility, as were the number of A-10 aircraft that could be on the ground there at any one time.

Host-nation political impediments made it difficult to preposition munitions in theater. No prepositioning of munitions existed in Saudi Arabia for any aircraft. Prepositioned ships carried additional MK-117s but were of little utility. While the United States had extensive prepositioned USAF munitions in Oman, U.S. restrictions stipulate that any munitions not made available to host countries cannot be stored in those countries. Consequently, in the early weeks of the deployment, many preferred advanced munitions were in short supply and had to be brought into the AOR. Apparently none of the USAF prepositioned ships was moved into the theater prior to the deployment order, further exacerbating the munitions shortfall.

Despite joint exercises and other forms of cooperation with various Gulf states, most do not allow the United States to conduct site surveys that would permit the collection of data on what is available at their airfields. Consequently, the United States had very little advance information on characteristics of and facilities available at all but a few of the bases provided for the deployment. In most cases, units knew little about the bases until they arrived at their beddowns. This lack of knowledge proved to be a great handicap to planners, who needed to know what was available at beddown sites to determine what supporting equipment must accompany deploying units. Lack of a formal and stable TPFDL during the early weeks made this information shortfall even more severe in its consequences. If the information was indeed available in the system despite formal political restrictions, it did not get to many users.

The long-term U.S. security assistance programs leading to the development of the extensive basing infrastructure into which U.S. forces deployed must be viewed as a major success. In Saudi Arabia, many facilities are modern and are

built with substantial overcapacity, which was readily exploited by arriving U.S. air forces. Increased security assistance activities resulting from the crisis were of limited utility—U.S. assets were already flowing in and most requested purchases would not arrive for several months or longer even with appropriate approvals, though mechanisms were employed in select cases to expedite the process. Once the surge of host nation requests began, there was also no apparent mechanism for setting priorities in terms of what would best serve the CINCCENT's near-term requirements. There was no peacetime or crisis list of necessary items against which to evaluate the extensive host nation requests. The principal value of surge security assistance was probably in the political leverage it provided in enhancing the access and support provided to the United States by host nations in the AOR.

A critical but intangible benefit for ODS was the network of contacts and personal relations established by in-country security assistance officers (SAOs) over the years. When the crisis occurred, these officers were well placed to assist in expediting the U.S. deployments, a particularly important service given the lack of peacetime agreements with the host countries on crisis procedures.

4. Deployment

This section addresses two areas: USAF airlift and aerial refueling operations in support of the overall deployment of U.S. forces and, more specifically, the issues particular to the USAF units that deployed. The analysis examined the constraints encountered in the ODS airlift operation, with a view toward how the USAF might prepare for future contingency operations. Observations were made on the difficulties of planning airlift contingency operations and on the constraining factors that affected ODS and may affect future USAF operations. More detailed information on the Deployment team analysis is given in App. B of Vol. II.

Background

The airlift operation in support of ODS was the largest such operation ever conducted. The Deployment team analyzed the accomplishments and limitations of the deployment during the initial buildup of forces in the AOR from 8 August until the end of September, at which point the USAF components were essentially in place. During that period, MAC, with its organic airlift and its assigned CRAF, delivered to the AOR an average of 2300 short tons of cargo and 2480 passengers per day over a distance of 7500 nautical miles, which translates to an average of 17 million-ton-miles per day (MTM/d) during the first 60 days of ODS. In contrast, the "Hump" airlift over the Himalayas in World War II operated at a capacity of 0.9 MTM/d, the Berlin airlift of 1948–1949 reached a peak of 1.7 MTM/d with an average of 0.78 MTM/d, the resupply of Israel in 1973 during the Yom Kippur War (Operation Nickel Grass) averaged 4.4 MTM/d, and the more recent Operation Just Cause airlift to Panama reached 2 MTM/d.

Another important aspect of ODS was the mobilization and movement of the many USAF units that deployed to the AOR and bedded down there. A total of 528 fighters, 20 bombers, 96 tactical airlifters, 138 tankers, and substantial special operations assets were among the forces deployed during Phase I of ODS.

Observations and Implications

ODS was conducted with little advanced notice and without an existing TPFDL in its early days. The airlift operations for the early buildup divide into three distinct stages. For the first several days (through about C+5), forces were moved not only with no TPFDL to form the basis for planning and execution of airlift operations, but also with little notice, little information on lift requirements, and no overall concept of the eventual scope of the operation. During the second stage, which lasted until about C+21, the overall scope of the operation was clearer, but there still was no stabilized TPFDL-deployment priorities and requirements changed frequently. In the final stage, starting after approximately three weeks, a relatively stable TPFDL formed the basis for deployment operations, permitting the use of established planning aids. The airlift capacity of 17 MTM/d was, however, below the 23 MTM/d expected using the planning factors found in the congressionally mandated mobility study. That reduction in capacity can be attributed to three types of constraints: planning problems, aircrew availability, and aerial port availability and operations.

Deployment Planning and Planning Aids

The joint community needs to reassess the assumptions underlying the formal crisis action procedures for deployment planning. Only about five hours were available for execution planning at the initiation of ODS. Although the lack of warning time was unavoidable, the detrimental effect on the efficiency of the deployment can hardly be overemphasized. A useful TPFDL did not exist for weeks, and requirements were imprecise and constantly changing. The crisis action procedures need to be rethought with a view toward giving better visibility to requirements and increasing the flexibility of the system.

Many of the problems that arose early in the deployment resulted from unrealistic expectations. The lack of realism partly resulted from the fact that transportation planners were not adequately involved either in the early, close-hold planning of the operation or during the execution phase. As a result, early USCENTCOM requirements requested roughly 200 percent of the available airlift capacity and were not adequately prioritized. Even up to three weeks following the beginning of the deployment, frequent changes in USCENTCOM priorities continued to have detrimental effects on airlift scheduling and the delivery of combat capability to forces in the AOR. A lack of validated requirements and stable priorities precluded efficient use of the available airlift capacity.

Problems also existed at some aerial ports of embarkation (APOEs) in the early days of the deployment. In many cases, MAC generated aircraft faster than the users could generate cargo. This imbalance resulted in underuse of large numbers of aircraft while they waited at APOEs for loads. More realistic planning factors are needed to estimate times for cargo and passenger processing.

In addition to the need for more realism in deployment planning, the data processing systems that support deployment planning and the scheduling of airlift operations for contingencies must be modified to provide the flexibility needed for rapid deployment. Because a stable TPFDL did not exist, MAC could not use its automated flow planner, so all missions had to be planned manually. Much of the problem in establishing a stable TPFDL arose from inadequacies in the then-current version of the Joint Operations Planning and Execution System (JOPES). When changes are made to later versions of JOPES, two items deserve particular attention:

- Procedures should be established to avoid unauthorized and unintended changes in the JOPES data bases. Planners should be able to limit the ability to modify the time-phased force deployment data base (TPFDD) to personnel with responsibility for that unit line number (ULN) and to keep track of who makes changes.
- JOPES needs to be able to track when ULNs are partially deployed. During the first weeks of the deployment, the number of aircraft needed to deploy units was consistently underestimated. For example, the first seven units deployed required 60 percent more airlift than initially planned. As a result, many ULNs failed to deploy all unit assets, and some of the units remained behind. As the system now stands, once a unit has used the airlift assigned to it, the automated systems record its ULN as "closed," even if the unit has more equipment and personnel to deploy. OSD planners had to create special ULNs on the fly to capture the material left behind and schedule additional lift against it. Airlifters had to do all load planning by hand, because these nonstandard ULNs were not in the computerized data bases.

Another area in which deployment planning could be improved is information flows between planners and users throughout the system. Many participants cited overclassification as a problem. The extended close-hold nature of the operation complicated and compressed unit deployment planning in MAC, SAC, TAC, and Air Force Special Operations Command. Classification guidance should be given in the execution orders. USCENTCOM or the Joint Staff needs

to establish DoD activity address codes early on for use by all deploying units of all services.

Receipt of heads-up information by deploying unit commanders through informal channels was critical to meeting deployment dates. Because so little warning was given through the formal crisis action procedures, units started making preparations based on word-of-mouth information.

In the absence of a valid TPFDL, direct communication between MAC and the user was effective in validating requirements and planning the airlift flow. The Requirements Augmentees cell in the MAC crisis action team (CAT), which established points of contact with deploying units, was essential to the planning process in light of the constantly changing TPFDD.

Ad hoc organizational changes were instituted to overcome deficiencies in automated planning systems. JOPES improvements combined with increased user familiarity with both JOPES and the airlift planning system should overcome many of the problems encountered in the transitional period for ODS. Planning staff drawdowns may restrict the use of manpower-intensive workarounds in the future, further increasing the need for flexible automated planning systems.

Airlift Crews

For most of the first 60 days, the primary limiting factor of the airlift operation was aircrew availability. Aircrew availability depends on reserve forces. Despite a high number of volunteers, crew members were rapidly approaching and exceeding their 30-day flying-hour limitations by C+19, even after the limit was increased from 125 to 150 hours. A reserve call-up was necessary if airlift operations were to continue.

The problem was exacerbated by the lack of an in-theater staging base for airlift crews. Because aircrew members could not enter crew rest in the AOR, crews had to be augmented with additional pilots to allow extended crew duty days. This practice used available crew duty time 50 percent faster, which reduced airlift capacity by about 30 percent.

Operational Factors

A number of planning factors were overly optimistic. The allowable cabin loads (ACLs) of C-141 aircraft were substantially less than the planning factors had led the users to expect. For example, change often required users to reconfigure their

loads. The C-141 ACL was limited to 20 short tons by the additional fuel required because of adverse winds and temperature deviations over the Atlantic. Planning factors indicated that at least 26.6 short tons should be available for the distances involved. These factors should be revised using factors based on experience in ODS.

Fighter unit deployments were restricted because access to a tanker base in the eastern Mediterranean was denied. As a result, fuel had to be shuttled from tanker to tanker ("force extend") to get the required fuel to the eastern Mediterranean, reducing the overall refueling capability of the system. By one estimate, this additional refueling effort caused the number of deployable fighter aircraft to drop from 48 to 24 per day. Also, although tanker aircrew availability did not limit operations in ODS, the margin was very slim.

Activation of CRAF Stage I was successful in providing critical augmentation to the MAC airlift fleet.[1] ODS was the first time that CRAF has been exercised in a contingency, and by all indications the system worked well. By the end of September, commercial carriers had flown 498 military missions for MAC. It is not surprising that the same type of problems that plagued the military airlift portion of the ODS deployment also affected the CRAF. During Phase I of ODS, short lead times for mission activation made the efficient use of CRAF assets difficult. Carriers reported that three- to five-day lead times forced them to reassign aircraft from regular flights, producing higher than anticipated costs. The uneven effect of the CRAF schedule demands prevented some carriers from adequately covering scheduled routes and caused them to lose contracts. In effect, carriers that provided the most support were placed at a competitive disadvantage. CRAF assets made an important contribution to the ODS deployment, and MAC representatives were satisfied with the carriers' performance. Periodic meetings between MAC and the carriers were held during the deployment to resolve recurring problems. It is important that the incentive structure remain adequate to preserve this asset for the future.

[1]Aircraft committed to the CRAF are assigned to one or more of the program's three stages. The concept of stages tries to ensure that all activated aircraft will be used productively and that no more aircraft will be called than necessary. Stage I is called by CINCMAC and has up to 40 long-range international aircraft. The Secretary of Defense may activate Stage II, which has long- and short-range international aircraft. Currently, 187 aircraft are committed under CRAF Stage II, but only between 55 and 70 aircraft were used in Desert Storm. The full mobilization of the CRAF would occur with a call-up of Stage III aircraft by the Secretary of Defense after the declaration of a national emergency or war. Aircraft and their crews have 24 hours to report to their mission site in a Stage I or II activation. Stage III, because of the numbers of aircraft involved (506 total), allows a 48-hour response time.

