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Supporting the Future Total Force

A Methodology for Evaluating Potential Air National Guard Mission Assignments

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Prepared for the United States Air Force

PROJECT AIR FORCE

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Preface

As the Air Force faces manpower end-strength reductions of approximately 40,000 active duty personnel, it becomes more difficult to support the air and space expeditionary force (AEF) construct using current force employment practices. These manpower reductions could leave the active component without sufficient end-strength personnel authorizations to support current operational requirements. The Air National Guard (ANG), on the other hand, will not undergo significant manpower reductions, but it will be affected by the Air Force force structure planning under way in support of the Quadrennial Defense Review (QDR) and Base Realignment and Closure (BRAC) that calls for the retirement of a significant number of legacy aircraft. This could potentially leave the ANG with a large number of highly trained, highly experienced personnel with no aircraft to operate and support.

This document presents a methodology that can be used to evaluate potential support posture options for the future total force employing the ANG. In conducting this research, we focused on the needs of the Air Force, as a whole, in achieving operational effects to enable the AEF. We investigated how to align the total force—to organize, train, and equip—in the most effective way possible employing the available resources. Transitioning some missions from the active component to the ANG may be a way to meet that goal without significant cost to the total force. Employing the ANG would use existing Air Force personnel to fulfill mission area requirements as directed in DoD and Air Force planning guidance. The ANG could contribute to the warfighter mission in ways that would leverage ANG strengths and pro-

vide effective and efficient approaches in achieving the desired operational effects.

The monograph reports our evaluation of five mission areas as the beginning of the development of a portfolio of potential missions for assignment to the ANG. We present each mission area along with a range of implementation options that could be considered by Air Force leaders for assignment to the ANG. The five mission areas we evaluated are not meant to be exhaustive. There are many other areas in which the ANG could add value to the warfighter. We chose these five mission areas, based on recent experience and operational requirements, simply to illustrate how the methodology used in this report can be applied to any mission area. We evaluated the following mission areas:

- Predator operations and support
- air mobility command and control
- Commander of Air Force forces staffing
- base-level intermediate maintenance
- intercontinental ballistic missile maintenance.

This report is intended to help inform strategic planning decisions, including those associated with QDR, BRAC, and the Future Total Force effort. Further manpower reductions only heighten the need for a continued review of roles and missions within the different component of the Total Force.

The Air National Guard Director of Logistics (ANG/LG) sponsored this research, which was conducted in the Resource Management Program of RAND Project AIR FORCE as part of a fiscal year 2005 project entitled "Evaluation of Air National Guard Transformation Options." The research for this report was completed in December 2005.

The report should be of interest to functional area subject matter experts (such as combat support, logisticians, or operations planners); mobility planners; headquarters personnel at the Air Force, major command (MAJCOM), and operational levels; maintenance personnel; and operators throughout the Department of Defense (DoD), especially those in the Air National Guard and active duty Air Force.

This report is one of a series of RAND reports that address agile combat support (ACS) issues in implementing the AEF. Other related publications include:

- *Supporting Expeditionary Aerospace Forces: An Integrated Strategic Agile Combat Support Planning Framework,* Robert S. Tripp, Lionel A. Galway, Paul S. Killingsworth, Eric Peltz, Timothy L. Ramey, and John G. Drew (MR-1056-AF, 1999). This report describes an integrated combat support planning framework that may be used to evaluate support options on a continuing basis, particularly as technology, force structure, and threats change.
- *Supporting Expeditionary Aerospace Forces: An Analysis of F-15 Avionics Options,* Eric Peltz, Hyman L. Shulman, Robert S. Tripp, Timothy L. Ramey, and John G. Drew (MR-1174-AF, 2000). This report examines alternatives for meeting F-15 avionics maintenance requirements across a range of likely scenarios. The authors evaluate investments for new F-15 Avionics Intermediate Shop test equipment against several support options, including deploying maintenance capabilities with units, performing maintenance at forward support locations (FSLs), or performing all maintenance at the home station for deploying units.
- *Supporting Expeditionary Aerospace Forces: Expanded Analysis of LANTIRN Options,* Amatzia Feinberg, Hyman L. Shulman, Louis W. Miller, and Robert S. Tripp (MR-1225-AF, 2001). This report examines alternatives for meeting Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) support requirements for AEF operations. The authors evaluate investments for new LANTIRN test equipment against several support options, including deploying maintenance capabilities with units, performing maintenance at FSLs, or performing all maintenance at Continental United States (CONUS) support hubs for deploying units.
- *Supporting Expeditionary Aerospace Forces: Lessons From the Air War Over Serbia,* Amatzia Feinberg, Eric Peltz, James Leftwich, Robert S. Tripp, Mahyar Amouzegar, Russell Grunch, John Drew, Tom LaTourrette, and Charles Robert Roll, Jr. (MR-1263-AF,

2002, not available to the general public). This report describes how the Air Force's ad hoc implementation of many elements of an expeditionary ACS structure to support the air war over Serbia offered opportunities to assess how well these elements actually supported combat operations and what the results imply for the configuration of the Air Force ACS structure. The findings support the efficacy of the emerging expeditionary ACS structural framework and the associated but still-evolving Air Force support strategies.

- *Supporting Expeditionary Aerospace Forces: Alternatives for Jet Engine Intermediate Maintenance,* Mahyar A. Amouzegar, Lionel A. Galway, and Amanda Geller (MR-1431-AF, 2002). This report evaluates the manner in which jet engine intermediate maintenance (JEIM) shops can best be configured to facilitate overseas deployments. The authors examine a number of JEIM supports options, which are distinguished primarily by the degree to which JEIM support is centralized or decentralized. See also *Engine Maintenance Systems Evaluation (En Masse): A User's Guide,* Mahyar A. Amouzegar and Lionel A. Galway (MR-1614-AF, 2003).
- *A Combat Support Command and Control Architecture for Supporting the Expeditionary Aerospace Force,* James Leftwich, Robert S. Tripp, Amanda Geller, Patrick H. Mills, Tom LaTourrette, C. Robert Roll, Jr., Cauley Von Hoffman, and David Johansen (MR-1536-AF, 2002). This report outlines the framework for evaluating options for combat support execution planning and control. The analysis describes the combat support command and control operational architecture as it is now, and as it should be in the future. It also describes the changes that must take place to achieve that future state.
- *Reconfiguring Footprint to Speed Expeditionary Aerospace Forces Deployment,* Lionel A. Galway, Mahyar A. Amouzegar, Richard J. Hillestad, and Don Snyder (MR-1625-AF, 2002). This report develops an analysis framework—footprint configuration—to assist in devising and evaluating strategies for footprint reduction.

The authors attempt to define footprint and to establish a way to monitor its reduction.

- *Analysis of Maintenance Forward Support Location Operations,* Amanda Geller, David George, Robert S. Tripp, Mahyar A. Amouzegar, and C. Robert Roll, Jr. (MG-151-AF, 2004). This report discusses the conceptual development and recent implementation of maintenance forward support locations (also known as Centralized Intermediate Repair Facilities [CIRFs]) for the U.S. Air Force. The analysis focuses on the years leading up to and including the Deputy Chief of Staff for Installations and Logistics (AF/IL) CIRF test, which tested the operations of centralized intermediate repair facilities in the European theater from September 2001 to February 2002.
- *Supporting Air and Space Expeditionary Forces: Lessons from Operation Enduring Freedom,* Robert S. Tripp, Kristin F. Lynch, John G. Drew, and Edward W. Chan (MR-1819-AF, 2004). This report describes the expeditionary ACS experiences during the war in Afghanistan and compares these experiences with those associated with Joint Task Force Nobel Anvil (JTF-NA), the air war over Serbia. This report analyzes how ACS concepts were implemented, compares current experiences to determine similarities and unique practices, and indicates how well the ACS framework performed during these contingency operations. From this analysis, the ACS framework may be updated to better support the AEF concept.
- *Supporting Air and Space Expeditionary Forces: Lessons from Operation Iraqi Freedom,* Kristin F. Lynch, John G. Drew, Robert S. Tripp, and C. Robert Roll, Jr. (MG-193-AF, 2005). This report describes the expeditionary ACS experiences during the war in Iraq and compares these experiences with those associated with Joint Task Force Nobel Anvil (JTF-NA) in Serbia and Operation Enduring Freedom in Afghanistan. This report analyzes how combat support performed and how ACS concepts were implemented in Iraq, compares current experiences to determine similarities and unique practices, and indicates how well the ACS framework performed during these contingency operations.

- *Unmanned Aerial Vehicle (UAV) End to End Support Considerations,* John G. Drew, Russell Shaver, Kristin F. Lynch, Mahyar A. Amouzegar, and Don Snyder (MG-350-AF, 2005). This report presents the results of a review of current support postures for unmanned aerial vehicles (UAVs) and evaluates methods for improving current postures that may also be applied to future systems.
- *Strategic Analysis of Air National Guard Combat Support and Reachback Functions,* Robert S. Tripp, Kristin F. Lynch, Ronald G. McGarvey, Don Snyder, Raymond A. Pyles, William A. Williams, and Charles Robert Roll, Jr. (MG-375-AF, 2006). This report analyzes transformational options for better meeting combat support mission needs for the air and space expeditionary force (AEF). The role the Air National Guard may play in these transformational options is evaluated in terms of providing effective and efficient approaches in achieving the desired operational effects. Four Air Force mission areas are evaluated: continental United States (CONUS) centralized intermediate repair facilities, civil engineering deployment and sustainment capabilities, GUARDIAN[1] capabilities, and air and Space Operations Center reachback missions.
- *A Framework for Enhancing Airlift Planning and Execution Capabilities Within the Joint Expeditionary Movement System,* Robert S. Tripp, Kristin F. Lynch, Charles Robert Roll, Jr., John G. Drew, and Patrick Mills (MG-377-AF, 2006). This report examines options for improving the effectiveness and efficiency of intra-theater airlift operations within the military joint end-to-end multi-modal movement system. Using the strategies-to-tasks framework, this report identifies shortfalls and suggests, describes, and evaluates options for implementing improvements in current processes, doctrine, organizations, training, and systems.
- *Supporting Air and Space Expeditionary Forces: An Expanded Operational Architecture for Combat Support Planning and Execution*

[1] GUARDIAN is an Air National Guard information system used to track and control execution of plans and operations such as funding and performance data.

Control, Patrick Mills, Ken Evers, Donna Kinlin, and Robert S. Tripp (MG-316-AF, 2006). This report expands and provides more detail on several organizational nodes in our earlier work that outlined concepts for an operational architecture for guiding the development of Air Force combat support execution planning and control needed to enable rapid deployment and employment of the AEF. These combat support execution planning and control processes are sometimes referred to as Combat Support Command and Control (CSC2) processes.

- *Combat Support Command and Control: An Assessment of Initial Implementations in Air Force Exercises,* Kristin F. Lynch and William A. Williams (TR-356-AF, forthcoming). This report evaluates the progress the Air Force has made in implementing the future CSC2 operational architecture and identifies areas that need to be strengthened. The research team monitored CSC2 processes, such as how combat support requirements for the force package options needed to achieve desired operational effects were developed, and assessed organizational structure, systems and tools, and training and education.

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Summary

This analysis concentrates on new or enhanced opportunities for meeting combat support mission needs for the air and space expeditionary force (AEF) with a reduced active duty force where Air National Guard (ANG) manpower could be available. In order to meet congressionally mandated end-strength ceilings, the U.S. Air Force must eliminate approximately 40,000 active duty personnel in the next several years, without sacrificing the operational capabilities outlined in Department of Defense (DoD) and Air Force Planning Guidance.[1] The ANG, on the other hand, will not undergo significant manpower reductions but will be affected by the Air Force force structure planning under way (in support of the QDR and BRAC) that calls for the retirement of a significant number of legacy aircraft, potentially leaving the ANG with a large number of highly trained, highly experienced personnel with no aircraft to operate and support (DoD, 2001, 2005b).[2]

In this report, we develop a methodology that can be used to investigate the role that the ANG may play in assuming some of the

[1] Current DoD Strategic Planning Guidance and the QDR specify that capabilities will be created to ensure homeland defense; deter aggression in four major areas of the world, and engage in a number of small scale contingencies if needed; and if deterrence fails in the four areas of strategic importance, to be able to engage in two major contingency operations (MCOs) simultaneously; with the ability to win one decisively while engaging in the other until the first is won; and then win the second MCO. However, DoD Strategic Planning Guidance for FY08 shifts the focus of the military toward irregular, catastrophic, and disruptive threats and capabilities while maintaining the ability to engage in two MCOs.

[2] For example, the BRAC Commission calls for the elimination of the flying mission of a number of ANG flying units operating the A-10, F-16, C-130, and C-135 aircraft.

missions the active component may not be able to fully staff under current manpower constraints.[3] Transitioning some missions from the active component to the ANG may be a way to meet that goal without significant cost to the total force. We evaluate mission area opportunities that would capitalize on, or leverage, ANG strengths and would provide effective and efficient approaches to achieving the desired operational effects—supporting the AEF construct from a total force perspective. The report presents a portfolio of potential missions, each with a range of implementation options that could be considered by Air Force leaders for assignment to the ANG.

Analytic Approach

As the Air Force continues to align the total force with its primary function—that is, to organize, train, and equip aviation forces primarily for prompt and sustained offensive and defensive air operations (USAF, 2003c, p. 43)—its ultimate goal is to match missions that support this function with providers to create the most effective total force response possible. Because the active component faces manpower shortages for critical missions and the ANG faces force structure reductions (leaving manpower available), some mission assignments could be transferred to the ANG without significant cost to the total force—employing existing Air Force personnel in mission areas required by DoD and Air Force guidance.

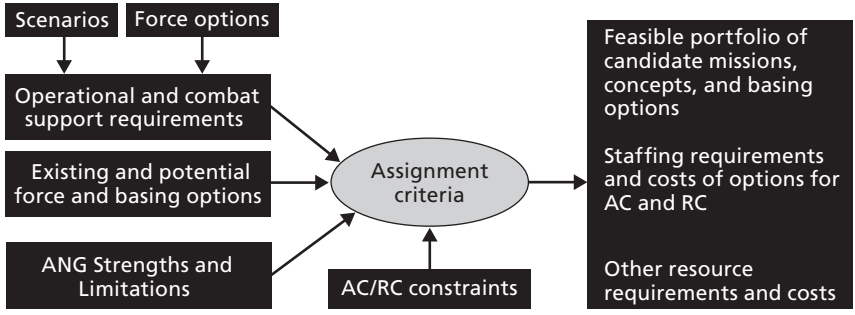
Building on past research (Robbert, Williams, and Cook, 1999; Tripp, Lynch, Roll, et al., 2006), we developed a decision framework to help identify a portfolio of roles and missions, currently supported by the active component, in which the ANG could participate supporting the AEF from a total force perspective. Using the total force perspective to develop an analytic framework, we focused specifically on (1) operational and combat support requirements; (2) existing and

[3] We did not consider contractor, civilian, host nation, or other types of mission support because we are looking at using existing personnel to meet existing mission needs, a zero cost alternative.

potential force and basing option; and (3) ANG goals, strengths, and limitations. As shown in Figure S.1, these three areas combine to create assignment criteria for missions, subject to a set of constraints in the active and reserve components. We used these criteria to develop a portfolio of candidate missions, concepts, and basing options. Once identified, candidate missions can be assessed to determine the staffing requirements for various alternatives within a mission and the associated personnel funding requirements for alternatives.[4]

We implemented the analytic framework by using a decision tree to evaluate various roles and missions, subject to mission assignment criteria. From a total force perspective, we focused on the work processes within the mission area rather than on existing mission area assignments. As presented in Figure S.2, the decision tree can be divided into roughly five sections—nature of the mission, ANG strengths, ANG mission feasibility, deployment characteristics of the mission, and workforce requirements. Within each section, the questions in the decision tree help determine from a total force perspective

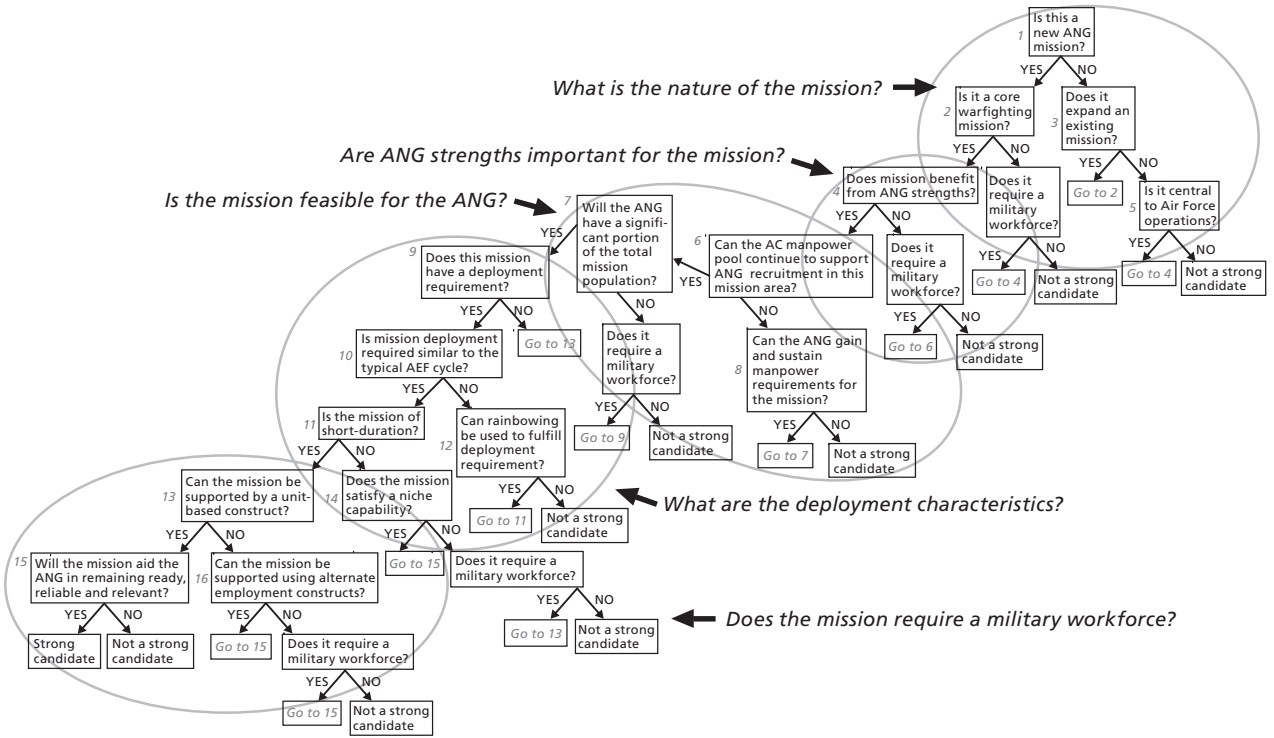
Figure S.1
Analytic Framework for Identifying ANG Mission Portfolio



NOTE: AC = active component; RC = reserve component.
RAND *MG539-S.1*

[4] We did not address those aspects of the ANG that do not figure into this assessment. Also, the framework does not so much answer the question "What missions should the ANG engage in?" as "What principles should the ANG consider when deciding how best to spend its energy?"

Figure S.2
ANG Mission Assignment Criteria Decision Tree



RAND *MG539-S.2*

whether a potential mission provides a good match for the ANG, based on a number of factors.

After we evaluated the mission area using the decision tree, we determined whether or not the mission could be considered a strong candidate mission for the ANG (the last branch of the decision tree). However, even if a mission is "not a strong candidate," the ANG may still be assigned that mission responsibility if, from a total force perspective, it is required for the good of the total force.

Potential ANG Mission Assignments

In conducting this research, we focused on the needs of the Air Force as a whole in achieving operational effects to enable the AEF. We investigated how the ANG could contribute to the warfighter mission in ways that would leverage ANG strengths and provide effective and efficient approaches in achieving the desired operational effects from a total force perspective. Although all the studies follow the same general methodology, they vary in amount of detail and specific analysis. Our goal is to present enough information to illuminate the potential new mission areas, not to complete four identical analyses.

The first analysis evaluates options for assigning portions of Predator operation and support missions to the ANG to facilitate the rapid absorption of this system into the Air Force inventory. In the second analysis, we evaluate options for assigning air mobility command and control missions supporting the Falconer Air and Space Operations Center (AOC) Air Mobility Division and functional AOCs, such as the Tanker Airlift Control Center (TACC), to the ANG. The third analysis evaluates options for assigning portions of Commander of Air Force forces (COMAFFOR) staff functions to the ANG. The fourth analysis evaluates the effect of using the ANG to conduct all or some intermediate-level maintenance (ILM) functions, also known as backshop maintenance, for active component flying units in addition to meeting ANG ILM requirements in the post-BRAC environment.

The use of the ANG in each of these missions could offset additional staffing requirements that may be needed in the active compo-

nent for these operations. Thus, the active component staffing could be used elsewhere—in other critical mission areas or toward end-strength manpower reductions—applying best employment practices to the total force. Each mission that we evaluate could benefit from deep knowledge and experience, strengths of the ANG.

We briefly describe each of the analyses.

Predator

The overall success of unmanned aerial vehicle (UAV) advanced concept technology demonstration (ACTD) programs and the use of UAV prototypes, including Predator, in recent operations have led to the rapid fielding of these vehicles into the Air Force inventory—without the usual planning afforded to the introduction of new weapon systems. In addition, Predator operations in Afghanistan and Iraq have shown that qualitative mission enhancements and operational efficiencies can be attained when some operational command and sensor exploitation remain in the United States. These reachback operations represent a new direction for Air Force command and control (C2) operations and raise questions of how to absorb these capabilities into the total force mix. In addition, potential applications of UAV systems in the homeland defense (HD) mission could further increase the size of the UAV fleet and complicate overall C2 operations. QDR and BRAC deliberations also raise many questions about the desired mix of mission assignments among the active and reserve components. (See pp. 21–33.)

We evaluated options for assigning portions of Predator operation and support missions to the ANG to facilitate the rapid absorption of this system into the Air Force inventory. The use of the ANG for this mission can offset additional staffing requirements that would be needed in the active component for these operations. Thus, the active component staffing can be used elsewhere—in other critical mission areas or toward end-strength manpower reductions.

We also examined the effectiveness and efficiency of options for the assignment of different mixes of operations and support responsibilities to the active component and the ANG for the Predator A. We developed the following options based on consideration of the Predator

end-to-end system operation and support requirements, the needs of the warfighter and the Air Force, and the comparative advantage and strengths of the ANG:

- The ANG could assume responsibility for Predator operations and support under current active component staffing rules.
- The ANG could assume responsibility for Predator operations and support using current contractor-accepted standards (cross-skilling).
- Launch and recovery elements (LRE) and ground control station (GCS) operations could be separated at individual units. GCS operations could be conducted centrally at one or two command and control sites that could be shared with the active component. In addition, this option includes examining the possibility of controlling multiple air vehicles from one control station. Multiple air vehicle control (MAC) could reduce staffing or could increase operational capability if staffing were not reduced.

The analysis has implications that are much broader than this single family of UAVs and could impact other operations. In summary,

- Current Predator operations are well suited for transfer to the ANG.
- Launch and recovery operations could be separated from the command and control of the air vehicles, thereby leveraging ANG strengths and enhancing multi-aircraft control.
- Employing cross-skilling policies that exploit ANG strengths could provide more efficient operations and support while maintaining a significant deployment capability (without mobilization).

Air Mobility Command and Control

Recent military operations in Afghanistan and Iraq have illustrated several problems associated with the planning and execution of airlift, exemplified by the backlogs of cargo and a lack of understanding of the airlift support request process (Tripp, Lynch, Roll, et al., 2006).