Aerial Ports and Facilities

Access to aircrew staging bases was not the only problem. After the first few days, the limited number of aerial ports of debarkation (APODs) in the USCENTCOM AOR began to restrict the airflow into the theater. The theoretical number of aircraft MAC could have flown into the AOR if not limited by APODs was about 120 per day. During the first six weeks, MAC averaged 76 flights to the AOR per day, of which 50 to 60 went to Dhahran. The maximum on ground (MOG) at Dhahran was further limited by problems associated with a lack of fuel trucks and incompatible fuel equipment. More realistic assumptions are needed about APOD availability for future plans. Thirty-four APODs is almost certainly unrealistic; a goal of 3 or 4 APODs, each with a MOG of 4 to 5, appears both achievable and adequate.

Beyond the issue of access to aerial ports, much has been learned (or relearned) about aerial port operations. Mobile aerial port squadrons (MAPSs) should be sent to man strategic ports initially if there are no strategic assets already in place. A strategic aerial port squadron, which normally would not expect to deploy, did go to Dhahran to set up a strategic port there. Such a squadron, however, depends upon fixed cargo handling and distribution facilities that were not in place at Dhahran at the time. It might have been more effective to man Dhahran with one or more MAPSs for an interim period, since MAPSs deploy with mobile assets and would have been an advantage in the initial stages of the operation as cargo started flooding into Dhahran. Such a concept would have helped prevent the huge backlog that developed there.

Material handling equipment (MHE) was a critical resource and a limiting factor at a number of ports. The MAC MHE is quite old. In contrast to the good supply of aircraft parts, MHE parts were not well funded and were in short supply. As early as C+7, shortages of MHE due to breakdowns were being reported. On C+8, the commander of airlift forces in the AOR cited MHE availability as the constraint limiting the MOG at Dhahran. Aerial port personnel state that they were doing well if 50 percent of their MHE worked. The wide-body elevator loaders (WBELs) used by MAC for loading commercial cargo aircraft and KC-10s were also in short supply. Moreover, because they were designed to be air transportable, they were not sturdy enough to withstand continuous heavy operation.

A shortage of 463L pallets, nets, and tie-down devices rapidly developed at APOEs. This shortage occurred because of a delay in the backflow of this material from the AOR, caused primarily by its use for other purposes within the theater. Extremely close monitoring of this equipment, along with stepped-up

production by the Air Force Logistics Command, kept this problem from becoming a limiting factor. A larger contingency stock of these items is probably needed for future operations like ODS.

ODS showed that deployment is a complex process and that each component of the system is important to the efficient operation of the whole. Plans must be timely, accurate, and well communicated to the participants. Aircraft and ground equipment must be ready, maintained, and positioned where needed. Crews must be available in the numbers needed to fly the aircraft, operate the aerial ports, maintain aircraft, and run the command posts. Above all, well-trained and dedicated people are required to make it all work.

Future Contingencies

Some problems that did not occur during ODS but may occur in future contingencies were identified. One major uncertainty is the future of the C-141. The aircraft performed extremely well at high-use rates for extended periods. However, one cost of ODS was a substantial reduction in the remaining flying hours for the airframes. The Air Force will need to reexamine the life expectancy of the C-141 fleet and determine how it affects the C-17 delivery schedule.

MAC aircraft achieved high rates of operational readiness throughout the operation, mainly because of the large supply of replacement spares that was purchased during the 1980s. This supply has now been substantially depleted and will have to be replaced if future airlift operations are going to have a similar maintenance performance.

While CRAF proved successful, problems encountered in the activation and operation of CRAF need resolution to ensure availability in the future. It is necessary to provide sufficient incentive for the carriers to commit their aircraft to Stages I and II. In these lower stages, carriers are concerned about losing market shares to nonparticipants. In addition to contractual problems, which led to the loss of up to half of the anticipated business for MAC, there may be problems because some carriers decide to limit participation in CRAF. Another serious problem for the future of CRAF is the projected shortfall in long-range, wide-body airframes. With the move toward hub-and-spoke systems since airline deregulation, most domestic carriers are procuring short-range, narrow-body aircraft instead. Incentives are needed to ensure that the United States will continue to have available the wide-body passenger and cargo aircraft for future contingencies.

Despite the enormity and intensity of the aerial refueling task during the first 60 days, SAC aerial refueling operators were able to provide every scheduled refueling. However, had the deployment been required to proceed faster, refueling capability would have been degraded.

Major en route airlift bases in Western Europe, preferably on the Iberian Peninsula, are critical to mounting and sustaining a large airlift operation to the USCENTCOM AOR. Initially, the airlift operation made use of Torrejon and Rhein Main air bases. Later, the operation grew to use the full capacity of these bases, plus Ramstein and Zaragoza. Not only is access required to bases with sufficient runways and ramp space, but also needed are loading docks, fuel hydrants, buses, trucks, MHE, and facilities for command and control, billeting, flight planning, and maintenance. These facilities must be exercised and "warm" to be ready to support such an operation. With our access to Rhein Main and Torrejon almost certainly disappearing, we must find other facilities or adjust our planned response time to any future contingencies.

5. Operations

This section describes the objectives and approach of the Operations team in assessing some USAF activities in the USCENTCOM AOR during the first 60 days of ODS. It also contains a set of summary observations and implications. The complete assessment appears in App. C of Vol. II.

Objectives

The basic objective was to assess potential USAF combat capabilities in terms of deployed aircraft and munitions during August and September 1990 in the event hostilities had broken out in this period. We also examined EC capabilities, the evolution of operational plans and priorities, numbers of aircraft on ground alert, daily sorties flown in the AOR, training activities in the AOR by each wing, reported aircrew proficiency before and after deployment, and air base operability (ABO).

In addition to the limitations discussed in Sec. 1, our effort was further restricted because there was no actual combat or experience in the AOR on which to base estimates of combat power.

Important topics not considered because of limited access and the limited availability of resources for this assessment included

- Plans for offensive and defensive air operations and for SEAD.
- Capabilities for attacks against Iraqi logistics installations, air bases, and strategic targets.
- Attrition of USAF aircraft.
- Operations of USN and USMC aircraft and allied air forces.
- Operations of tactical airlift and tankers in the AOR.
- Deployments and activities of SOF aircraft.
- Special plans.

Deployment and operation of reconnaissance aircraft, E-3(AWACS)s, Joint STARSs, and EC-130E(ABCCC)s are discussed in Sec. 6.

Approach

The fighter and bomber deployments and munitions available during August and September 1990 at each deployment base have already been described. From these and estimates of aircraft munitions loads and sortie rates, estimates were developed of potential USAF A/A and A/S capabilities during this critical period. For each day, the total kill potential of all the munitions available at each deployment base was estimated, as well as the antiarmor, point target, antipersonnel, antitruck, and antiradar damage that could have been done by the deployed aircraft if hostilities had begun on that day.

These "potential" capability estimates are simply additional measures of the aircraft and munitions deployments in that they reflect the quality of the deployed force in relation to various targets. They do not reflect actual wartime capabilities, because they do not include degradations for aircraft attrition, attacks on air bases that would reduce sortie generation, C3 and IFF (identification, friend or foe) problems, weather and environmental effects, mission aborts, target location and acquisition difficulties, uncertainties in weapons effects, target overkills, and countermeasures. Quantification of these degradations requires much more analysis than was possible in this limited assessment. Furthermore, such an analysis should involve a complete theater war simulation in which all air, ground, and naval forces are considered. Thus, the potential capabilities presented here can be thought of as the theoretical upper bounds on actual USAF wartime capabilities.

A summary assessment of potential USAF A/A and A/S combat capabilities in four periods was also made. It reflects all of the activities considered. The periods were 11 to 16 August (C+4 to C+9), 17 to 28 August (C+10 to C+21), 29 August to 9 September (C+22 to C+33), and 10 to 30 September (C+34 to C+54).

Observations and Implications

The observations and implications arrived at regarding USAF activities in the AOR from C-day to C+54 deal with

- Initial deployments and capabilities.
- Squadron and force readiness.
- Aircraft basing and ABO.
- Munitions availability.

- EC capabilities.
- Potential USAF A/A and A/S capabilities.

Initial Deployments and Capabilities

Table 5.1 shows the initial deployments of various fighter, bomber, and EC aircraft. It also shows their capabilities. By C+8, 20 B-52Gs had deployed. Eight more were to have deployed, but bed-down arrangements could not be worked out. By C+29, 18 TFSs with 398 fighters had deployed. And by C+39, 19 EC jamming aircraft had deployed. This completed the first phase of the USAF ODS deployments. High-level decisions determined the schedule of these deployments. USAF units could have deployed much faster if all U.S. mobility assets had been available to move them.

Squadron and Force Readiness

Specific capabilities were nominally available within a few days after the deployment times shown in Table 5.1. However, in most cases they were limited by the munitions the aircraft deployed with. Fighters began local orientation flying and training two to six days after they arrived. The B-52Gs flew their first sorties eight days after the first bombers arrived. The intervening time was spent resting aircrews, getting squadron units organized and settled on the base, placing aircraft on ground alert, and preparing the aircraft and crews for the commencement of flying.

Table 5.1

Initial Deployments and Capabilities

Days After C-Day	Aircraft	Capability
2	5 AWACSs and 45 F-15Cs	Air defense
4	44 F-16Cs	A/S day
5	19 F-15Es	A/S day/night
5	7 B-52Gs	Strategic bombing
10	20 F-4Gs	SEAD
13	46 A-10s	Close air support (CAS)
14	18 F-117As	GBU delivery/designation day/night
14	3 EC-130H(CC)s	Communications jamming
17	8 EF-111s	Radar jamming
18	18 F-111Fs	GBU delivery/designation day/night

Integrated package training did not start until C+32, after all the fighters and bombers and all but one EC aircraft had deployed. By that time, all the units were flying at about their normal peacetime sortie rates, if allowances are made for aircraft on ground alert. By C+54, a wide variety of joint and combined training exercises had been carried out, all the TAC squadrons were C-1 (i.e., fully mission capable) for training, and most had maintained their graduated combat capability (GCC) training levels and goals. Thus, the force was ready for offensive as well as defensive operations.

Aircraft Basing and Air Base Operability

The ODS deployment benefited greatly from the well-developed air base infrastructure in the countries of the AOR. Many of the bases have hardened, dispersed, revetted, and air-conditioned aircraft shelters that are large enough for more than one aircraft. Even so, the facilities available were not sufficient for all the fighters that deployed. As a result, large numbers of fighters and all the larger aircraft and helicopters were parked in the open, where they could be damaged by air, missile, or terrorist attacks. This possibility, even though very small, warrants more concern than appears to have been given to the protection of these aircraft. Dispersal, overhead cover, concealment, and measures to direct the attack away from the aircraft should be employed to the extent possible. Revetments placed side-by-side will not protect aircraft from CBU attacks. Additionally, concentrations of personnel in tent cities are attractive targets for air and sapper attacks.

The air bases in northeastern Saudi Arabia and Bahrain also faced the possibility of attacks by ballistic missiles with conventional and chemical warheads. Conventional warheads were not much of a threat because they are small and not very accurate. Chemical warheads were a more serious threat because they could disrupt air base operations. Personnel could not carry out their duties for long when wearing the standard chemical ensemble in the hot, humid environment of the ODS AOR.