The Air Mobility Division (AMD) is responsible for planning, coordinating, tasking, and executing the airlift component of the theater distribution system. Recent operations have also shown that qualitative mission enhancements and operational efficiencies can be attained when some operational command and control remains in the United States (for example, the overall success of UAV reachback for operational planning, execution, and real-time data exploitation) (Tripp, Lynch, McGarvey, et al., 2006). These capabilities leverage a few forward-deployed personnel who help gather knowledge and sequence tasks for the combatant commander. Many current air mobility missions that require forward-deployed C2 capability could reach back for in-depth planning and execution support. These reachback opportunities represent a new direction for Air Force C2 operations and raise questions of how to absorb these capabilities into the total force mix. (See pp. 35–53.)

We evaluated the following options for assigning air mobility C2 missions supporting the Falconer AOC Air Mobility Division and functional AOCs, such as the Tanker Airlift Control Center (TACC), to the ANG:

- Providing augmentation for experience and additional manpower, using individual personnel or small groups of personnel deployed forward
- Providing augmentation using a unit-based, force-provider construct. Individual ANG units deployed forward would be tasked to perform specific processes or functions
- Assuming responsibility for air mobility command and control at regional AOC and TACC reachback locations with the support of a small forward-deployed active component
- Assuming responsibility for air mobility command and control (AOC and TACC) at a centralized reachback location with the support of a small forward-deployed active component
- Sharing mobility C2 responsibilities with the active component at regional or centralized reachback locations.

The AOC mission indemnifies ANG units with a critical capability that may be difficult for the active component to achieve given the need for experienced staffing and depth of operational knowledge to meet the tiered operational demand placed on AOCs.

The operational C2 mission also has implications for infrastructure and basing because many of these missions are performed via on-site augmentation, as an integrated split operation, or via reachback for supporting products and services with broad regional or global application. There may be value for basing command and control forces in regional centers that draw from several state ANG units. There may also be value in creating regionally managed local centers if there are key recruitment areas that the ANG can tap. Likewise, C2 and C2 support missions can be organized and presented in a manner that is output-blind to work location.

Although many issues associated with unit augmentation, reachback, and deployed in-garrison forces remain unresolved, there appears to be a consensus that the ANG could be beneficial to both forward presence and HD mission areas, thus extending the global reach of military power. However, new missions supporting the air mobility C2 mission require an understanding of how the ANG can use its strengths to add value and yet remain an ANG force. That means understanding how ANG forces are recruited, organized, sustained, and employed.

We also looked at trade-offs between establishing a strategic partnership between a supporting ANG unit and its client AOC, and establishing air mobility C2 providers that would work with all AOCs and combatant commanders having air mobility tasks to be done. This initial look found added value in the existing Falconer ANG-active component partnerships; it also recognized the importance of Air Combat Command and the Air and Space Expeditionary Force Center having sufficient flexibility in assigning C2 forces to combatant commanders. The analysis indicated that a single, centralized site would give ANG commanders greater flexibility in fulfilling emerging requirements with volunteers when deployment was a necessary part of duty. However, this flexibility is of less value when reachback is the primary method of performing work. There may also be long-term benefits to accessions and force management when the air mobility mission requirement can

be spread among several state ANG organizations. More work needs to be done, but this would appear to be especially important for state Adjutant Generals (AGs) with a group or wing-level air mobility force capability.

In summary, we found the following:

- Adding an AMD augmentation unit could extend current ANG Falconer AOC augmentation.
- Some AOC-AMD functional tasks may be well suited for a reachback support mission and ANG force presentation.
- TACC is a complex operation requiring a variety of air mobility support functions, many of which could be improved through ANG involvement.
- Utilizing the ANG to provide forces working C2 missions via reachback could yield gains in both effectiveness and efficiency.
- ANG growth in the air mobility command and control mission area may currently be constrained by the ability of the individual states and the National Guard Bureau (NGB) to release manpower from other missions.

COMAFFOR Staffing Functions

Recent military operations in Bosnia, Kosovo, Afghanistan, and now in Iraq have increased the awareness of the importance of the COMAFFOR staff (Lynch and Williams, forthcoming). The COMAFFOR staff is the operational commander's instrument for shaping the combat power of the force presented across time, maintaining service administrative control, and providing combat support sustainment capability to maintain the desired level of combat power. In the past, COMAFFOR staffing requirements were drawn from personnel in a numbered Air Force (NAF). However, NAFs had limited staffing and some functional staff positions were not represented. This resulted in forces dealing directly with MAJCOM functional staff (what was called a "skip echelon" concept). During Operation Enduring Freedom (OEF), the decision not to deploy a COMAFFOR staff forward overburdened the

deployed combined air and space operational center (CAOC) personnel who were drawn into performing staff functions.[5] (See pp. 55–71.)

Historically, the Air Force emphasis has been on the AOC and operational-level air and space tasking order (ATO) development and command and control functions at the expense of developing staff capabilities. After the initial campaign in Afghanistan, the need to build a forward staff was recognized by the combatant commander and supporting MAJCOM. This brought greater visibility to the need to provide a commander with not just an AOC, but also a fully functioning staff. These experiences influenced the present operational level headquarters restructure, now under way, resulting in the creation of the Warfighting Headquarters (WFHQ) (USAF, 2003b).[6] The Warfighting Headquarters construct being implemented today is a component command structure that includes a Falconer AOC and a fully functional staff centered on COMAFFOR warfighting tasks.[7]

We evaluated options for assigning portions of COMAFFOR staff functions to the ANG. AOCs are already being successfully augmented with ANG personnel. Currently, operations in Southwest Asia are being supported with both a forward staff and a reachback capability from CONUS. This may make the warfighting headquarters staff, the Air Force forces (AFFOR) staff, a good potential mission for ANG participation. If properly configured, it may allow some level of in-garrison work either from the CONUS headquarters site or via staff reachback from ANG home stations. We evaluated the following specific options for the ANG:

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[5] Discussions with General T. Michael Moseley, formally 9AF Commander, COMAFFOR and Joint Forces Air Component Commander (JFACC), during Operation Iraqi Freedom (OIF), currently Vice Chief of the Air Force, Spring 2004.

[6] The Air Force has experimented with how best to meet staff requirements, generally keeping COMAFFOR capability at the Numbered Air Force level, but sometimes pulling it back to the MAJCOM when necessary to maintain operational tempo in the joint operations area or to better coordinate theater-wide combat support such as during the Kosovo operation.

[7] The term WFHQ was changed to C-NAF in Program Action Directive 06-09, dated November 7, 2006.

- Assuming some responsibilities within COMAFFOR staff providing experience, additional manpower, and a surge capability by
  - providing augmentation using individual personnel or small groups of personnel using AFFOR staff unit type code (UTC)
  - providing augmentation using a unit-based, force-provider construct. Individual ANG units could be tasked to perform specific processes or functions
  - providing augmentation by using a unit-based and AOR-specific force-provider construct. Individual ANG units could be assigned to specific theaters or areas of responsibility.
- All the above examples could be enhanced by creating a centralized COMAFFOR command function support center at which forward deployed operational level commanders can reach back for functional staff and operational force management resources.

We found that all three options could improve COMAFFOR staff support. However, the unit-based option with units assigned to specific AORs holds the most promise for significantly improving COMAFFOR support. If a decision to utilize the ANG in this area is made, reachback should be considered in unit design. The idea of providing some portions of COMAFFOR staff functions from CONUS appears desirable. Improvements in technology, coupled with continually improving communication capability, have reduced the need for some face-to-face interaction. The ANG may be well suited to support the WFHQ if significant portions of that support could be located in CONUS. As the ANG gains expertise and capability in this area, the active component may be able to reduce the manpower requirements needed to support COMAFFOR responsibilities.

Intermediate-Level Maintenance

BRAC calls for the retirement of a significant number of legacy aircraft, leaving the ANG with a large number of highly trained and highly experienced personnel with no aircraft to support and operate (DoD, 2005a, Appendix Q). Further, the Future Total Force (FTF) plan increases the crew ratio of fighter aircraft and creates associate

basing relationships in the active and reserve components. The resulting increase in sorties per month needed to maintain pilot proficiency may have a direct effect on the maintenance requirements for each aircraft and, consequently, on maintenance staffing requirements. (See pp. 73–111.)

We examined use of the ANG to provide major segments of intermediate-level maintenance (ILM). We evaluated two options in which the ANG assumes responsibilities to support active component ILM needs by developing and fielding new component maintenance squadrons (CMS) and equipment maintenance squadrons (EMS). We also evaluated post-FTF options in which the ANG assumes responsibilities to support maintenance needs at active bases. The specific options are as follows:

- The ANG assumes ILM responsibilities for moderately deploying sections of the CMS and EMS. High-deploying sections of the ILM are the responsibility of the active component.
- The ANG assumes ILM responsibilities for moderately deploying sections of the CMS and EMS. The active component provides some of the manpower within these sections, in addition to assuming responsibility for the high deploying sections of the active ILM.

The ANG CMS and EMS units would be tasked to provide intermediate-level aircraft maintenance capability to the active component flying units located at bases having a mix of ANG technicians and traditional guardsmen. The ANG unit commanders would be responsible for meeting active unit ILM requirements and would continue to report through the National Guard Bureau and to support both federal and state missions.

The ANG ILM squadrons would act as a source of supply to the active unit for component and equipment maintenance activities. These ANG ILM units could also provide upgrade training resources and experiences for active duty maintenance technicians assigned to the active flying units. Whether colocated at active bases or located offsite, ANG ILM units could take advantage of the ANG's deep main-

tenance knowledge and skills and could offset staffing requirements in the active component.

Because the ANG may have difficulty meeting the deployment requirements for sections of the CMS and EMS with high deployment demands, we excluded these sections from consideration for ANG involvement, leaving these positions with the active units. We also excluded from consideration personnel in four sections within the current CMS and EMS that have heavy deployment requirements in the AEF rotational scheme: the Aerospace Ground Equipment (AGE) Flight, Conventional Munitions Flight, and the Fuels section and Egress section of the Accessories Flight. We estimated the number of active duty personnel authorizations that would no longer be required and the resulting total annual personnel funding requirements. In constructing these estimates, we varied the mix of full- and part-time ANG staffing and changes in the annual flying program proposed under the FTF initiative.

Since it is not altogether obvious what the appropriate full-time/part-time ANG personnel mix would be, for each option we varied the mix of full-time to part-time positions. A higher percentage of full-time positions may increase active component confidence that adequate support is being provided. Each option also varied the flying program or utilization rate. Using a typical F-16 unit, we evaluated two different options for ANG staffing mix and utilization rate. Each option has variations that create a range in the slots made available to the active component and in annual personnel funding requirements. The number of active component authorizations made available in an option depends on the level of involvement by the ANG and the number of slots retained by the active component in the ILM. The costs depend on the full- and part-time staffing mix employed by the ANG and the number of slots retained by the active component in ILM. Both options and their variations make active component positions available that could be redirected to other requirements. There are additional options that lie on a spectrum between the specific options shown in this report. The exact mix of full- and part-time staffing would need to be carefully determined—as would the proportion, if any, of ILM positions retained by the active component. Our analysis of F-16 ILM,

for example, suggests that there are opportunities within these parameters to leverage important skills of the ANG and to relieve stress on the active component by freeing up low-deployment positions.

In conclusion, our analysis suggested the following:

- A large fraction of current ILM operations at active component flying wings is well suited to the characteristics of the ANG.
- BRAC and FTF initiatives significantly change the ANG and active component maintenance environment.
- The ANG's deep experience in ILM missions could provide efficient operation of ILM functions while also providing reserve surge capability through drill positions.
- Given the AEF tasking requirement of some ILM specialty areas, the active component should retain some ILM authorizations to enhance expeditionary capability.
- Implementation issues imply significant trade-offs.
- Implementation efforts may require individual technicians at ANG units to voluntarily relocate to new ILM units being formed at active duty air bases. However, ANG unit moves are unlikely to be sufficient to form these new ILM units.

Overarching Concepts and Conclusions

Transferring some missions to the ANG would employ available ANG personnel while freeing up some active component personnel for use in other critical mission areas—at little to no cost to the total force. (See pp. 113–116.)