Terrorist attacks were judged by Air Force intelligence to be a threat at all bases with U.S. aircraft in the event of hostilities. In view of the uncertainties that existed regarding Hussein's intentions during the first weeks, it appears that additional security police for base security might have had a higher priority in the initial deployments.

Although more secure from attack, the aircraft on the seven fighter bases in Bahrain, Qatar, the UAE, Oman, and southwestern Saudi Arabia were too far from Iraq to reach targets there on unrefueled roundtrip missions. Only the

A-10s could operate without aerial refueling. Thus, most aircraft needed aerial refueling for roundtrip missions. To provide enough tankers for all aircraft in the AOR, 91 KC-135 tankers also deployed by C+39.

Munitions Availability

Munitions had been prepositioned at three sites in Oman, on Diego Garcia, and on three ships. These stocks included large numbers of older, conventional munitions. There were no A/A or A/S missiles. However, the fighters deployed with full loads of AIMs. The F-4Gs also brought high-speed antiradiation missiles (HARMs), and the F-117As and F-111Fs also brought munitions.

For the seven tactical fighter squadrons (two F-16Cs, one F-15E, one F-4G, two A-10s, and one F-117A) that deployed by C+14, additional A/S munitions arrived at their bases within a few days of the arrival of the first aircraft. In contrast, for the F-111F and three F-16C TFSs that deployed to three bases after C+14, additional A/S munitions did not arrive for about two weeks. By the end of September (C+54), there were adequate weapon loads for all aircraft.

Electronic Combat

As shown in Table 5.1, it was not until several weeks that the full panoply of USAF EC assets—F-4Gs, EC-130H(CC)s, and EF-111s—was available in the AOR. There were multiple loads per deployed F-4G. With these ARMs, the F-4Gs had the potential to damage many of the surface-to-air missile (SAM) fire control radars possessed by Iraq. The antiradar damage potential would not reach the total number of these radars until later.

Chaff and flares for aircraft self-protection always lagged the arrival of the aircraft during the first month of ODS. Furthermore, the total number of chaff and flare loads per aircraft lagged the total number of A/S weapon loads per aircraft for the F-15Es and A-10s through September and for the F-16Cs through August.

Potential Air-to-Air and Air-to-Surface Capabilities

As noted above, "potential" A/A and A/S capabilities are simply additional measures of the aircraft and munitions deployments in that they reflect the quality of the deployed force in relation to various targets.

The First 10 Days. Two carriers arrived in the AOR within two days of the Execution Order. They provided an initial air defense capability, but were limited by range from sustained offensive operations. Within 38 hours of the initiation of Operation Desert Shield, the first USAF fighters were ready to commence combat operations in theater. By C+4, two F-15C, two F-16C, and one F-15E squadrons had arrived in the theater. These aircraft deployed with air-to-air missiles and provided an effective air defense capability in the early days. USAF and Navy aircraft operating in conjunction with deployed AWACS possessed the potential to engage and destroy over half of the Iraqi offensive air threat in less than a week. The deployability of air-to-air fighters, AWACS, and the forward presence of carriers provides the potential to establish a successful air defense within days.

The capability of air-to-surface forces was limited by munitions availability in the first 10 days. After the arrival of five squadrons and the carriers in the first five days, there was a short delay in the arrival of additional fighter squadrons. During this period airlift priority was shifted to move the 82nd Airborne Division and the C3I assets. The only addition to the air combat force during this period was the deployment of B-52s. Twenty B-52Gs were bedded down in Diego Garcia by C+9. Each aircraft had a full load of bombs, but their sustained combat capability was limited by the availability of munitions loading crews.

17 to 28 August (C+10 to C+21). The air component of the forces in the AOR rounded its capability during this period with the arrival of two A-10, one F-117A, one F-111F, and an F-4G Wild Weasel squadron. These additional forces provided a capability to conduct long range precision weapon delivery, defense suppression, and close support operations. The arrival of munitions for the forces that had previously closed added to the overall force potential. Training missions increased over this period, but limitations on low level flying, simulated weapons deliveries, and supersonic flight constrained the realism of training mission.

17 August to 9 September (C+22 to C+33). From the beginning of this period until 5 September, the remainder of the USAF fighters that were deployed in Phase I of Desert Shield arrived in the theater. This force consisted of 18 fighter squadrons with 398 aircraft. By C+33, the air-to-air kill potential of the forces in the theater was greater than the total Iraqi air force. The daily anti-armor kill capability had increased to over 1000 combat vehicles. The precision attack potential had increased to 250 point targets. Finally the defense suppression forces had the potential to damage over one half of the Iraqi SAM fire control radars.

10 to 30 September (C+34 to C+54). By the end of September, a balanced force capability existed for the Air Force and realistic training in the theater was well underway. Aircraft, munitions and accompanying defensive equipment were in place at the respective bases, and a tactical airlift fleet was operating in the AOR to move any needed equipment around from base to base. As we shall see in the next section, during this period, the C3I network also reached operational status. The necessary elements to conduct an integrated air campaign had come together by the end of September. By this time it is likely that the air component together with light ground forces could have conducted an adequate defensive operation while the heavier ground forces were closing by sealift.

6. C3I

This section summarizes observations on the C3I system used in support of ODS. A more detailed discussion of these observations and a narrative account of C3I activities appear in Appendix D of Volume II.

Objectives

The objectives of the C3I team were to

- Collect information on the performance of reconnaissance, surveillance, target acquisition intelligence, data processing, and communications systems and architectures in supporting ODS.
- Document limitations and inadequacies.
- Identify workarounds, innovations, and other approaches taken to improve performance.
- Identify ways to improve performance in future programs and plans.

The team focused on the performance of command and control systems supporting force employment, specifically Air Force missions of defensive counter-air, offensive counter-air, air interdiction, and CAS. Other functional teams addressed command and control issues concerning the deployment of aircraft into theater and logistics support (see Secs. 4 and 7).

Observations and Implications

The Air Force ODS C3I system had to be built essentially from scratch in theater, and connectivity had to be quickly established with rear commands and supporting agencies in CONUS. U.S. forces on the Arabian Peninsula faced an Iraqi threat that was in many ways nearly as well equipped as the Warsaw Pact, especially in terms of air defenses, ballistic missiles, fighter aircraft, and heavily armored ground forces. Many USAF C3I systems were developed for conflicts involving the Warsaw Pact. Those systems also offered considerable capability for countering the Iraqi threat and were integrated into the ODS C3I system. ODS pointed out the importance of lightweight, transportable, airborne, and

space-based C3I assets for rapidly building a C3I system, and the importance of interfaces for quickly integrating U.S. and allied forces.

The major observations concerning the challenges of deploying and integrating a multinational C3I system from scratch in a theater of operations are described in the following list. These factors are then developed in the remainder of this section.

- ODS proved taxing to Air Force C3I assets. A large majority of the USAF's combat communications units and all computer-aided force management system (CAFMS) units were deployed. In addition, developmental and prototype one-of-a-kind equipment was used. In the event of an additional contingency, these units and equipment would not be available or would have to be drawn out of Saudi Arabia. These problems arose from the prior lack of a command and control infrastructure in the USCENTCOM AOR and should be considered in future force sizing decisions.
- ODS illustrated the value of airborne command, control, and reconnaissance and surveillance aircraft and satellite-based systems. Particularly in the early stages of the deployment, airborne systems such as the AWACS formed the nucleus of a command and control system. Satellite systems were relied on for communications and other support. At the same time, ODS illustrated some problems, specifically the lack of a real-time moving target tracker against ground targets, capacity and coverage limitations of collection assets, and the need for more self-deployable air command and control systems. Some of these surveillance shortfalls were alleviated by deployment of the only two experimental Joint STARS aircraft now in full-scale development.
- Communications systems were overloaded, particularly in the early stages of the operation. Although a modern commercial communications infrastructure was available and appears to have carried a significant fraction of military communications in Saudi Arabia, especially in the first weeks of the operation, military communications systems are still essential. However, many existing tactical communications systems—including tactical circuit switches, super-high frequency (SHF) satellite terminals, and high-frequency (HF) radio quick reaction packets (QRPs)—are relatively heavy and bulky when compared to modern commercial communications gear. Many of these systems did not arrive in theater until two or sometimes three weeks after C-day. The delay in deploying communications systems illustrates the need to reduce the size and improve the performance of Air Force satellite communications terminals, terrestrial communications and switching systems (TRI-TAC AUTODIN and AUTOVON switches), and defense-wide long-haul communications.

- Large-scale deployment in ODS was feasible in part because of the large air base structure in Saudi Arabia. However, even though this region had been a focus of national security interest for some time, the Air Force found its existing data base on facilities and geography in the region to be inadequate. This was true for mapping, charts, and geodesy (MC&G) data, such as basic maps of the region, and for air base information. In some cases, air bases used in the deployment were not in the airfield identification file (AIF), complicating the deployment. The necessary data on air bases resided in the personal knowledge of officers familiar with the region, but that knowledge was not readily accessible to the deployed units. This knowledge and access to it should be improved for future contingencies.

Air Force Intelligence Units

USAF intelligence units worked to connect operational users with intelligence sources. In many cases, this task required the intelligence community to overcome and find solutions to communications and computer interoperability problems. Systems were fielded to broadcast intelligence derived data to wings, the Tactical Air Control System, the Army, and the Navy. Production of the Tactical Digital Facsimile (TDF) was accelerated to ensure commonality of equipment for dissemination of secondary imagery. These proved success stories in their own right but also pointed out the need for an integrated architecture for disseminating intelligence products with direct connection to user systems. Specific needs are for linking intelligence sources with mission support systems and the air surveillance picture, linking sensor data collectors with in-theater processing.

Role of Commercial Systems

Commercial communications systems played an important role in ODS. When used with STU-IIIs, they provided quick secure access from Saudi Arabia to headquarters in CONUS. With the advances in commercial communications, the Air Force should exploit commercial capabilities in future contingencies. This attempt should be tempered by possible legal and technical performance problems (particularly commercial communications susceptibility to electronic countermeasures [ECMs]). However, new commercial equipment, particularly Motorola's Iridium system, could play a major role in supplementing military communications in future contingencies.

The need for quick MC&G and target material production stressed military data collection assets. LANDSAT and SPOT were contracted to supplement military systems and provide much of the wide-area coverage used to support the creation of maps and target materials. DoD space policy should explicitly include the use of these systems and should encourage the development of future U.S. systems to replace LANDSAT.

Use of Developmental and Early Production Equipment

Developmental and early production equipment played an important role in linking the command and control system. Many elements of the C3I system used during Desert Shield/Storm were primarily designed to operate in the NATO theater. Ground stations and downlinks were built to feed several fixed ground stations. There are many examples of taking developmental and test bed systems to link surveillance and reconnaissance systems to the ground environment in the AOR. These examples illustrate how the acquisition community can respond to needs by pushing systems forward. A system to formalize this process of matching developmental systems with user needs could ease the process in the future. Care must be taken, however, to consider supportability in deciding whether a system is worth the cost of early fielding.

Multinational Operations and Interoperability

Multinational operations may be the norm in future operations, particularly large ones. ODS allied the United States with some nations not normally considered to be allies, such as Syria. Conducting multinational operations had some tangible benefits beyond the ability to use other nations' forces. For example, other nations had systems which proved useful early in the deployment and during the war like the Saudi AWACS and a number of British and French subsystems. In other ways, the multinational coalition complicated operations, such as the lack of interoperability in communications, the need to deploy tactical control parties (TACPs) with the ground forces of other nations to conduct CAS, and the need to coordinate air operations with the liaison officers at the Tactical Air Control Center (TACC). However, U.S. national policy will likely emphasize these types of operations in the future. The Air Force should actively develop a knowledge base of the technical capabilities and operational concepts of potential allies, develop plans for operating with the forces of potential allies, and train personnel for those operations.

In addition, where feasible, other countries should be encouraged to develop or purchase systems that are interoperable with U.S. systems. Currently,

interoperability with U.S. systems is not a requirement for U.S. Foreign Military Sales (FMS) programs. The Air Force and DoD may wish to review FMS policy with regard to interoperability requirements. Ensuring interoperability may take extensive negotiation with the National Security Agency (NSA) and foreign governments. However, with due attention paid to cryptographics, U.S. systems should remain safe from hostile foreign exploitation as crypto keys and equipment need only be shared on a case-by-case basis. However, data-link standards and similar communications standards could be released to friendly foreign governments when U.S.-made C3I systems are purchased. A concurrent U.S. investment may be needed, particularly to maintain interoperability as U.S. standards change.

CONUS-Based Support

CONUS-based headquarters provided invaluable support to ODS, particularly during the early phases of the deployment. Because of the size of the deployment, organizational relationships and functions dynamically changed to meet needs. Some key observations concerning these headquarters and agencies were as follows:

- Contingency plans need to be flexibly constructed to account for a wide range of conditions. These plans need to consider explicitly the capabilities of host nations to support (or not support) U.S. operations. While this may seem an obvious point, it was clear that in ODS many aspects of the existing plans required modification to meet conditions. Incorporation of a wider set of potential assumptions (e.g., concerning warning time and the lack of a full reserve call-up) and a more readily available data base on host country assets (e.g., airfields, terrain, maps, communications systems) would aid future contingencies.
- USCENTAF Rear functions overwhelmed the USCENTAF staff remaining at Shaw AFB. These functions shifted to the TAC battle staff, which controlled the deployment of forces into the theater. This organization, along with its assets and staff expertise, could form a model for future large-scale contingencies, its location determined by the then-current requirements.
- Intelligence support to ODS, particularly generation of target materials, was complicated by the shifting target list and its classification. The target list was generated by the National Command Authority, not USCENTCOM. Target material production was eventually coordinated by the Defense Intelligence Agency (DIA), which allocated targets to available production centers. This organization may prove to be a model for future contingencies,

especially if targets are chosen at the highest command levels because of political sensitivity.

- (Long-haul communications networks were flexibly restructured to support ODS needs. Both military and commercial communications systems provided invaluable support. However, problems were encountered with communications satellites—both with the satellites and ground terminals—in terms of availability and capacity. Those problems point out the need for DoD to develop a program for replacement of the military COMSAT that takes into account the need for global tactical communications for contingency operations far from CONUS or Europe. The development of alternative military satellite communications systems to provide high-capacity long-haul communications should be explored.

7. Support

Current combat support concepts focus on deploying peacetime units with high levels of readiness and sustainability, where *readiness* is the ability of a combat unit to mobilize, deploy, and execute its initial combat missions, and *sustainability* is the ability to continue carrying out those missions for a prolonged period. From a support point of view, this ability requires developing and maintaining trained personnel, equipment (including aircraft), material, communications, organizations, and procedures in peacetime, and mobilizing and deploying those resources in wartime.

This section outlines the objectives of the Support team and summarizes its major observations and their implications. Appendix E in Vol. II contains further details.

Objectives

The Support team focused on the central issue facing any assessment of a contingency response: determining whether the resources delivered were adequate and effective enough that the force could begin immediate effective operations, continue those operations, and perhaps intensify them until it achieved its assigned objectives. Implicitly, such an assessment has to recognize that the transportation system cannot move everything at once—i.e., that choices have to be made, and that effective choices move those personnel, equipment, and material that provide the greatest boost to meeting the contingency objectives. Thus, all resource moves, whether deployment or sustainment, should move needed rather than unneeded resources and should maintain an *objective-driven* mix of resources in theater at all times.[1] Just as important, such an assessment should recognize that some of the needed resources may already exist where they are needed and that any resources deployed to meet one contingency would limit the ability to meet another.

Ideally, one would simply compare the full range of available resources to the resources judged necessary to achieve the military objectives and assess the

[1]The analysis explicitly assumed that different military objectives require different resource mixes, including support personnel, equipment, and material, as well as specific weapon systems. For example, deployments into a hostile region might require more security police, deep penetration raids would require additional fuel, etc.

adequacy of the available resources over time. However, the fact that ODS military objectives were neither constant nor explicitly stated during the critical early phases of the contingency made such a simple, direct assessment impossible and senseless.

More troublesome was the fact that hard data about the quantities, location, and condition of resources (other than aircraft and munitions) moved to ODS destinations were unavailable. Without access to more complete theater asset data or even deploying resources data, it was not possible to assess directly and independently whether sufficient resources were deployed or whether the balance of those resources was adequate.

Consequently, secondary sources of information about ODS support performance were concentrated on—primarily interviews with personnel recently returned from theater or who had participated directly (i.e., in command/control or physical mobilization support) in providing CONUS-based support to units deploying or already in the theater. In contrast to the excellent detailed aircraft and munitions data available to the Operations team (see Sec. 5), the evolution of USAF support assets in ODS could only be drawn from indirect evidence, such as sudden changes in command/control priorities or deployment schedules, effects of deployments on residual units, past support experiences, and comparisons of actual events with expectations.

Observations and Implications

Five broad observations emerged from the analysis of data gathered in the interviews:

1. Combat support command and control played a critical role in both the deployment and sustainment phases.
2. The deployment introduced imbalances in support resources for the units left behind, but those imbalances were corrected over time by the CONUS support system.
3. Recent Tactical Air Force Electronic Warfare support initiatives probably improved readiness and sustainability in ODS, but there was a potential for undetected degradations in those critical subsystems as the deployment wore on.
4. The Saudi Arabian military and economic infrastructures played a critical role in making it possible to deploy and operate such a large force in such a short time.

5. From the relatively low number of unexpected environmentally induced support problems, it is reasonable to assume that the current policy of making first-line USAF weapon systems available to selected countries helped to make it possible to deploy and operate an effective force in this different physical environment.

The implications drawn from the observations were as follows.

By some measures, the units deployed were richly endowed with resources. War reserve spares kits (WRSKs), in particular, were filled and enhanced (beyond the notional "requirements" level) to the point of cannibalizing aircraft left behind to provide protection against potential demands in the AOR. Known good aircraft and ECM pods were selected for deployment. Test equipment and other support equipment were likewise selected and enhanced. Even so, problems were encountered that required substantial real-time logistics command and control corrective actions to resolve. Specifically, several important resource imbalances occurred during the initial deployment period that would have limited the forces' ability to respond effectively. Once those imbalances were recognized, the logistics, command and control (Log C2) system, centered in theater at USCENTAF and in CONUS at USCENTAF Rear (located at TAC headquarters), reacted quickly to remedy the limiting resource shortfalls. Other imbalances occurred that probably did not threaten the units' combat capabilities, but that illustrate the ability of a strong support command and control system to detect and correct imbalances.

Also observed was a marked initial decrease in the readiness of units left behind. Not only did the deployment degrade the residual units' ability to reinforce ODS operations or to support another contingency, it also degraded their ability to train the remaining aircrews. Training sortie rates dropped an average of 35 percent during the month in which the five TAC F-15/F-16 units deployed forces to ODS. The limited data available indicated that residual elements of early-deploying units rebounded somewhat in the first month following the deployment. In addition, later deploying units (those deploying after the first month of ODS) did not encounter such a deep reduction in sortie rates. Much of this recovery can be attributed to improved depot support, as early deploying units took much of their available material with them (sometimes cannibalizing aircraft in the process), and the depot filled not only the resulting holes but the WRSK for the units that were selected to deploy later.

Two recent USAF peacetime support initiatives arising from the Coronet Warrior series of exercises substantially improved the effective readiness of electronic warfare (EW) subsystems, both on board the aircraft and in the EW pods. The

first initiative resulted in passive tests of EW receiver equipment with a "hat check" that stimulates the EW detection gear. The second initiative requires active elements in flight, but this procedure results in a loss of security. Continuing in-theater hat checks probably maintained high performance levels in the passive detection subsystems, but the lack of an effective, secure range in theater might have been expected to lead to a degraded active capability.

The force relied heavily on Saudi Arabian resources and prepositioned USAF resources to support the deployment. While initial squadrons reportedly deployed with full-scale deployment packages for bare base operations, later squadrons reportedly were given only a fraction of the airlift to support such a deployment, so they needed to select their deploying resources carefully in light of the available resources already in theater. For two units, USAF F-15 aircraft engines and avionics were maintained in part by Saudi personnel. For other units, jet engine intermediate maintenance was performed using the QUEEN BEE concept at U.S. Air Force, Europe (USAFE) main operating bases. Moreover, the availability of a rapidly developing economy smoothed the road for many support functions. Some personnel were housed temporarily in commercial hotels, and contracts were written and implemented for transportation, civil engineering, fuel, and other life-support needs. As important as the resources themselves, the Saudis' practiced ability to negotiate and implement a Western-style contract greatly speeded up the access to local resources.

Finally, there was a second benefit to continued military relationships with potential allies: the opportunity to operate U.S. weapon systems in environments other than the temperate climates typically available in CONUS. Such relationships with the Saudis probably overcame at least one often-mentioned early support problem prediction: that there would be many USAF fighter engine failures due to operating in a sand-laden environment. For several years, the Saudi Arabian Air Force has operated the F-15 with one of the same engines (F-100) used by the deploying USAF forces. They had discovered that an interaction between their calcium-loaded sand, the engine inlet temperature, and the temperature of subsequent engine stages caused a glaze deposit in the engine, leading to reliability problems.[2] This problem was resolved by a combination of engineering improvements and tactical flight adjustments over the last decade. Without prior foreign military sales to the Saudis, this avoidable

[2]This sand differs substantially from desert sand in the U.S. Southwest, so the problem was not detected during CONUS operations.

problem probably would not have been recognized, and the force deployed to ODS might have encountered substantial difficulty maintaining high readiness throughout the prolonged deployment.

8. Manpower and Personnel

The successful deployment and employment of forces depends, in part, on the accurate identification of the manning required to perform the missions, the provision of the required numbers of each type of person, and the ability to account for those personnel. This section summarizes the results of the Manpower and Personnel team's interviews with Air Force personnel, highlighting both successes and problems in achieving these important functions. Further details are contained in Appendix F of RAND Note N-3427-AF.

Objectives

The analysis focused on the processes of determining and providing the required number of personnel and the accounting for them, identifying key successes and problems. Two types of problems were identified: those that affected the ODS deployment and those caused by the deployment that may affect the ability of the Air Force in future deployments. The implications of those problems for legislation, policy, and execution are discussed.

Observations and Implications

ODS occurred in the midst of a drawing down of the active Air Force and potential restructuring of the Air Force active/reserve balance. This operation was the first important functional test of the DoD Total Force Policy since its conception in 1973. Observations from this deployment should inform discussions of the active/reserve balance. The Air Force seems to have had no significant problems integrating Air Reserve Forces with the active component. Further, Air Reserve Forces required no additional training to perform their missions.

Nothing was found in the manpower and personnel area that prevented or impaired the ability of the Air Force to carry out its mission. Although the interviewees told of many problems and improvements to the system, they spoke of no important cases of inappropriate manning or difficulties with satisfying manpower requirements with trained personnel. As discussed below, there were significant problems in accounting for personnel, although even those problems did not appear to have immediate consequences for Air Force capabilities.