The four mission areas discussed in this report—Predator support, air mobility command and control, COMAFFOR warfighting support, and base-level intermediate maintenance—provide insights into specific functions and roles where the Air National Guard—with its depth of knowledge and experience—may be well suited to support the warfighter. Through the evaluation of each of these mission areas, we garnered several overarching principles and concepts:

- Several mission areas and specific roles are well suited for ANG assignment.
- The Air Force could benefit from a continual review of assigned roles and missions.
- The ANG may need to consider the demographics or other characteristics of an area before assuming a new role or mission.

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Abbreviations

AC	active component
ACC	Air Combat Command
ACS	agile combat support
ACTD	advanced concept technology demonstration
AECT	Aeromedical Evacuation Control Team
AEF	air and space expeditionary force
AETC	Air Education and Training Command
AF/IL (now AF/A4/7)	Deputy Chief of Staff for Installations and Logistics
AF	Air Force
AFB	Air Force base
AFFOR	Air Force forces
AFLMA	Air Force Logistics Management Agency
AFMC	Air Force Materiel Command
AFRC	Air Force Reserve Command
AFSC	Air Force specialty code
AG	adjutant general
AGE	aerospace ground equipment
AGS	Air Guard Station
ALCT	airlift control team
AMC	Air Mobility Command
AMCT	air mobility control team
AMD	Air Mobility Division
AMU	aircraft maintenance unit

AMXS/HMXS	aircraft/helicopter maintenance squadron
ANG	Air National Guard
AOC	Air and Space Operations Center
AOG	Air and Space Operations Group
AOR	area of responsibility
ARCT	air refueling control team
ATO	air tasking order
BLOS	beyond-line-of-sight
BRAC	Base Realignment and Closure
C2	command and control
CAOC	Combined Air and Space Operations Center
CAT	crisis action team
CEMS	Comprehensive Engine Management System
CENTAF	U.S. Air Forces, Central Command
CENTCOM	U.S. Central Command
CIRF	centralized intermediate repair facility
CMDB	Consolidated Manpower Database
CMS	component maintenance squadron
COCOM	combatant command
COMAFFOR	Commander of Air Force forces
CONOPs	concept of operations
CONUS	continental United States
CRAF	Civil Reserve Air Fleet
CSAF	Chief of Staff of the Air Force
CWO	combat wing organization
DIRMOBFOR	Director of Mobility Forces
DoD	Department of Defense
ECS	expeditionary combat support
EMS	equipment maintenance squadron
EO/IR	electro-optical and infrared
EUCOM	European Command
FTF	Future Total Force
FOL	forward operation location
FSL	forward support location

FTF	Future Total Force
FTU	Flying Training Unit
FY	fiscal year
GA	General Atomics
GCS	ground control station
HD	homeland defense
ICBM	intercontinental ballistic missile
ILM	intermediate-level maintenance
IMA	individual manpower augumentee
IOC	initial operational capability
ISR	intelligence, surveillance, and reconnaissance
JCSG	Joint Cross-Service Group
JEIM	jet engine intermediate maintenance
JFACC	Joint Forces Air Component Commander
JOA	joint operations area
JTF NA	Joint Task Force Noble Anvil
LANTIRN	Low Altitude Navigation and Targeting Infrared for Night
LCOM	Logistics Composite Model
LOS	line of sight
LRE	launch and recovery element
LRU	line replaceable unit
MAC	multiple air vehicle control
MAJCOM	major command
MCO	major conti
MDS	mission design series
MOS	maintenance operations squadron
MXS	maintenance squadron
NAF	Numbered Air Force
NGB	National Guard Bureau
NORAD	North American Aerospace Defense Command
NORTHCOM	U.S. Northern Command
OCONUS	outside Continental United States

OEF	Operation Enduring Freedom
OEM	original equipment manufacturer
PAA	primary assigned aircraft
PACAF	Pacific Air Forces
PACOM	U.S. Pacific Command
PAF	Project AIR FORCE
PBD	Program Budget Decision
PCS	permanent change of station
POC	point of contact
POC-N	Predator Operation Center-Nellis
POSC	PACAF Operations Support Center
PRP	Personnel Reliability Program
QDR	Quadrennial Defense Review
RC	reserve component
RLA	repair level analysis
SAR	synthetic aperture radar
SEAD	suppression of enemy air defenses
SJTF	standing Joint Task Force
SOUTHCOM	U.S. Southern Command
SRU	shop replaceable unit
START	Strategic Tool for the Analysis of Required Transportation
STRATCOM	U.S. Strategic Command
TACC	Tanker Airlift Control Center
TCTO	time compliance technical order
TDS	Theater Distribution System
TDY	temporary duty
TEG	Test and Evaluation Group
TMDE	test measurement and diagnostic equipment
TST	time-sensitive target
UAV	unmanned aerial vehicle
USAF	U.S. Air Force
USAFE	U.S. Air Forces, Europe
USTRANSCOM	U.S. Transportation Command

UTC	unit type code
WFHQ	Warfighting Headquarters
WRM	war reserve materiel

CHAPTER ONE

Introduction

The Air and Space Expeditionary Force (AEF) construct, a concept developed by the Air Force, calls for a tailored, sustainable force to respond quickly to national security interests, as needed. As the Air Force faces force structure changes and end strength manpower is reduced, it becomes more difficult to support the AEF contruct using current force employment practices. The Air Force continues to strive to align the total force with its primary function—to organize, train, and equip aviation forces primarily for prompt and sustained offensive and defensive air operations—in the most effective way possible employing the available resources (USAF, 2003c, p. 43).

In conducting the research described in this report, we focused on the needs of the Air Force as a whole in achieving operational effects to enable the AEF. This analysis concentrates on new or enhanced opportunities for meeting combat support mission needs for the AEF with a smaller active component where ANG manpower could be available (because of Base Realignment and Closure [BRAC]–imposed force structure reductions). We develop a methodology that can be used to investigate the role that the ANG may play in assuming some of the missions that the active component may not be able to fully staff under current manpower constraints.[1] We evaluate mission area opportunities that would capitalize on, or leverage, ANG strengths and would

[1] We do not consider contractor, civilian, host nation, or other types of mission support because we are looking at using existing personnel to meet existing mission needs, a zero cost alternative.

provide effective and efficient approaches to achieving the desired operational effects—such as the ability to configure support rapidly and to deploy and employ quickly—supporting the AEF construct from a total force perspective.

Study Motivation—End Strength and Force Structure Changes

To meet congressionally mandated end strength ceilings, the Air Force must eliminate approximately 40,000 active component personnel in the next several years, without sacrificing the operational capabilities outlined in DoD and Air Force Planning Guidance.[2] In addition, Program Budget Decision 720 (PBD 720) (DoD, 2005e) has mandated further manpower reductions, resulting in the total loss of approximately 57,000 personnel through fiscal year (FY) 2011.[3] Attrition and manpower savings achieved through BRAC will provide some of these manpower reductions. However, approximately 40,000 manpower positions will be eliminated in the Air Force (primarily in the active component), with approximately 20,000 to be taken at the start of FY07. Under current force employment practices, these manpower reductions will leave the active component without sufficient end strength personnel authorizations to support current operational requirements.

The ANG, on the other hand, will not undergo significant manpower reductions as a result of BRAC or PBD 720. However, the ANG will be affected by the Air Force force structure planning under way (in support of the QDR and BRAC) that calls for the retirement of a sig-

[2] Current DoD Strategic Planning Guidance and the Quadrennial Defense Review (QDR) (DoD, 2001) specify that capabilities will be created to: ensure homeland defense; deter aggression in four major areas of the world, and engage in a number of small scale contingencies if needed; and if deterrence fails in the four areas of strategic importance, to be able to engage in two major contingency operations (MCOs) simultaneously; with the ability to win one decisively while engaging in the other until the first is won; and then win the second MCO. However, DoD Strategic Planning Guidance for FY08 shifts the focus of the military toward irregular, catastrophic, and disruptive threats and capabilities while maintaining the ability to engage in two MCOs.

[3] Discussions with AF/A4MM.

nificant number of legacy aircraft (DoD, 2001, 2005d). Many of these legacy aircraft are in the ANG, and their retirement could potentially leave the ANG with a large number of highly trained, highly experienced personnel with no aircraft to operate and support in "ANG enclaves." Under current force employment practices, force structure reductions will not affect ANG end strength personnel authorizations, but will leave the ANG without sufficient clearly defined missions (in support of its current operational requirements) to employ its existing end strength.

In the past, mandated manpower reductions have led to the transfer of mission assignments to contractors. However, current manpower reductions (in PBD 720) also require the reduction of contractor support. Thus, contractor support cannot be considered as a method to meet current operational requirements.

Because the active component faces manpower shortages for critical missions and the ANG faces force structure reductions (leaving available manpower), the total force could transfer some mission assignments to the ANG without significant cost—employing existing Air Force personnel in mission areas required by DoD and Air Force guidance.

Analytic Approach

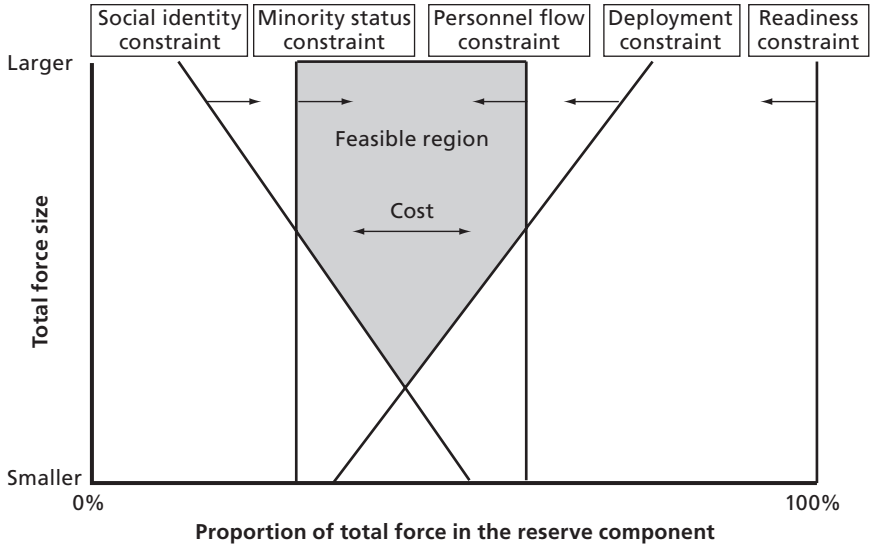
Assuming that the active component will lose significant manpower (but not missions) and the ANG will lose force structure (but not manpower), transitioning some missions from the active component to the ANG may be a way to meet operational goals without significant cost to the total force. This report develops a methodology to evaluate ANG participation in mission areas considered for transfer to the ANG. We present a portfolio of potential new or enhanced missions supporting the AEF, each with a range of implementation options that could be considered by Air Force leaders for assignment to the ANG. Previous RAND research and analyses provide insights and direction for considering new roles and missions for the ANG.

Previous RAND Analyses

Robbert, Williams, and Cook (1999) produced a seminal report that established a rational basis for determining the absolute and relative size of the reserve component relative to the active component. We used their analysis to help constrain new and enhanced mission assignments to those assignments that would be feasible for the ANG.

Across the top of Figure 1.1, we list a set of constraints that should be considered for determining the reserve-active mix in the total force (Robbert et al., 1999, p. 11). The arrows on the boundary lines indicate how the constraint could affect the force mix between the active and reserve components.[4] Further, some of the constraints might vary as a

Figure 1.1
A Framework for Considering Multiple Force-Mix Principles Simultaneously



SOURCE: Robbert, William, and Cook (1999), p. 11.
RAND *MG539-1.1*

[4] These constraints are further discussed in the "Analytic Framework" subsection of this chapter. Specifically, the social identity and minority status constraints are discussed in the "ANG Mission Feasibility" subsection, and deployment is discussed in the "Deployment Characteristics of the Mission" subsection.

function of total force size. The intersection of the constraints forms a feasible region for thinking about the size of the reserve component within the total force. A specific option within the feasible region can then be evaluated on the basis of cost considerations.