Successes

Mobilization of Reserve Units by UTC. Prior to ODS, mobilization planning of Air Reserve Forces was by unit identification code (UIC). No plans existed for separate mobilization of subelements of UICs, which are identified by unit type codes (UTC).[1] However, for ODS the Air Force found it advantageous to mobilize by both UICs and UTCs. This appeared to be an effective strategy. (Some personnel data system problems caused by mobilizing by UTC are discussed below.)

Volunteerism. The very high volunteerism rate among Air National Guard (ANG) and Air Force Reserve (AFR) aircrews supported a high-flying optempo in airlift and air refueling. The volunteerism was especially valuable in the interim before President Bush invoked the 200K reserve call-up (10 U.S.C. § 673b). There was extensive volunteerism among non-flight-crew reserve personnel as well.

The deliberate planning process should recognize the probable existence of reserve volunteers in the early stages of a contingency. This consideration would allow for the establishment of guidelines for each mission type that would determine when reserve volunteers should be sought, thereby allowing a smoother inclusion of reserve volunteers with the active component. In ODS, volunteer flight crews could have been used even more extensively in the earliest days and would have decreased flight crew fatigue.

Family Support. Family support centers existed at most bases or were quickly established. Family support centers established programs for information dissemination and rumor control about deployed family members and for information about services available to dependents, including special services established for ODS. The Air Staff surveyed family support centers to document special programs and use for ODS.

Problems Affecting ODS Deployment

Legal and DoD-Level Policy Issues. Three sections of public law relating to the ODS call-up of reserves needed clarification:

- 10 U.S.C. § 673b (Selected Reserve: order to active duty other than during war or national emergency—"200K call-up").

[1]Deployment planning is by UTC, however.

- 10 U.S.C. § 673c (Authority of President to suspend certain laws relating to promotion, retirement, and separation—"stop-loss").
- 50 U.S.C. § 501 et seq. (Soldiers' and Sailors' Civil Relief Act).

Because ODS was the first important reserve call-up since the passage of § 673b, several important issues were raised regarding the call-up and the involuntary extension of service of military members. These issues included the question of what constituted a "unit," when the 90-day period of service begins, and whether a unit released before completing 90 days of active service could be called up again. There was a question of whether § 673c applied to reserve members who were not on active duty. Finally, there was confusion about whether the Soldiers' and Sailors' Civil Relief Act covered reserve personnel who volunteered for active duty as well as those involuntarily called up.

On legislation critical to mobilization, the text of important laws, legal interpretations, and explanations in lay language need to be made widely available. Also, the many useful interpretations of the 200K call-up that have been drawn from ODS should be incorporated into policy.

Uncertain and Fluctuating Manpower Requirements. Manpower requirements in the AOR were changing on a daily basis as of mid-December 1990. For at least the conventional bombing mission by B-52s, this change was due to the absence of previously developed and agreed upon manpower documents. If hostilities had commenced, units may have had to operate with inappropriate skill mixes of personnel.

The ODS deployment highlighted the need for more flexible manpower documents. Generic manning documents for varying numbers of deployed aircraft by geographic region and documents for varying levels of base operating support should be established.

Tracking Personnel. There were several problems related to accounting for deployed personnel. First, the involuntary recall of reserve personnel to active duty by UTC required extensive personnel data system (PDS) workarounds. Second, because there was no automated way for the classified personnel data required during a deployment to interface with the unclassified systems, there were inconsistencies in data bases used to account for and control personnel. Third, there may be shortcomings in the training of the wartime skills required of the personnel readiness staff in consolidated base personnel offices (CBPOs). Finally, the classified computer data system used by PERSCO teams in the AOR to process and track personnel was inadequately documented, difficult to use, and malfunctioned in the desert environment.

Problems related to UTCs and to the communication between classified and unclassified systems were well recognized, and some corrective actions were initiated by the Air Force. The Air Force should examine the wartime skills training of CBPO personnel and determine whether it should be augmented or special skill identifiers developed for specialists in personnel readiness skills. The Air Force should improve the documentation for the classified personnel tracking system and examine the training of CBPO personnel for this system.

Conflicting Taskings. ANG aeromedical evacuation units being activated received conflicting taskings from MAC and the National Guard Bureau (NGB). Taskings from MAC were by UTC, specifying only the numbers and skills of personnel required. Taskings from the NGB were for specific individuals and did not necessarily correspond to the numbers and skills tasked by MAC. The number of deploying ANG units surveyed was not enough to determine if this problem existed outside the aeromedical evacuation units.

This problem may have arisen because of the lack of procedures for managing the reserve call-up by UTC. It seems that the MAJCOMs initially directly tasked units rather than going through the ANG contingency support staff. The ANG saw two problems with direct tasking: The MAJCOMs might not know the readiest units, and the ANG would not find out who was actually deployed. However, it was not clear why the NGB should be better informed about unit readiness than the gaining MAJCOMs. More investigation is required to reconcile conflicting information from units and the NGB.

Volunteerism Not Uniformly Beneficial. Apparently, some reservists in support skills (e.g., intelligence, security police) volunteered for fairly short tours in CONUS and in the AOR, entailing temporary duty (TDY) costs with insufficient benefit. Too heavy an emphasis on volunteerism may present problems because of the more frequent rotations among volunteers. Gaining commands should consider establishing tour length standards appropriate to the contingency and to the mission or tasks assigned to the volunteers. Also, drawing volunteers from several units, either to augment an existing unit or to man a deploying UTC, can degrade the capabilities of the units from which the volunteers are drawn. The advisability of drawing volunteers in this way should depend on predicted requirements for all the affected units.

Medical Planning. The Air Force Surgeon General's office feels confident that the Air Force met its medical requirements both in personnel and equipment. However, as of mid-December, the Army reportedly had a shortage of medical equipment and facilities in the AOR. This shortfall could have implied significantly increased demands on Air Force medical facilities in the AOR in the

event of hostilities. Because long evacuation flights would be problematic for unstable patients, it would be valuable to have more closely located contingency hospitals. Air Force policy is that wounded personnel are not moved unless in stable condition. Thus, without the Army's contribution of medical equipment, more people would die.

Problems Affecting Future Deployments

Reenlistment and Cross-Training. Ordinarily, first-term enlisted personnel who plan to reenlist are required to apply for career job reservations and, if desired, cross-training into a new primary Air Force specialty code during a narrow time window. Personnel in the AOR are currently not permitted to apply for cross-training. There are two potential problems with this policy. For the Air Force, this policy could result in inadequate post contingency cross-flows into undermanned specialty codes. For individuals, it may generate ill will toward the Air Force; viz., those who are undergoing the most arduous assignments are being denied an opportunity available to others. The Air Force should allow application for cross-training and make provisions for the cross-training upon return from the AOR.

Pay Problems. As of 24 August 1990, most active enlisted personnel deployed to the AOR lost their basic allowance for subsistence (BAS) payments. The reason for this loss is clear, but the consequence was a reduction in pay that hit younger airmen with families especially hard. Personnel are now authorized additional pay such as hazardous duty pay, overseas duty pay, and family separation allowances. But in the early stages of ODS, many personnel took a cut in pay when deployed, forcing some families to seek welfare assistance. Such a situation generates ill will and may have consequences for future retention.

Potential Reserve Recruiting and Retention Problems. Even in the absence of hostilities, ODS resulted in a variety of especially negative consequences for some reservists and their employers. These include lost income and benefits, civilian job concerns, and credit problems. While these factors had no effect on the ability of the Air Force to perform its ODS mission, they may affect recruiting and retention.

The most significant problem was (and will be) lost income. Many reserve personnel suffered large losses in family earnings as a result of their participation in ODS because their military pay was significantly less than their lost civilian earnings. Income problems particularly affect doctors, despite Congress's recent increases in medical special pays and liberalization of eligibility rules. DoD should consider establishing and subsidizing an income insurance fund for

reserve personnel. Individuals would contribute to the fund during peacetime to partially or completely insure against income loss during mobilization.

There were no manpower and personnel showstoppers in ODS, and the Air Reserve Forces contributed significantly to the fulfillment of the Air Force's mission. The high flow of qualified prior-active-service personnel into Air Reserve Force positions is a major contributor to reserve component readiness. Should specific missions be assigned exclusively to the Air Reserve Forces, this cross-flow could not occur. The consequences of ODS for reserve recruiting and retention should be key inputs into active/reserve balance decisionmaking.

9. Strategic Reserve

The national military strategy is designed for fighting multiple regional conflicts. It was thus deemed appropriate to closely examine the level of commitment during ODS and subsequently identify the remaining forces available during ODS to constitute a "strategic reserve." More details on this subject are provided in Appendix G of Volume II.

Background

A critical element of strategic planning within a contingency-oriented defense context is the available U.S. strategic reserve capabilities. The roles and functions of the strategic reserve are to

- Maintain an adequate base to deter potential opportunistic aggressors and permit the United States to meet other possible contingencies.
- Permit the United States to reinforce the primary contingency.
- Enable the United States to maintain a proper rotation base and training infrastructure during a contingency.
- Provide a nucleus for any subsequent force structure expansion or reconfiguration the United States may elect to undertake because of a particular crisis or for other reasons. Such an undertaking may involve mobilization of new units or redesign of forces.

Historically, the strategic reserve has been viewed in somewhat narrow terms, chiefly as a consequence of the global containment orientation of U.S. strategy in the Cold War era. In that framework, it was generally presumed that the United States would mobilize and commit most of its forces to several theaters (but especially Europe) to meet the threat the Soviets and their allies could bring to bear in simultaneous attacks. Under those circumstances, the strategic reserve was viewed in operational terms, revolving mainly around the availability of residual or mobilizable forces to reinforce U.S. force packages for forward theaters.[1]

[1]In early 1968, for instance, in the wake of simultaneous crises in Vietnam (Tet) and Korea (the *Pueblo* incident), the JCS, surveying worldwide obligations and forward commitments, recommended that the nation mobilize more than 200,000 reservists to fill out the strategic reserve that had been

But in the emerging strategic environment of the 1990s, the prospects for coordinated multitheater attacks by U.S. adversaries seem greatly reduced. Moreover, the dissipation of the traditional threat and declines in the overall size of the U.S. posture rule out the design of interlocking force packages and the emphasis on forward deployments that served to dedicate various components of the total U.S. posture to specific regions. New strategic realities also dictate that the United States be ready to confront relatively unpredictable and possibly undeterrable aggressive behavior in unusual scenarios and be willing to accommodate more strategic and operational uncertainty as it plans. In such respects, ODS seems an excellent prototype of the strategic problems with which the United States may increasingly find itself concerned.

It seems prudent, then, to view the strategic reserve problem in a richer context. Given the requirement to deploy uncertain force and support elements to forward theaters on short notice, to what extent should we retain military options to meet other possible contingencies that might erupt concurrently, either by chance or as a result of a local aggressor's calculation that the United States lacks the capability to respond effectively to a second contingency? Recent draft strategic guidance expected to form the core of U.S. contingency planning in the future takes the following approach to this question. Under this guidance, the United States would be prepared to meet two major regional contingencies.[2] The combat forces available for meeting two major regional contingencies should be capable of fighting simultaneously, but because of deployability constraints, they would not be deployed as total force packages at the same time to meet contingencies.

Key Strategic Reserve Lessons from ODS

ODS forcefully highlights certain critical aspects of U.S. planning inasmuch as this contingency raised important questions about the nature of future force structure, not to mention the options for meeting extra-USCENTCOM requirements. These lessons are striking in the case of ODS, and they seem even more noteworthy given force structure changes projected for the future. Stated simply, the key strategic reserve lessons deriving from ODS are as follows:

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severely depleted by Vietnam requirements. The President declined to act on this recommendation, mobilizing instead only 2 Army National Guard infantry brigades and some 12 USAF tactical fighter and reconnaissance squadrons.

[2]In addition to such preparations to meet major regional threats, there is a requirement for a mobilization capability to deal with residual Soviet reassertion (to be met primarily from some Guard and Reserve elements and establishment of new force structure), plus the need to maintain forces for continuing nuclear deterrence and various low-intensity-conflict and other special requirements.

- After Phase I, the USAF possessed the largest number of combat units available to meet possible concurrent contingencies.
- After Phase II, the USAF had virtually the only residual means for a U.S. response in major force on short notice to a significant contingency arising elsewhere. In a longer mobilization scenario, various active and reserve elements could be mobilized and deployed from both the USAF and other services to meet other obligations. But for rapid deployment, only the USAF could be thought of as being able to commit large-scale forces to, say, a Korean emergency, were that to have emerged as a possibility as ODS continued.
- The USAF has shortfalls in various elements of its combat posture that would affect options in a second major contingency. However, potential shortfalls in lift, combat support, and logistical capabilities are potentially much more serious than combat force structure deficiencies. Specifically, limitations on tankers, C3I, and defense suppression assets would constrain the ability of USAF forces in a second contingency.
- Projected force structure changes over the period FY 1991–1997 could cause some of these problems to evolve from matters of concern to issues of critical strategic vulnerability. In effect, one can meet a very large contingency (such as ODS) and still have some substantial residual capability remaining (some of it rapidly deployable, as with the USAF; other parts of it less so) given a 1990 force size. With a mid-1990s posture, U.S. options become substantially more constrained.

Quantitative Evaluation of Reserve Situation

The first step here is to briefly review the availability of combat force to ODS in light of the larger question of available strategic reserves. There is no formal force-structure-related definition of strategic reserve. However, historically, the U.S. Army's CONUS-based force structure has never been allowed to dip below six active divisions. This approach has assumed the requirement to maintain forward deployments—a requirement that, in the case of Europe, was substantially violated in ODS. Even so, the following assessment is revealing.

USAF Tactical Force Availability

Table 9.1 compares USAF Tactical Air Force (TAF) deployments in support of ODS with the worldwide total force structure in terms of tactical force squadron equivalents (TFSEs). It shows the TFSEs prior to ODS, after Phase I deployment,

Table 9.1

USAF Tactical Forces Available After Phase I and II Deployments[a]

Type Aircraft and Component	Summer 1990 TFSEs (Worldwide)	TFSEs Left After Phase I Deployment	Percentage of Original Total	TFSEs Left After Phase I Deployment	Percentage of Original Total
CAS/BAI[b]					
Active	11.5	7.5	65	6.8	59
Reserve	16.3	16.3	100	15.5	95
Total	27.8	23.8	86	22.3	80
Multimission					
Active[c]	28.5	21.5	75	18.5	65
Reserve	16.5	16.5	100	14.8	89
Total	45.0	39.0	87	32.3	72
Air superiority[d]					
Active	18.1	15.1	84	13.1	72
Reserve	3.0	3.0	100	3.0	100
Total	21.1	18.1	86	16.1	76
Long-range attack[e]					
Active	10.8	7.0	65	4.0	37
TOTAL					
Active	72.4	53.1	73	45.3	62
TAC	(34.8)	(20.0)	(58)	(17.8)	(51)
AFE	(25.3)	(20.8)	(82)	(15.2)	(60)
PAF	(12.4)	(12.4)	(100)	(12.4)	(100)
Reserve	25.8	35.8	100	33.3	93
Total	108.2	88.9	82	78.6	73

[a]In 24 PAA TFSEs.

[b]Less F/A-16; excludes OA-10.

[c]Includes 18 PAA F-16 Aggressors (CC); includes squadron from 401 TFW at Incirlik.

[d]Assumed that two Bitburg TFSs deploy in Phase II, one to Saudi Arabia and one to Turkey.

[e]Excludes Phase II F-117As drawn from training forces if necessary; includes F-111Es in Turkey.

and after Phase II deployment. The data are broken down into five mission categories:

- CAS/BAI
- Multimission
- Defense suppression
- Air superiority
- Long-range attack

Table 9.1 shows those USAF TAF elements *not* deployed; these constitute, in effect, the reserve available for continuing deterrence in other locales and for defense and reinforcement in other theaters if a substantial contingency were to erupt elsewhere during any phase of ODS. Thus, after Phase II deployment:

- Pacific-oriented forces remained intact.
- Forces in Europe were drawn down from a level of about 25 TFSEs to 1 of about 15 TFSEs.
- The CONUS active reserve posture about halved in size (34.8 to 17.8) after Phase II.
- Available ARF combat components were reduced by about 10 percent (35.8 to 33.3).
- The entire CONUS strategic reserve (active and reserve components together) declined from a total of 70.6 TFSEs to a post–Phase II deployable level of 51.1 TFSEs. The latter value still represents a considerable portion (almost three-fourths) of the total homeland-based fighter-attack force at the disposal of the United States. It is sufficient to deploy a full northeast Asia reinforcement package, fully replace force drawdowns in Europe, and still provide a residual of roughly 10 tactical fighter wings (TFWs) equivalents for allocation to other security problems.
- Stretched relatively thin were two categories of aircraft, both of which exist entirely in the active component: defense suppression (e.g., F-4G) and long-range ground attack capabilities (e.g., F-111, F-15E, F-117A). The residual force of both fell below half of the pre-ODS level.

Table 9.1 shows that the USAF contribution to the overall U.S. strategic reserve—whether this is defined as forces not committed to the ODS contingency, active forces remaining in CONUS, or active plus reserve forces remaining in CONUS—is substantial. In an extended crisis scenario (one that involved, say, a resurgent Soviet threat or the eruption of third or subsequent contingencies, there are non-TAF tactical assets available to the United States for emergency commitment, including about 11.5 TFSEs of fighter aircraft (active and reserve) assigned to air defense duties, some 30 TFSEs of aircraft in the training or combat development base,[3] and roughly 24 TFSEs in the "overhead" inventory (this constituting combat- or training-coded aircraft not counted in PAA, but rather earmarked as attrition fillers, logistics pipeline aircraft, etc.).[4]

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[3]I.e., coded TF (training force) or CC (command coded); both active and reserve, and both MFP I and II.

[4]In addition, it should be noted that, just as USAF tactical combat elements can deploy rapidly into the theater, so too they can presumably move out of it relatively quickly. This presumably would be especially the case with respect to those USAFE deployed units, given the proximity and extensive support remaining at those home bases. Moreover, the USAF retains various trainer, observation, and other aircraft that could presumably carry out limited tactical operations.

ODS Commitment of USAF Support Forces

The TFSs and bombers deployed for ODS represent the visible portion of the Air Force's combat capability. By viewing the strategic reserve that the Air Force possessed during ODS in terms of fighter squadrons alone, one is left with an optimistic picture, except for the heavy commitment of long-range tactical airlift, the air refueling force, EC aircraft, and essential combat support assets associated with reconnaissance, surveillance, command, and control.

Strategic and Tactical Airlift. The ODS airlift operation was the largest in history. During the first month of ODS, virtually all of the combat capability arrived by airlift. This required a total commitment of the airlift fleet and CRAF Stage I. Seventy to 75 sorties arrived in the AOR daily on the average. This involved approximately 60 percent of the strategic airlift on any single day through mid-September and for the period from the Phase II buildup through the beginning of war. On the whole, 75 to 80 percent of the airlift fleet was committed to ODS. The remainder of the fleet was involved in "essential" airlift tasking to other regions or in maintenance. Therefore, from the beginning of ODS, the strategic airlift force was essentially totally committed, with little capability to support another contingency.

Tactical airlift is important for intratheater force and logistics movements. These assets are especially important in large underdeveloped regions like the USCENTCOM AOR. With the in-theater assets taken into account, 128 of 306 PAA active and ARF C-130E/H aircraft were deployed to the theater at the end of Phase II. This number represents 42 percent of the modern C-130 force.[5] If C-130s stationed outside the AOR that were used in support of ODS were included, the figure would certainly exceed 50 percent of the force. This is a substantial force commitment, which is noteworthy considering the extensive role played by Air Reserve Force units in tactical airlift (a role projected to grow in the future). For tactical airlift, like other elements of the combat support forces, the level of commitment exceeds the percentage of combat units involved with an accompanying lower strategic reserve.

Tankers. Tankers for air refueling were critical for all phases of this operation. They were involved from the outset, when two tankers were dispatched to the region in July 1990 as part of Ivory Justice. Because of the large distances in the USCENTCOM AOR, air refueling was necessary for almost all air operations. Air Force tankers supported not only USAF sorties but also the Navy, Marines,

[5]Excludes 40 older C-130A/Bs scheduled for near-term retirement.

and coalition air forces. Further, they were essential to support unit deployments to the region.

The level of tanker commitment varied as the operation progressed. Even in early August, 15 to 20 percent of the total USAF tanker force were deployed and operating in support of ODS. Additionally in this early period, another 20 percent of the tanker force (approximately 120) were used to support unit deployments. Nevertheless, through the outset of the war, the tanker force had enough reserves that there was little effect on the ability to cover SIOP commitments.

The maximum level of commitment of tankers occurred later in Desert Storm, when 262 KC-135s and 46 KC-10s were deployed and operating in support of forces in the conflict. This constituted about 45 percent of the total tanker force.

Electronic Combat, C3I, and Reconnaissance and Surveillance Aircraft

While the USAF possessed sufficient fighter aircraft to respond to another contingency, there were limitations in several critical support areas. Currently, the airlift fleet can only support one major contingency at a time. Tankers, EC assets, and the airborne platforms that provide reconnaissance and surveillance for the C3I system and perform vital command and control functions were heavily committed to ODS, and priorities would have had to be evaluated if another contingency had occurred.

Strategic Reserve Contributions: U.S. Ground Forces

Army and Marine Corps force availability (and hence strategic reserve potential throughout ODS) was also considered, using the same sort of portrayal. Table 9.2 shows the Army and USMC ground combat forces. The percentage figures shown are those Army and USMC active and reserve forces available for deployment elsewhere.

Table 9.2 shows that

- The Army Phase I deployment for ODS amounted to roughly one quarter of the active Army posture. Of the remaining forces not committed to ODS (of 40-1/2 brigade equivalents), roughly two-thirds (26 other brigade equivalents) was deployed forward. Thus, the reserve available in the U.S. active posture might be considered as low as one-quarter (14.5 brigade

Table 9.2

Army and USMC Forces Available After Phase I and II Deployments

	Brigade Equivalents Available (Summer 1990)	Percent Remaining	
		After Phase I	After Phase II
ARMY UNITS[a,b]			
Active	54	75	54
Forward based[c]	(26)	(100)	(65)
CONUS based	(28)	(52)	(43)
Reserve	53	100	94
Total	107	87	74
USMC UNITS[d]			
Active	8	70	44
Forward based	(3)	(48)	(63)
CONUS based	(5)	(62)	(34)
Reserve	3	100	50
Total	11	76	45

[a]In addition, three ARNG heavy brigades mobilized in light of ODS requirements but were not available for deployment in time for the 15 January 1991 United Nations deadline. In addition, ARNG/Reserve forces (brigades in ARNG divisions) and separate brigades/regiments, including those with roundout missions, consisted of 27 light units and 23 heavy units (total ARNG/Reserve force consisting of 53 brigade equivalents).