In 2004, RAND evaluated the role of the ANG in four Air Force mission areas: civil engineering deployment and sustainment capabilities, continental United States (CONUS) centralized intermediate repair facilities, The Force Structure and Cost Estimating Tool—A Planning Extension to GUARDIAN capabilities, and reachback missions in the air and space operations center (AOC).[5] These evaluations also provided detailed insights into where the ANG could add value to the warfighter (Tripp, Lynch, McGarvey, et al., 2006).

Analytic Framework

Building on past research, we developed an analytic framework to help identify a portfolio of roles and missions, currently supported by the active component, where the ANG could participate in support of the AEF from a total force perspective. Using the total force perspective to develop an analytic framework, we focused specifically on three areas: operational and combat support requirements; existing and potential force and basing options; and ANG goals, strengths, and limitations (left side of Figure 1.2). These three areas combine to create assignment criteria for missions, subject to a set of constraints in the active and reserve components (middle of Figure 1.2). These criteria are used to develop a portfolio of candidate missions, concepts, and basing options that fall within a feasible region created by the criteria. Once identified, candidate missions can be assessed to determine the staffing requirements for various alternatives within a mission and the associated personnel funding requirements for alternatives (right side of Figure 1.2).[6]

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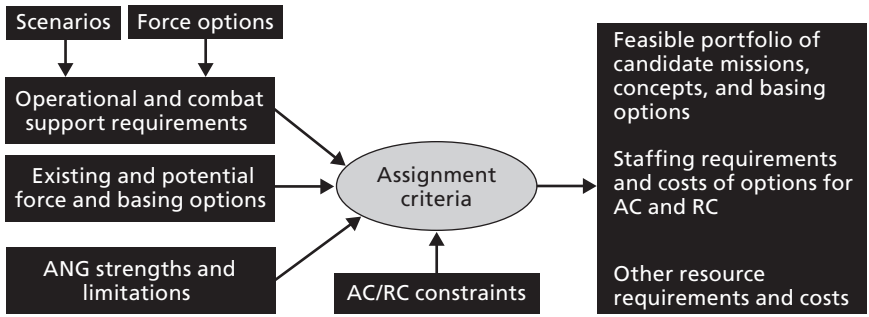
[5] GUARDIAN is an Air National Guard information system used to track and control execution of plans and operations such as funding and performance data.

[6] We do not address those aspects of the ANG that do not figure into this assessment. Also, the framework does not answer the question "What missions should the ANG engage in?" insomuch as "What are the principles that the ANG should consider when deciding where to best spend its energies?"

Figure 1.2
Analytic Framework for Identifying ANG Mission Portfolio



NOTE: AC = active component; RC = reserve component.
RAND *MG539-1.2*

We implement the analytic framework using a decision tree to evaluate various roles and missions subject to mission assignment criteria. From a total force perspective, we focus on the work processes within the mission area rather than on existing mission area assignments. The decision tree can be divided into roughly five sections (see Figure 1.3). Within each section, the questions in the decision tree help determine whether from a total force perspective a potential mission provides a good match for the ANG based on the three original focus areas (requirements; force and basing options; and ANG goals, strengths, and limitations) taking into consideration the constraints already established in Robbert, Williams, and Cook (1999).[7] We discuss each section of the decision tree below.

Nature of the Mission

The first section of the decision tree focuses on the requirements or nature of the proposed mission. As presented in Figure 1.4, this section determines whether the mission is a new ANG mission or an expanded ANG mission. Then we determine whether the mission is a core warfighting mission.

[7] Costs are not considered within the decision tree, but are considered in the options presented in each chapter.

Figure 1.3
ANG Mission Assignment Criteria Decision Tree

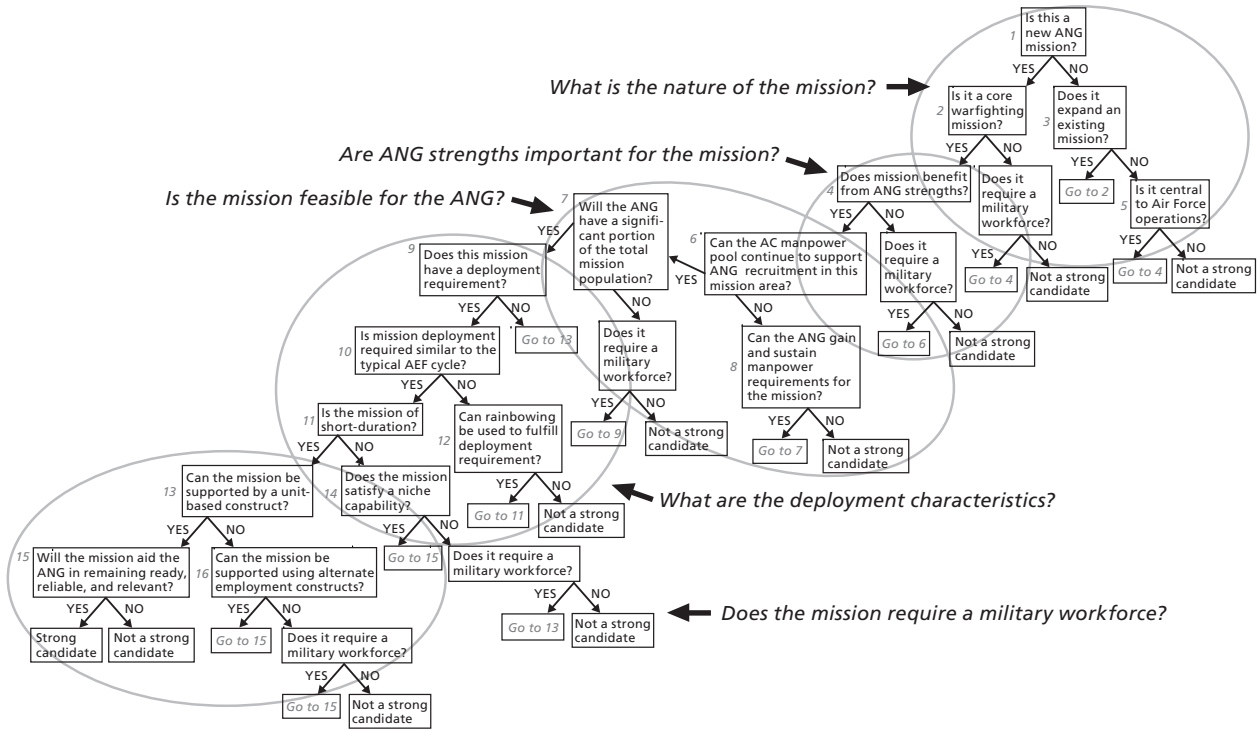


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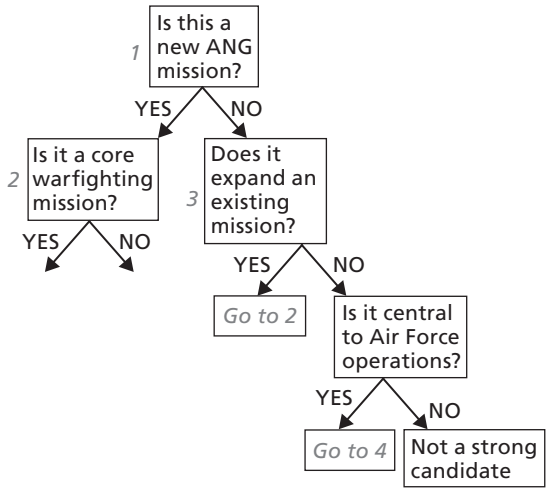
Figure 1.4
Nature of the Mission



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The ANG has experience in developing new missions, for example, the development of a Global Hawk remote data exploitation capability employing reachback.[8] If a proposed mission is not new to the ANG, the next question is whether the proposal expands an existing mission. Because the ANG may already have experience in a mission area, to expand that mission would build upon the deep knowledge and experience in the ANG workforce.

Whether the mission is new to the ANG or an expanded mission, it is important that the ANG not be given missions that are not central to current Air Force operations. If there are no opportunities for ANG personnel and active component personnel to share duties, the ANG could become isolated from Air Force decisionmakers. While the ANG should not mirror the active component, it should guard against becoming "mission isolated."[9] This first section of the decision

[8] *Reachback* allows some critical missions to be done in CONUS through enhancements and communications advances.

[9] This was one problem with the North American Aerospace Defense Command (NORAD) aerospace defense mission prior to 9/11. Since the ACC was not directly engaged, it came to

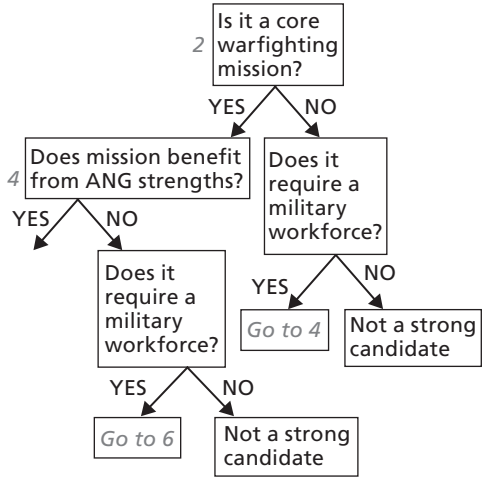
tree helps us determine which new or expanded core warfighting mission may be suitable for ANG participation.

ANG Benefits and Limitations

The next section of the decision tree focuses on ANG goals, strengths, and limitations to ascertain whether the potential mission would benefit from ANG participation (see Figure 1.5). The principal strengths of the ANG derive from its structural and cultural differences from the active component. These strengths include the deep knowledge and experience of ANG personnel, typically gained from years of experience in their field and strong unit cohesion. ANG units train together, are educated together, and participate in exercises together. Such collective team experience may contribute to more effective and efficient work practices.

The ANG force is ultimately a military force. It can be used where a contractor or government civilian work force may not be able to be

Figure 1.5
ANG Strengths



RAND *MG539-1.5*

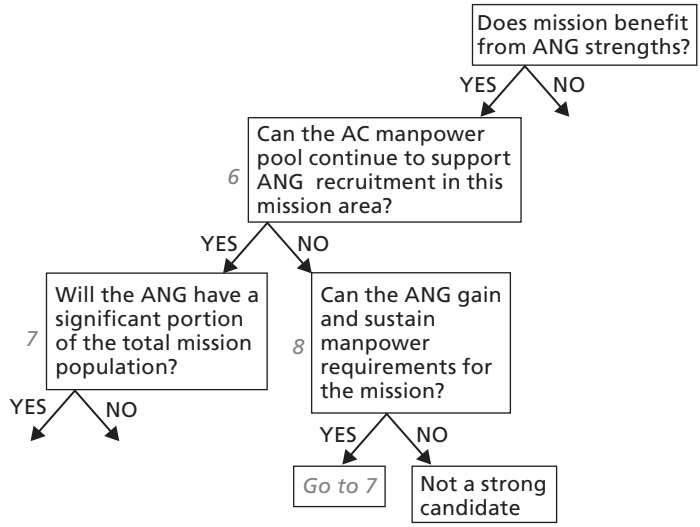
undervalue the NORAD requirement and thereby the ANG contribution to the mission.

used. The unique ability to employ civilian specialties in an ANG role may be important in some contexts. We generalize that missions that benefit specifically from deep knowledge and expertise and those that require a military workforce may be reasonable candidates for consideration in a portfolio of mission options.

ANG Mission Feasibility

The third section of the decision tree focuses on force and basing options to ascertain whether a potential ANG mission lies within the feasible mission region as defined by the research of Robbert, Williams, and Cook (1999). As presented in Figure 1.6, this section establishes whether a mission meets the personnel flow constraint (whether there are enough positions retained by the active component to train future recruits for the ANG in that mission area) and minority status constraint (whether the reserve component maintains the minimum pro-

Figure 1.6
ANG Mission Feasibility



RAND *MG539-1.6*

portion required for a sufficient or meaningful level of representation with the mission area of the total force) (illustrated in Figure 1.1).