[b]Includes brigades in divisions and separate brigades and regiments; includes 75th Ranger Regiment; excludes other SOFs.

[c]Includes some nondeployable theater defense-type brigades; 2nd Infantry Division counted as three brigades. Includes forward brigade equivalents of CONUS-based divisions; counts forces in Alaska and Hawaii as forward units.

[d]Because of the relatively greater speed with which USMC reserve battalions can be mobilized, USMC deployment doctrine, and the use of these battalions as components of larger forces (e.g., separate major formations), the reserve component elements of the USMC force are included.

equivalents) of its total worldwide strength (if other forward deployments were off limits for redeployment) or as high as three-quarters (if any forward unit other than one in ODS could be redeployed).

- After the Phase II Army deployment, however, which nearly doubled the committed Army force (much of it coming from Europe), the Army's available active strategic reserve in fact declined to something on the order of 54 percent, again depending on what is meant by *strategic reserve*. Leaving aside certain theater defense units (e.g., the Berlin or Panama brigades), units undergoing deactivation or major reconfiguration, forces in the process of deactivating, and minimal forward based forces (units in Korea, Japan, and residual forces in the Federal Republic of Germany), a maximum available strategic reserve for the Army would probably represent no more than one-fourth of the *active* pre-ODS force structure (or 28 percent if three activated ARNG brigades are included).

- After Phase II, a large residual (50-brigade) reserve component existed, but the lead times and other issues involved in activating, readying, and deploying those forces constrained their availability for a rapidly evolving contingency. Forward includes forces based at Okinawa and Hawaii; also includes forward forces afloat, including one battalion deployed to Philippines and one offshore Liberia under Sharp Edge.
- Of particular interest is the depletion of available heavy forces and the depletion of a forward theater (Europe) to provide reinforcements for another contingency. Almost 60 percent of the Army's active heavy brigades worldwide were directly committed to ODS.
- The USMC was more or less fully committed to ODS. The residual USMC force not deployed to ODS was probably the smallest it could be to (1) maintain a commitment to Northeast Asia; (2) maintain a cadre base for possible further mobilization; (3) provide limited rotation options for forward forces. Unlike the Army, the USMC could only be expanded by the number of reservists not already called (only about 1-1/2 infantry regiments), so any new Marine force structure would almost certainly have required mobilization of new units.
- Moreover, given various constraints on force support, aviation, and related support assets, the USMC was probably about as forward deployed in ODS as was possible.[6]

Air Force, Army, and Marine Corps Strategic Reserve Observations

Table 9.1 presented the residual force equivalents for both the active and reserve tactical forces before ODS Phase I deployment and after both Phases I and II. It shows that after Phase II, 73 percent of the U.S. TAF combat units remained uncommitted, over half of which were assets assigned to the active force. Table 9.2 presented ground force equivalents for both the Army and the Marine Corps at the three time points used for Table 9.1. In the case of the Army, 74 percent of the original force had not been committed to ODS, about one-third of which were active forces. In the case of the Marines, of the 45 percent of its force that was not committed to ODS, slightly less than half were active forces.

Figure 9.1 displays these results. It also shows that the Air Force and the Army had about the same percentage of residual forces, but the Marine Corps was more heavily committed. Most important is the fact that a large percentage of

[6]Norman Polmar, *The Ships and Aircraft of the U.S. Fleet*, U.S. Naval Institute Press, 14th edition, 1987, pp. 22–23.

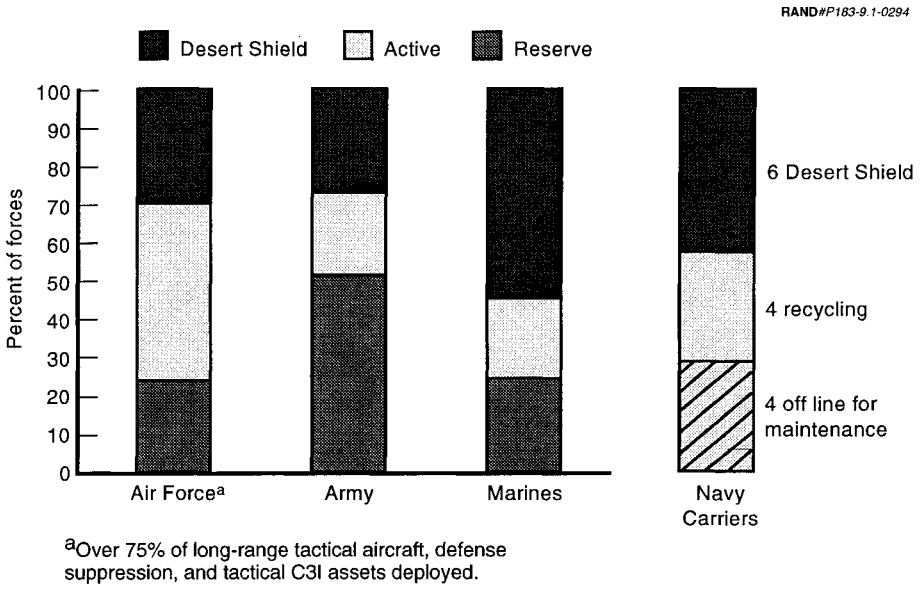

Figure 9.1—Deployed and Residual Forces by Service

the remaining Air Force capability was in the active force. The Air Force residual force (strategic reserve) represents the most readily available strategic reserve.

Navy Strategic Reserve Contribution

Navy strategic reserve estimates are more difficult to calculate, mainly because of the flexibility of naval force organization and the constant rotation of units. It should be noted that the Navy also can maintain various deployments or expand the scope of its operations more than basic planning factors might indicate by limiting its normal peacetime deployment tempos. Finally, Navy forces are not generally theater forces in the same sense as theater air and ground forces maintained by the Army, USAF, and USMC, creating an apples and oranges problem when it comes to comparing naval and theater force "reserve" potentials.

As a measure of Navy force availability in ODS, carrier deployments over the ODS crisis were evaluated. Based on various estimates and news media accounts, Table 9.3 shows that with six carriers on station for ODS, the USN was limited in its ability to respond to a second contingency. The options for meeting any other contingency would have been to interrupt a recycling schedule or to

Table 9.3

Month-by-Month USN CVBG Status During ODS

Carrier Status	Jul 90	Aug 90	Sep 90	Oct 90	Nov 90	Dec 90
Total CV/Ns	15	15	14[a]	14	14	14
Off line (SLEP/RFCOH/ Overhaul)	5	5	5	5	5	5
Deployable[b]	10	10	9	9	9	9
Recycling	7	6	4	4	3	3
Deployed ODS (incl. Med.)	0	3	3	3	3	6
En route to ODS	0	1		1	2	0
Returning from ODS	0	0		1	1	0
Forward deployed/ deployable	3	0	0	0	0	0

[a]Forrestal off line (to AVT) permanently.

[b]Possibly available for other contingencies. Not shown in forward deployed column as such, however. Deployable includes CVs deployable under emergency circumstances only.

swing an ODS-tasked carrier out of the region.[7] Even so, the timeliness of any such response would be questionable. As the Navy posture declines through the 1990s, meeting even a three-carrier forward deployment for a contingency like ODS will be increasingly difficult.

Strategic Evaluation of Aspects of Reserve Problems Suggested by ODS

In light of the foregoing, the following conclusions were reached about the USAF contribution to the nation's strategic reserve:

- After both deployment phases of ODS, the USAF represented the largest number of combat units available to respond rapidly to an emergency in some other region.
- As the posture shrinks in the 1990s, the relative importance of the TAF to the strategic reserve may increase, even though the TAF will itself be declining dramatically in numbers.
- U.S. TAFs can undertake a limited deployment to a second theater with the aim of deterring aggression or meeting certain defense requirements without placing the same enormous demands on U.S. strategic mobility assets as ground forces.

[7]Under the circumstances, the Navy would probably have elected to draw a deployed ODS-tasked carrier for any such assignment, even one that had come to the end of its normal six-month operational rotation.

- Given today's posture, U.S. TAFs can readily meet a host of strategic reserve requirements; in the future, this margin of safety will decline significantly. Therefore, readiness and sustainability measures (including measures to exploit the potential of the non-PAA components of the TAF posture) need to be explored to make possible the most effective deterrent and combat potential from a reduced force structure.
- Because of the speed with which they can deploy, U.S. TAFs can be withheld from a theater until more or less the last moment (as was the case with ODS Phase II deployments). In effect, they continue to serve as a strategic reserve force until they begin such deployments. The USAF should, however, ensure that the planning and other systems, not to mention training support, exist to reconfigure rapidly the operational potential of units shifting from one theater to another.
- Certain deficiencies exist in combat forces (long-range ground attack and defense suppression) and elements of the C3I system, and future force planning should specifically address these issues (to include both pertinent USAF initiatives for projecting such power, perhaps including strategic bombardment options and unmanned systems).
- U.S. planners should think specifically of ways in which air power can, probably in conjunction with non-U.S. ground forces, achieve strategic objectives in second theaters pending the arrival of substantial second-contingency (including Guard and Reserve) Army ground forces.
- For many reasons, it is important for the United States that contingencies be resolved as quickly as possible. The longer a contingency goes on, the more the strategic reserve would be needed as a rotation and mobilization base (and the less it could be thought of as a pure combat-oriented reserve).
- Of course, tactical air power cannot serve as a direct substitute for ground forces or maritime power. It is constrained by various operational and other limitations (access to bases, availability of munitions, communications, logistics support, and lift). As forces are reduced, the United States will rely on Air Reserve Force components. But to the extent that the USAF maintains a quick-responding balanced force structure able at the very least to blunt a possible enemy attack and, in any case, to signal U.S. determination to defend actively a forward theater, the responsiveness of the USAF is a vital component of the overall U.S. response menu, particularly in the new arena of rapidly evolving and unpredictable regional contingencies.

10. Summary Observations on the Planning and Execution of ODS

ODS represents an important transition for the Air Force. For over 40 years, the Soviet Union and its client states have been the principal threat dominating defense planning and force structure requirements. Even when the Soviets were not directly involved, the possibility of Soviet action elsewhere or behind the scenes to exacerbate the crisis weighed heavily on the available courses of action. ODS differed dramatically.

As is evident in the description of the movement to crisis and the buildup of combat power in the region, the situation was dynamic and difficult to predict. The political context within which the crisis unfolded was primarily responsible for both the strategic and operational conditions under which ODS was initiated, setting the stage for many of the difficulties the Air Force faced once the decision to act was made and the execution order was issued. An already challenging operation required extensive adaptations to compensate for the situations caused by the conditions that led to its initiation.

The existing plans did not exactly match the actual situation. A USCENTCOM OPLAN was oriented toward a Soviet invasion of the region. A new USCENTCOM CONPLAN was in draft form and did not have an accompanying TPFDL. Additionally, the planning factors built into the plans did not match the conditions under which the operation was actually conducted. The plan assumed more strategic warning, more rapid activation of reserves, and greater access to the Civil Reserve Air Fleet. On top of this, basing uncertainties and changing priorities in response to developing needs in the theater complicated an already formidable task. It is not surprising that plans did not match actual conditions, but despite a less than ideal set of starting factors, the operation was initiated quickly. The existing plans formed the basis for the actual deployment. Exercises, knowledge of the plans and region (it has been estimated that about two-thirds of the personnel involved in the actual deployment planning were "experienced"), and limited preplanning as the situation unfolded prepared individuals for the task at hand. The key element in the execution of the initial phase of ODS was that resourceful, dedicated people starting from the foundation established by imperfect plans used their experience to make things work.

Rapidly developing crises with plans that do not quite fit must be generally considered normal and will almost certainly be more characteristic of the security challenges of the future. Therefore, flexible force packages, exercises, and tools that permit ordered modification of plans will have value for future contingencies.

Deployment Observations

The airlift operation to deploy and sustain the forces for Phase I of ODS was the largest such operation ever conducted by the United States. Between 7 August and 30 September, 123,999 short tons of cargo and 134,215 passengers were transported to the AOR using C-5s, C-141s, C-130s, KC-10s, and civilian aircraft (CRAF and volunteer). The average daily deliveries to the AOR were 2285 short tons of cargo and 2486 passengers. The average airlift flow of 17 MTM/d exceeded the peak of Operation Nickel Grass, the resupply of Israel during the Yom Kippur War, by over a factor of three. Nevertheless, planning rates used in studies for airlift requirements were not achieved.

The lack of a validated, stabilized TPFDL in the first three weeks of the deployment prevented planners from executing an efficient airlift flow plan, and the automated data-processing (ADP) systems that support deployment planning were new, difficult to use, and could not handle the changing priorities. JOPES had recently been introduced and the system was not complete. Many users were unfamiliar with JOPES use, procedures, and protocols, and some were not part of the system when ODS started. During Phase I, protocols for changing the JOPES data base were not able to prevent unauthorized entries, and the system had to be manually frozen and adjusted. Also, the system did not accommodate partially delivered UTCs. Appendix B, Volume II, details the problems encountered with ADP systems for deployment and airlift planning. Flexible ADP is a necessity for the development of efficient airlift scheduling.

Even with ADP support that can operate in a dynamic environment and accommodate flexible force packaging, important real-world constraints will always be present and will bound the delivery capacity of the system. For the early part of ODS, airlift was restricted to one APOD (versus the assumed figure of 34 in OPLAN 1002-88). This constraint reduced the daily arrival of airlift into the theater from a practical level of 120 sorties to about 70. Furthermore, there was no staging base for airlift crews in the AOR. As a result of this limitation, MAC had to fly sorties into the theater with augmented crews (three versus two pilots). This requirement was a factor in restricting aircrew availability and is

estimated to have reduced airlift capacity by 30 percent in the critical early days of the operation.

Aircrew availability was the bounding constraint on the delivery of forces to the AOR in the early phases. As a consequence, MAC initiated the first request to activate a reserve call-up at C+10. Volunteer reserve aircrews alleviated aircrew availability constraints, but a call-up was nevertheless necessary to sustain orderly, high-rate airlift operations. In the future, an increasing proportion of the airlift force is programmed to be placed in the reserves. For contingencies like ODS, effective use of reserve volunteers and flexible call-up means may be needed to reduce the constraints on airlift crew availability.

The aging C-141 fleet performed well in ODS. The investment in spare parts over the past decade sustained the airlift flow and mission-capable rates of these aircraft through Phase I of ODS. The performance of the C-141 fleet was not analyzed beyond Phase I, but the effects of sustained high sortie rates on these aircraft and the life of the fleet should be analyzed. The ability of the C-141 fleet to perform in the future could be reduced by ODS.

Torrejon and Rhein Main air bases handled over 80 percent of the airlift for Phase I of ODS. These bases possess an established infrastructure well-suited for high-tempo airlift operations. They have large ramps, adequate refueling capacity, cargo docks and handling equipment, an airlift command and control, and crew rest facilities. Current plans call for these bases to revert to host nation control in the near future. Without these bases, the ODS deployment would have been more difficult and slower. En route staging bases are necessary for contingency operations. As the U.S. forces are drawn down overseas, consideration must be given to the effect of the loss of en route bases with an established, accessible infrastructure for airlift operations.

C3I for Contingencies

A C3I system is essential for the conduct of sustained joint operations. ODS presented a set of unique C3I challenges that may occur in future contingencies. These challenges seem increasingly likely to be the norm in the future in light of the changing world.

Most of the planning for large-scale U.S. military operations since World War II has been oriented toward areas in which an Air Force command and control network was already in place, or it assumed that if the Air Force had to respond to an emerging crisis, there would be time to build up the C3I system. For example, the canonical Central European scenario involved a rapid buildup of

forces, but NATO has a well-developed, interoperable command and control network. Korea and Panama also possess developed C3I networks.

ODS was different. The USCENTAF staff moved forward from Shaw AFB to the AOR on the first day of the crisis and subsequently set up operations. Only a few usable assets were present in the theater. The physical assets that made up the C3I network therefore had to be moved into the AOR. A timeline of the C3I buildup is shown in Section 2. Some elements of the air defense network were in place as a result of the FMS program, but they were not all interoperable with USAF systems. The modern telecommunications network in the region facilitated the establishment of the C3I system and reduced the load on military communications systems. The use of STU-III secure telephones and small computers accelerated the process and aided early operations. Many innovative means had to be employed to integrate reconnaissance and surveillance assets into the C3I network. To link the system together, a majority of the USAF tactical communications assets were committed to the theater.

ODS presented a number of problems in the fielding of Air Force C3I systems. Such problems, caused by the uncertainties implicit in contingency operations (such as the location, threats, and allies), complicated the planning for deployments and the development of the necessary systems to construct a C3I structure. One of the success stories of ODS was the reaction of the Air Force acquisition community in the quick and flexible acceleration and development of systems to support the command and control structure. This process was exemplified in the Rapid Response Program, in which user needs were quickly evaluated, prioritized, and assigned to relevant program offices. This process should be formalized to match developmental systems with user needs for future contingencies. Care must be taken, however, to balance supportability with user needs.

The need to provide C3I for ad hoc coalition forces is a significant requirement. The Air Force provided some C3I assets for allied forces in ODS. USAF TACPs supported the ground forces of allied nations, and a single unified air task order (ATO) was being produced by the TACC and distributed to all allied forces. Providing a C3I structure for multinational forces, particularly for contingencies in which conditions are not well defined in advance, is an emerging need that will also grow with the introduction of new, sophisticated C3I systems.

The interoperability problem introduced by the creation of an ad hoc coalition for ODS is likely to be experienced in future contingency operations. Interoperability has always been a thorny issue in NATO, and some NATO standards were used for ODS, since many forces were from the alliance.

Interoperability for ODS had to be solved in weeks rather than years. Providing interoperable C3I systems to potential allies through the FMS program and establishing new international military communications standards would help the integration of multinational forces in future contingencies. The interoperability problems and solutions arising from ODS can help determine the alternatives for future contingencies.

The movement of USCENTAF staff forward created a command and control void in the rear. TAC recognized the problem and shifted the responsibilities for USCENTAF Rear to Langley AFB. Contingency plans had envisioned USCENTAF Rear as being manned by mobilized reserves from 10th Air Force. Without a full reserve force call-up, this manning could not be achieved. Further, the magnitude of the tasks necessary to deploy and support the forward forces and the need for immediate solutions would probably have surpassed the capability of reserve personnel activated on short notice. The TAC staff had a day-to-day working familiarity with the types of problems that needed attention and possessed an existing source of expertise for operations, deployment, and logistics. The decision to have TAC assume the responsibilities for USCENTAF Rear was timely, important, and correct.

Though existing plans had specified some relationships to support contingency forces, support requirements for deployment, operations, logistics, and intelligence were much greater than anticipated. Proliferation of centralized support systems over the past decade has greatly expanded the need for CONUS support of deployed forces. This need will continue to grow. The evolution of responsibilities for supporting USCENTAF forces can be a useful model.

The role of TAC in assuming responsibilities as a CONUS-based (versus USCENTAF) Rear command center is a model that merits consideration for future contingency operations. The benefits of establishing Contingency Rear where there is a source of existing staff expertise and the facilities to perform the functions are obvious. It should be noted that planned drawdowns in headquarters may limit the ability of staffs to perform this dual tasking. Nevertheless, we believe the roles, responsibilities, and facilities for a Contingency Rear should be institutionalized.

Force Capability

The deployment of five fighter squadrons, 20 conventional B-52Gs, and the USCENTAF staff within eight days of the execution order demonstrates the flexibility and mobility of air power. The Phase I buildup to over 400 combat

aircraft within a month of the initiation of ODS provided forces necessary for defensive operations. The buildup of combat forces was followed shortly by the munitions, C3I, and support needed to conduct sustained combat operations. By mid-September, the Air Force buildup of combat power in the AOR was essentially complete. The limited assessment conducted showed that the Phase I ODS force had the potential to perform the missions it was sent to accomplish.

The value of the readiness investments made during the 1980s was reflected in the deployed force. Mission-capable rates for the forces in the AOR were sustained at an average of 92.6 percent during ODS. An effective logistics command and control system maintained mission-capable rates for the deployed forces through Phase I at a lower level than was experienced at home stations. The deploying forces were augmented with parts, but within a month the squadrons that remained in the CONUS were operating at mission-capable rates that exceeded the force averages of a decade earlier. Through Phase I, munitions stocks appeared sufficient to sustain the forces in the region and provide a worldwide reserve. Over 96,000 bombs and older CBUs were prepositioned in the region—more than could be stored on the deployment bases. Preferred modern munitions and missiles were shipped into the region as shown in Appendix C (Operations) of Volume II.

These shipments did not deplete worldwide stockage. For example, by the end of September, a small percentage of AIM-7s, AIM-9L/Ms, AGM-65Bs, AGM-65Ds, and AGM-88s were in the theater. The training qualification levels of aircrews in the region was high, and realistic training rates near those sustained at home base were achieved. The bare base deployment/employment exercises for the conventional bomber force, which began in 1985, enhanced that force's ability to deploy for this contingency. SAC had deployed 20 bombers to Diego Garcia at C+8, 22 days before its programmed closure time. The payoffs of readiness investments and initiatives over the past decade cannot be precisely measured, but they appear to show in the indicators of force performance. However, an undetermined reinvestment may be necessary for post-ODS reconstitution.

Reserve forces played a notable role in ODS. Combat units were not deployed in Phase I, but a significant portion of airlift, air refueling, and communications assets came from the reserves. Volunteerism remained at twice the level needed through Phase I. However, a reserve call-up was necessary to sustain the tempo of operations for ODS. Significantly, Air Reserve Forces became part of the operating force without additional training or administrative burdens.

Although the force structure was designed and built around a different threat and set of scenarios, the assessment conducted showed that it met the needs of Phase I of ODS. Even after additional forces were added to the AOR for Phase II, the Air Force could still respond to a crisis elsewhere in the world. Roughly 70 percent of USAF combat forces were available for employment elsewhere in an active/reserve mix similar to pre-ODS conditions. The overall structure retains this capability to act elsewhere, but long-range tactical attack aircraft, night attack aircraft, defense suppression assets, intelligence, and tactical communications assets were heavily committed to ODS and would not have been available in sufficient numbers to field a balanced force for other contingencies. In addition, limits on airlift would have constrained participation in simultaneous contingencies.

ODS provided an opportunity both to examine the performance of the Air Force today in a challenging situation and to gain a view of future needs. The performance in this situation was good. Resourceful and motivated people solved many difficult problems. However, this crisis may have occurred at an opportune time. The Soviet Union was cooperative and not threatening. Support and access from around the world was largely unrestricted. Although plans for a force drawdown were programmed, they had not yet occurred, and the United States still had forward-deployed forces and bases overseas. Recent cuts had been made in the readiness investment, but the effects had not yet been felt and the benefits of a decade of readiness investment were still evident throughout the force. Future force drawdowns, the loss of overseas bases for en route staging and support, and the shift of assets and personnel to the reserves may reduce the ability to respond decisively and quickly in the future.

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