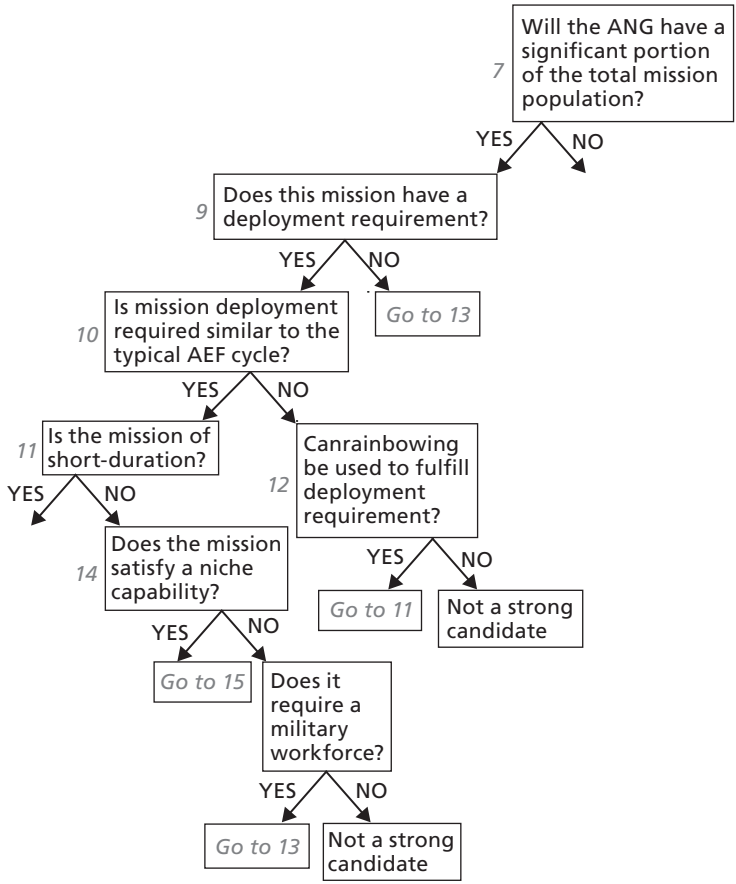
If the active component cannot support ANG recruiting needs, we ask whether the ANG could achieve recruiting requirements for the mission. An ANG unit has a largely regional employment base, which may make it difficult to quickly resize a unit or to stand up a new unit. More centralization of a mission may make it easier for ANG commanders to meet the mission demand with a larger pool of manpower. Yet, because of the state-based role of the ANG, more centralization may make it difficult for the ANG units to fully participate in the new mission area, either because of the dispersion of units across a state or because of questions about crossing state boundaries for doing in-garrison work. These do not appear to be serious limitations, but they must be deliberated and decided prior to launching new mission capabilities.

If the active component manpower pool is large enough and the ANG is able to achieve recruiting requirements, we evaluate the minority status constraint, that is, whether the ANG will have sufficient representation in the mission area. Robbert, Williams, and Cook (1999) suggest that sufficient representation occurs at about 20 percent of the total population. This means that the ANG should have at least 20 percent of the authorizations in the mission area to achieve adequate representation of its views and resource requirements. Here, we generalize that if the ANG can maintain a recruiting pool while achieving minority status, the mission area could be considered a viable mission for ANG participation.

Deployment Characteristics of the Mission

As depicted in Figure 1.7, the fourth section of the decision tree also focuses on force and basing options, evaluating the deployment requirements of a mission. If no deployment is required, a number of decision points are avoided. However, if a mission has some deployment requirement, questions must be asked about (1) frequency

Figure 1.7
Deployment Characteristics of the Mission



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and similarity to the AEF cycle,[10] (2) duration of mission, and (3) the feasibility of "rainbowing"[11] to fulfill deployment requirements.

[10] The Air Force has largely reorganized its combat forces into an AEF rotational structure, whereby combat units are tasked for deployments outside the continental United States (OCONUS) of up to 120 days on a regular rotational basis. This schedule sends a participating unit overseas roughly once every twenty months.

[11] *Rainbowing* is a strategy the ANG has employed to meet frequent or long-duration deployment demands. A deployment package is built consisting of a small number of aircraft and

Given the current operating environment, an additional consideration for potential missions might include those active component missions with low or moderate deployment requirements. This would limit both the rotational stress on the ANG (but still provide some deployment opportunities) and allow the active component to focus its manpower on missions with higher deployment requirements.

If a mission has deployment requirements that are similar to those of the typical AEF cycle, the duration of the mission requires further evaluation to determine whether it is suitable for the ANG. However, if a mission has a deployment requirement with relatively infrequent taskings, the ANG may be able to use rainbowing to fulfill its requirements.

The increasing level of deployment brought about by Operation Enduring Freedom (OEF) and OIF has demanded heavy participation from both the active component and the reserve component on an ongoing basis. Deployments have been frequent, with no predicted reduction in effort, creating rotational stress for some Air Force specialty codes (AFSCs). If a mission has a rotational requirement that is not short-duration, we evaluate whether the mission satisfies a niche capability where ANG depth of experience could provide mission efficiencies. The ability of the ANG to keep individuals in a single location for a long period of time appears to offer advantages both in training and support missions, particularly in light of the difficulty that the active component has had maintaining small career fields. In this section, we use the deployment requirements of a mission to help us decide whether a mission would be suitable for ANG participation.

Workforce Requirements

The final section of the decision tree focuses again on ANG goals, strengths, and limitations to evaluate mission workforce requirements. As presented in Figure 1.8, we now determine whether the potential

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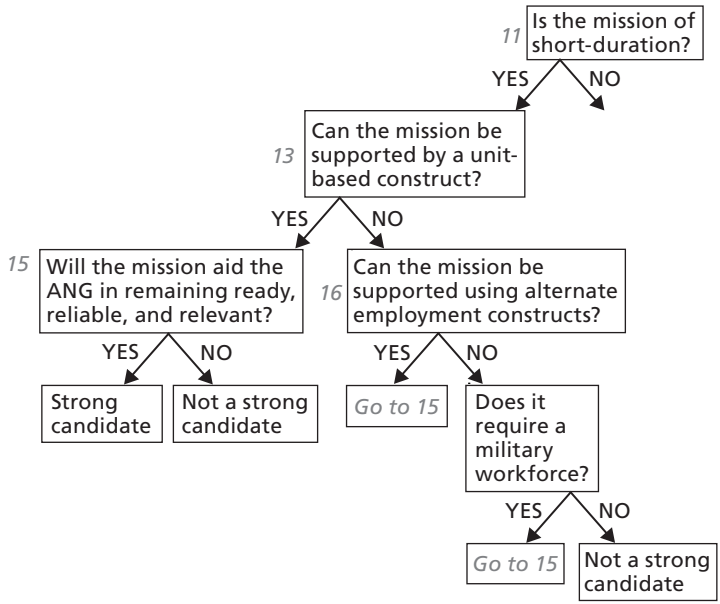
personnel from different ANG units. The deployment requirement is met by switching out ANG units at deployment sites to meet deployment needs. The ANG made significant contributions to AEF flying operations in Operation Northern Watch and Operation Southern Watch through rainbowing.

Figure 1.8
Mission Desirability



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mission can be unit-based—to take advantage of a key ANG strength. In the event that the mission is not unit-based, we determine whether the mission can be supported using alternate employment constructs that are acceptable from a total force perspective.

And finally, we verify that the mission is central to helping the ANG remain ready, reliable and relevant to the total force. The mission should have a direct connection to warfighting commanders and should exploit the strengths of the ANG.

After we evaluate the mission area using the decision tree, we determine whether the mission could be considered a strong candidate mission for the ANG or not (the last branch of the decision tree). However, even if a mission is "not a strong candidate," the ANG may still be assigned responsibility for that mission if, from a total force perspective, it is required for the good of the total force. The ANG may be asked to accept mission assignments that support the best employment practices of the total force.

Potential Mission Candidates

With the impending changes in Air Force force structure (resulting from BRAC), the ANG stands to lose aircraft—and thus missions—for highly experienced personnel. In addition, manpower reductions, which call for approximately 40,000 fewer active component personnel, might mean that it is time to reevaluate the total force structure and seek alternative providers for some missions in order to use the total force most effectively and efficiently to meet AEF requirements. The ANG can contribute to this goal by identifying active component, unit-based missions that could benefit from the ANG's deep knowledge. It may be prudent to consider roles or missions such as those used during national disasters and other CONUS-based emergencies where the ANG is already employed in its state capacity. Transferring some missions to the ANG would employ available ANG personnel while freeing up some active component personnel for use in other critical mission areas—at little to no cost to the total force.

Support of Recent Operations

Operations Enduring Freedom and Iraqi Freedom have shown that active component personnel alone have had difficulty meeting the current operational tempo demands. ANG personnel were used in first-level Global Hawk data exploitation as well as to augment the Air Mobility Division within the Combined Air and Space Operations Center during OEF and OIF. Missions vital to support the AEF construct, such as the Predator mission and the planning and execution of in-theater airlift, have shown that qualitative mission enhancements and operational efficiencies can be attained when some operational command and control remains in the United States—a role the ANG may be able to fulfill.

In addition to federal war and peacetime responsibilities (Title 10), the ANG also has state (Title 32) responsibilities, which were used notably during 2005. The response of the National Guard to such emergencies as hurricanes Katrina and Rita highlights National Guard (both Army and Air Guard) capabilities and their value in the state arena. (See Appendix I for details of the Guard response and contribu-

tions to hurricanes Katrina and Rita relief efforts.) Increasing or changing state responsibilities may affect the future roles and missions of the ANG.

Mission Areas Evaluated

The mission assignment criteria outlined in the decision tree (see Figure 1.3) were used to evaluate five mission areas as the beginning of the development of a portfolio of potential new or enhanced mission areas for the ANG. Mission areas evaluated included

- Predator operations and support
- air mobility command and control
- Commander of Air Force forces (COMAFFOR) staffing
- intermediate-level maintenance (ILM)
- intercontinental ballistic missile maintenance.

Recent military operations led us to evaluate the first three mission areas. The Predator UAV has been used with much success during both OEF and OIF, relying heavily on contractor support (Drew, Shaver, Lynch, et al., 2005). This mission area is expanding and will require further manpower authorizations to staff future Predator operations. Since both contractor support and active component authorizations will be limited in future years, this area may be a good candidate for transfer of some of its mission assignment to the ANG.

RAND teams visited the combined AOC (CAOC) in Al Udeid, Qatar, which is part of the Warfighting Headquarters (WFHQ) construct in the Central Command.[12] Many of the tasks observed in the CAOC (for example, tasks in the Air Mobility Division [AMD] and those performed by the COMMAFFOR staff) did not require forces to be located forward in the CAOC. Those tasks could have been performed anywhere, including in the continental United States (CONUS) (Tripp, Lynch, McGarvey, et al., 2006). RAND teams also observed Terminal Fury 2004, an exercise in the Pacific, and Austere

[12] The term WFHQ was changed to C-NAF in Program Action Directive 06-09, dated November 7, 2006

Challenge 2004 in Europe. Both exercises employed a Falconer AOC similar to the CAOC in Al Udeid. Again, RAND observed many tasks that could have been moved to the rear.

In addition, ANG units were already providing AMD and AOC support through augmentation to both Pacific Air Forces (PACAF) and U.S. Air Forces, Europe (USAFE). In both theaters, the active component only manned the AOC to 50–60 percent in the first level of response, the immediate response package. Personnel from the functional staff and the second level of response (the quick response package), including the ANG, were used to complete the immediate response package, creating a shortfall for the next level.[13] Although this was not an issue during the exercises, for real world operations, the AOC would not be staffed at an appropriate level with current manning (Lynch and Williams, forthcoming).

The WFHQ construct is one of the initiatives the Air Force is committed to continue to support in PBD 720. The manpower shortfalls that currently exist will need to be filled. To fully implement the WFHQ construct will require additional personnel. Because of recent ANG experience and success in these mission areas, the AMD and COMAFFOR staff may be good candidate missions for partial assignment to the ANG.

Intermediate-level maintenance and intercontinental ballistic missile maintenance mission areas were considered in this evaluation for several reasons. First, the maintenance career field consists of a large percentage of the total active component authorizations today. Of the anticipated 40,000 end strength reduction in manpower, the Directorate of Maintenance, Maintenance Management Division (AF/A4MM) expects a reduction of approximately 6,500; and the Directorate of Maintenance, Munitions, Missiles, and Space Plans and Policy Division (AF/A4MW) expects a reduction of approximately 2,500.[14] The size of both the career field and the reductions made maintenance

[13] The immediate response package should provide the capability to manage 300 sorties per day. The quick response package should provide the capability to manage 500 sorties per day.

[14] Discussions with AF/A4MM and AF/A4MW.

a candidate for evaluation. In addition, since the ANG will lose aircraft and thus have maintainers available, it was reasonable to consider transfer of some of the maintenance responsibilities from the active component to the ANG.

The five mission areas evaluated are not meant to be exhaustive. There are many other areas where the ANG could add value to the warfighter. We chose these mission areas, based on recent experience and operational requirements, simply as an illustration of how the methodology used in this report could be applied to any mission area. Further anticipated manpower reductions (through FY11) only heighten the need for a continued review of roles and missions within the different component of the Total Force. Our methodology can be used to evaluate other mission area assignments to the ANG.

Of the five mission areas evaluated, only four qualified as potential mission candidates using the mission assignment criteria. Intercontinental ballistic missile maintenance was not deemed a good candidate for ANG participation. The missile maintenance career field is a very small career field. If portions of the mission were assigned to the ANG, the active component may not be able to support a large enough pool of manpower for future ANG recruitment. In addition, the ANG may not be able to gain and sustain the manpower requirements for the mission. To support the missile maintenance mission, the ANG would have to implement a personnel reliability program (PRP). This program may be difficult for the ANG to support outside an active duty base on a civilian economy.

For these reasons, we do not consider intercontinental ballistic missile maintenance to be a suitable mission for assignment to the ANG. Therefore, missile maintenance is not discussed as an individual chapter in this report. The other four mission areas are discussed in detail in the report.

In each of the four remaining mission areas, we discuss operational and combat support requirements; ANG goals, strengths, and limitations; and existing and potential force and basing options. We also present resource requirements of options, if appropriate, and expected mission effectiveness as a result of ANG assignment of the mission.

Although all the analyses follow the same general methodology, they vary in amount of detail and specific analysis. Our goal was to present enough information to illuminate the potential new mission area, not to complete four identical analyses.

Organization of This Report

Chapter Two examines Predator operations and support. Chapter Three examines air mobility command and control. COMAFFOR staffing options are discussed in Chapter Four. Chapter Five details options for base-level intermediate maintenance, and Chapter Six discusses overarching concepts and conclusions. In Appendix A, we present the mission assignment criteria decision tree and its application to five mission areas. In Appendix B, we provide general background on Predator operations. Appendix C provides air mobility command and control background, and Appendix D gives background information on COMAFFOR warfighting support. In Appendix E, we provide a description of AFFOR staff roles and responsibilities. Appendix F gives background ILM information. Appendix G presents the 2005 BRAC recommendations affecting ECS personnel, and Appendix H presents Future Total Force initiatives. In Appendix I, we provide an overview of the National Guard response to Hurricane Katrina.

CHAPTER TWO

Potential Predator Operations and Support Postures

Having developed a methodology and an analytic framework to evaluate assignment of some mission areas to the ANG, we now look at several high-value examples. We begin with the Predator. The overall success of unmanned aerial vehicle (UAV) advanced concept technology demonstrations (ACTDs) and the use of UAV prototypes, including Predator, in recent operations has led to the rapid fielding of these vehicles into the Air Force inventory—without the usual planning afforded to the introduction of new weapon systems. The Air Force has recently announced plans to procure additional Predator air vehicles—from a projected buy of approximately 80 to now over 200. These actions will drive increased operations and support requirements.

This chapter evaluates options for assigning portions of Predator operation and support missions to the ANG to facilitate the rapid absorption of this system into the Air Force inventory, enabling expeditionary operational effects of the AEF—rapidly configured support and speedy deployment and employment of the UAV warfighting capability.[1] Since PBD 720 concentrates on reducing contractor support, employing the ANG for this mission could offset additional staffing requirements that would be needed in the active component. Active component staffing could then be used elsewhere—in other critical mission areas or toward end-strength manpower reductions.

[1] See Appendix B for details about the current operations and support for the Predator system, and about the air vehicle itself.

Operational and Combat Support Requirements and Existing Force Options

The Predator was developed as an ACTD and was rapidly pressed into service to meet an emergent warfighter need. As such, not all support issues were given adequate consideration. One of the main concerns, which still plagues the program, is personnel utilization. During development and initial operations, the system was matured without the additional Air Force–wide manpower authorizations that a more traditional acquisition process would have provided. Instead of developing a pool of resources based on a defined need with an established training program and support infrastructure, a pool was established by drawing on the varying abilities of the current workforce to absorb a new mission. All Predator maintenance and support operations were manned from AFSCs that were healthy or overstaffed.[2] These individuals were not given a new mission AFSC, and not all skill sets required for Predator operations were closely aligned with their prior AFSC training.[3] A major portion of the training burden fell on the Predator contractor, which primarily focused on manufacturing the vehicles, not operating them.

Initially, there was no way to track and separately manage personnel in critical AFSCs with Predator experience. Additionally, the active component has had to struggle to keep the experience it gained in the Predator program—because of completion tour of military duty, recruitment from civilian commercial firms, personal desires to leave the area, and other realities of active component personnel management. The relatively small size of the workforce, the remote assignment to Creech Air Force Base (AFB), Nevada, and deployments to desolate operating locations have all combined to drive active component individuals away from the program.

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[2] For example, A-10 aircraft mechanics and fighter avionics maintenance personnel.

[3] The Air Force Logistics Management Agency (AFLMA) has completed one study and is in the process of a second expanded study looking at skill mixes needed for Predator and attempting to determine the best fit among existing Air Force AFSCs. Currently, it is looking at Missile Maintenance as well as the typical manned aircraft AFSCs.

Today the Air Force supports Predator operations through one active component squadron at Creech AFB (the 757th Maintenance Squadron) and a permanent ground control station (GCS) at Nellis AFB, Nevada, the Predator Operation Center-Nellis (POC-N). The POC-N both operates the air vehicle and exploits and disseminates the data from it.

Currently, all maintenance and flying training support is conducted at Creech AFB. Initial staffing was approximately 390.[4] Current staffing is approximately 335, with a projected drawdown to 220 by the end of FY06. Some of the drawdown resulted from refined requirements estimates; other slots have been transferred to the contractor.[5] When the 757th reaches its final 220 positions, it will be expected to provide a standing deployment capability to support continuous operations 365 days a year, 24 hours a day—much like operations today. It is also expected to support continuing training at Creech AFB as well as a surge capability for a pop-up deployment of short duration.

ANG Goals, Strengths, and Limitations

Current Predator operations offer the opportunity to take advantage of ANG strengths, such as a skilled and experienced workforce that could use cross-skilling. Experience has shown that the ANG can support sizable deployment commitments if given the opportunity to aggregate individual volunteers and to "rainbow" equipment from several units to form a complete unit from the parts of several different units.

The active component may be able to recognize many of the same efficiencies as the ANG if it were able to change current business practices. However, the active component has historically had difficulty maintaining small career fields (because of limited career path progres-

[4] They were overstaffed because of overestimated initial requirements.

[5] General Atomics (GA), the original equipment manufacturer (OEM), is the contractor currently supporting Predator. They currently support test operations at CONUS sites as well as staffing one deployed location. The field services representatives or technical experts provided by GA are part of the procurement contract and as such are not part of this sustainment contract.

sion) and allowing individuals to gain deep knowledge in single mission types or career fields (because of current rotation practices). The ANG also has some added flexibility in recruiting-to-need for high-value and emergent career specialties.

There are some interesting possibilities for using the ANG for the Predator mission. As an ANG mission, Predator support could utilize ANG strengths and develop a place for deep knowledge and backup capability. It may also save on deployment and sustainment costs, although it would require an initial investment in infrastructure to include communication and systems.

Finally, the ANG force is ultimately a military force. It can be used where a contractor or government civilian work force cannot be used. The ANG's unique ability to help bridge civilian specialties may be useful as the Air Force absorbs new vehicles.

Assignment Criteria Findings

Because of the rapid fielding and acquisition of the Predator system, the active force will face many challenges in absorbing the large number of new airframes and associated ground equipment in the near term. This quick absorption could create staffing shortfalls and knowledge gaps. Creative solutions are needed to ensure the successful integration of Predator into the total force.

Working through the decision tree (see Appendix A for details), we evaluated Predator operation and support as potential mission areas for the Air National Guard. All sections of the decision tree indicated that the Predator mission would be well suited for ANG participation. Predator operations in Afghanistan and Iraq have shown that qualitative mission enhancements and operational efficiencies can be attained when some operational command and sensor exploitation remains in the United States. These reachback operations represent a new direction for Air Force command and control operations and raise questions of how to absorb these capabilities into the total force mix. In addition, potential applications of UAV systems into the Homeland

Defense (HD) mission could further increase the size of the UAV fleet and complicate overall command and control operations.

Portfolio of Candidate Mission Options

The potential movement of Predator operations from the active component to the ANG raises the questions of effectiveness and efficiency. First, can the ANG maintain the same level of support to the Combatant Commander as the active component does? Second, would ANG operation and support of Predator cost more or less than if the operation and support were conducted in the active component? We use these two questions to evaluate options for assigning Predator operations and support to the ANG.

GCS operators, launch and recovery element (LRE) operators, intelligence analysts, targeting officers, and other manpower requirements for Predator operations are highly dependent on concepts of operations (CONOPs). This initial look at the Predator mission and how it is being used by the warfighter demonstrated just how fluid CONOPs development can be. Supplying the Predator warfighting capability with a competent and stable force while absorbing the new vehicles will be a difficult execution task. Current POC-N operations with all six workstations operating at full capability, 24 hours a day, would require 120 individuals per day.[6] In addition, seven individuals would be required at each deployment operation to staff the LRE. For the purpose of this study, we lump these requirements under the heading of "operator." To establish a baseline for this analysis, we assign sufficient operators to each ANG unit to run two GCS workstations and to conduct two LRE operations. Any change to operational CONOPs could drive changes to the number of assigned operators.

Base Case: ANG Assumes Active Component Staffing Profiles

First, we consider assigning Predator operations to the ANG using active component personnel staffing rules to determine ANG person-

[6] Sixteen operators per day × 6 workstations = 96 operators + 24 support personnel = 120.

nel requirements. As new Predator systems are manufactured, the ANG would assume responsibility for the equipment, as well as fly and maintain them. Eventually, this option would benefit from ANG's depth of experience and stable workforce. The ANG would augment the existing active component capability as new Predator systems became available. Given 120 air vehicles available for distribution, if the active component retains the unit based at Creech AFB, the ANG could staff 10 units with approximately 12 air vehicles per unit.

Since the ANG would maintain one-half the air vehicles of an active component unit (12 in the ANG versus 25 in the active component), the manning would be expected to be one-half the active component manpower, or approximately 110 maintenance and support personnel per unit.[7] Using our previously defined methodology, we would assign 70 operators to each unit.[8] If this option was implemented and the ANG established 10 units (10 × 180 personnel) plus the active component unit (220 support + 386 operators), the total force would be approximately 2,406 personnel.

For this option, we now consider deployment capability with and without mobilization of the ANG. The active component would retain the ability to operate one permanent deployed capability of a single orbit and the ability to handle one pop-up, single-orbit capability.[9] The permanent deployed capability is currently a 44-person team that deploys forward to launch and recover the air vehicles. The forward team launches the air vehicle and immediately transfers command and control (C2) to the GCS. Today, the active component full-time capability is deployed in Southwest Asia, along with an additional contractor-run deployment capability at a separate site.

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[7] Current plans call for the 757th to draw down to 220 individuals and to maintain approximately 25 air vehicles plus nine GCS vans. Comparatively, each ANG unit would have 10–12 air vehicles and one GCS van, and thus, approximately 110 personnel. These estimates are conservative. We expect the ANG would be able to complete this mission with even fewer personnel.

[8] Thirty-two operators for two workstations + 24 GCS support personnel + 14 personnel for two LRE operations.

[9] A single orbit is defined in the Current Operations section in Appendix B of this report as the ability to provide surveillance over the target area for a specified amount of time.

The pop-up capability resides with the 757th Maintenance Squadron (MXS) and the 15th Recovery Squadron (RS). These personnel can deploy on short notice to provide a single orbit. Since this pop-up deployment capability has the same unit type code (UTC) as the permanent deployed capability, approximately 44 active component personnel would deploy. Based on ANG planning factors and previous experience, 10–20 percent of ANG personnel are willing to volunteer for missions without any type of mobilization.[10] In this example, if each ANG unit could maintain a volunteer rate of 10 percent, the additive ANG capability could be as much as two additional deployments, giving the total UTC capability of three equivalent deployments in addition to the one permanent active component deployment capability.[11] If the ANG could maintain a 20-percent volunteer rate, the ANG UTC capability would increase to four single-orbit deployments, increasing the total Air Force capability to five single-orbit deployments plus the active component permanent deployment capability. And if the ANG-provided military UTCs were mobilized, the total surge capability would be twelve single orbits (ten from ANG units and two from the active component).

Because of interest in using Predator for HD missions, it is also prudent to look at assigning the capability to a specific area. Some of the most often mentioned possible uses of Predator in an HD role include border patrol and pipeline security. Although Creech AFB provides a large unrestricted airspace for flight training with the UAV, the base is some distance from U.S. borders or any significant pipelines. Assigning the Predator mission to the Arizona, California, New Mexico, or Texas ANG may place the capability much closer to the intended point of use.

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[10] According to Future Total Force General Officer Steering Committee briefings from June 2005, a 10–20-percent volunteer rate is actually very conservative. The ANG planning factors are much higher.

[11] Assuming the ANG is manned at 1,800 and that the volunteers are all of the correct AFSCs. The ANG could provide the capability for two additional LRE at 44 persons each (88 total) and the ability to staff four GCS workstations (two orbits plus inbound and outbound legs) (88 total).

The actual cost of assigning the mission may not be as large as one would think. The Predator is able to take off and land on fairly short runways and in austere environments. The system could most likely use any existing facilities with a paved runway and room for a small maintenance area. Vehicles can be airlifted or trucked into remote sites and quickly set up. Additionally, the individual states may be willing to fund some of the start-up costs in exchange for gaining a new capability. The largest impact would be operating unmanned vehicles in manned aircraft airspace and en route flight paths.[12]

Option 1: Implement Cross-Skilling Policies in ANG Predator Units

This option departs from the traditional view of the ANG as mirroring the active component and examines the effects of the ANG's using highly experienced individuals to perform numerous and varied tasks[13]—similar to the way contractors currently operate. This is known as cross-skilling; that is, using one person to perform a function that many had performed in the past. The Air Force has enjoyed the advantages of contractor use of this process. However, cross-skilling will create cultural issues for the ANG because the ANG has always tried to look like the active component. This option exploits the unique differences and strengths of the ANG. There is no reason to expect that the ANG could not achieve the same results as the contractors if current Air Force constraints were eliminated. These policies may require the ANG to develop its own ways to address the formal training and certification for ANG technicians.

Using cross-skilling policies, we take the 110 personnel in our proposed ANG Predator unit (from the baseline example above) and

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[12] Generally, aircraft in lower altitudes outside restricted airspace rely on a see-and-avoid approach to flying and avoiding collisions. Until this is better defined, all UAVs are restricted.

[13] These highly experienced personnel could be contractors who have been working on the Predator system from years and have become part-time drill personnel. Or they could be retrained ANG personnel, or recruited from active duty personnel who would develop deep experience year after year in the job.

divide them in half.[14] Each ANG unit would now consist of 55 maintenance personnel and 70 operators, for a total of 125 individuals per unit. If the active component retains one unit at Creech AFB, with 220 support personnel and 386 operators, and the ANG has 10 units (125 personnel in each), the total force would be 1,856. The deployment capability would remain the same as in the baseline, although the ANG portion of the deployment would be maintained with less than half the forward footprint.

The reduced LRE staffing could be attained through the use of cross-skilling. Exploiting the ANG's strengths (deep knowledge and a stable workforce), a conservative estimate would be 22 ANG personnel, half of the 44 personnel currently used for LRE operations. Since contractors currently staff their LRE operations with only nine personnel, the number 22 seems reasonable.

Extend Option 1: Blend ANG and Active Units

Additional reductions could occur by blending the 757th Maintenance Squadron at Creech AFB with the ANG.[15] For this option, we keep one-half the active component at Nellis and replace the other half with 55 ANG personnel. This could drive the total maintenance and support force down to 715 personnel (110 active component + 55 ANG at Nellis + 550 ANG units elsewhere). Conceivably, once the ANG has become fully trained and integrated into Predator support, the blended unit could become an ANG-only unit. This option would free up the remaining 110 active component personnel and replace them with 55 ANG personnel. By doing so, the Air Force could place the entire responsibility for Predator maintenance and support on the ANG. The

[14] One-half is a conservative estimate. The contractor was able to replace 44 active duty individuals with only nine contractor personnel, although active component representatives feel that may be too few. The contractor is currently reviewing an increase to the current nine authorizations. Additionally, we allow for leave, time off, and training to arrive at 50 percent of active component authorizations. However, we suspect that once the ANG is fully trained, this number may be reduced.

[15] Portions of this option are presently being implemented. The active component is working to establish some ANG positions in the 757th MXS.

total ANG maintenance and support manning would be approximately 660 personnel plus operators.[16]

Potential for Changing CONOPs

UAV CONOPs are continually changing. When the system was designed, it consisted of four air vehicles, a launch and recovery element, a deployable ground control station, and an antenna array. However, in practice, the GCS has remained permanently in CONUS for current operations.

The 15th Recovery Squadron and the 757th Maintenance Squadron are currently treated as one complete capability. They perform all functions, including storage and control of the air vehicles, operation and maintenance of the GCS, deployment and mobility, launch and recovery capability, and a deployable maintenance capability. From a systems viewpoint, these capabilities may not need to be linked as they currently are. It is foreseeable that one unit could be given the responsibility for storage, maintenance, accountability, and deployment of the air vehicle. A separate unit could be given launch and recovery responsibility. Yet another could operate and maintain a CONUS-based GCS. All these CONOPs could change the manning requirements.

Option 2: Change the Support Paradigm

Up to this point, the analysis has concentrated on mirroring current practice. Option 2 separates launch and recovery of the air vehicle from GCS flying and training operations. There are several operational and support reasons for making this separation. For example, the skill sets required to fly the air vehicle in the area of responsibility are different from launch and recovery skills. Currently, the Air Force is evaluating multiple air vehicle control (MAC). Concentrating on one skill could streamline that training process.

[16] There may be reasons to leave a small active component workforce—for example, for immediate response, ACC management and control, or total force mix. These issues, however, are outside the scope of this report.

By separating the LRE and GCS functions and assigning individual functions to individual units, we further exploit the strengths of the ANG. For example, 1st Air Force (1AF), with headquarters at Tyndall AFB, Fla., is the responsible C2 center for the air portion of HD. If the functions were separated, an ANG GCS could be established at Tyndall AFB.[17] The establishment of a GCS in the Southeast could be accomplished by moving portions of the GCS from Nellis to Tyndall or by building a new GCS. The new GCS capability could provide C2 for CONUS HD missions as well as back-up C2 for the POC-N. The Air Force either owns or is in the process of procuring enough equipment. The only costs associated with building the new GCS may be building some pads for the large antennas used to link with the satellites and installing some cabling to link the antenna to the actual GCS. The GCSs were originally designed as deployable vans; experience has shown the actual control consoles can also be used inside permanent facilities.[18] In either case, the largest concern with opening and operating a GCS at 1AF would be staffing.

Exploiting the ANG strengths, we anticipate that its initial GCS and LRE performance will be more effective but not necessarily more efficient. Employing MAC may temporarily reduce the number of GCSs in use. However, as recent experience has shown, it is likely that combatant commanders will ask for more missions to be flown using the extra GCSs, which could result in no staffing reductions. And, although LRE manning may be reduced to 22 personnel, 55 support personnel and 14 operators would still be needed to support each unit—again, yielding the possibility of no savings in personnel.

One way to meet GCS operator requirements for this option would be for the air vehicle and sensor operators to remain with their assigned units and rotate through Tyndall on a temporary duty (TDY) basis. That is to say, the operators could be assigned to a different unit and then go TDY to Tyndall for duty. Another option may be to assign the operators to the Florida ANG and have them perform all drill and

[17] Various issues with operating UAVs in CONUS remain unresolved, but for the purpose of this mental exercise we assume they can be resolved.

[18] There are plans to build a permanent facility at Creech AFB much like the POC-N.

duty from Tyndall. In this scenario, the other units would keep only enough operators to perform LRE operations, and the rest of the operators would transfer to the permanent GCS site. A third option may be to assign the operators to the National Guard Bureau (NGB) much as the Air Force Reserve Individual Mobilization Augmentee (IMA) program does, and have them work at Tyndall as required.

Specific field units would only be responsible for the launch and recovery missions. There is no reason for operations in CONUS to be different from OCONUS operations. By assigning LRE responsibilities to units, we reduce training range space requirements because the air vehicle will only need to take off, reach cruising altitude, and return to the base. There would be no requirement for long training flights for these units. The units assigned GCS responsibility could have their missions launched and recovered using the current ranges in Nevada. Presently, the Predator training mission durations are 12 hours and are limited by available operators. Conceivably, once the pool of operators increases by including ANG, training missions could be flown for 24 hours, allowing four or more GCS operators to be trained on every mission. Additionally, in the future there may be an opportunity to fly Predator training missions in other than desert conditions. All these changes should improve operator training. Again, the active component may be able to recognize many of the same efficiencies as the ANG if it could change its current business practices.

Table 2.1 presents staffing for the baseline and the three options examined.

Table 2.1
Predator Staffing Summary

Manpower	Baseline	Option 1	Extend Option 1	Option 2[a]
Active component support	220	220	110	110
ANG support	1,100	550	605	605
Active component operators[b]	386	386	386	193
ANG operators	700	700	700	350
Total force	2,406	1,856	1,801	1,258

[a] Option 2 represents an equal performance analysis. We assume that MAC is able to achieve a one-for-two reduction. The Air Force is experimenting with a one-for-four capability, which could further reduce the required operators. In actual practice, we suspect the Air Force will not reduce GCS operators but instead will increase capability.

[b] Active component operator data represent projected FY06 staffing levels—297 in the 15th RS (combat operations squadron), 53 in the 11th RS (the formal training unit), and 36 in the test and evaluation group.

Summary Findings

The analysis in this chapter has shown the following:

- Current Predator operations are well suited for transfer to the ANG.
- Launch and recovery operations could be separated from the command and control of the air vehicles, leveraging ANG strengths and enhancing multiaircraft control.
- Employment of cross-skilling policies that exploit ANG strengths could provide more efficient operations and support while maintaining a significant deployment capability (without mobilization).

CHAPTER THREE

Potential Air Mobility Command and Control Postures

We next examine air mobility command and control, part of the Warfighting Headquarters construct—one of the two core areas highlighted in PBD 720 as a focus for the Air Force. Recent military operations in Afghanistan and Iraq illustrate several problems associated with the planning and execution of in-theater airlift, including inefficient use of airlift resources. As a result, a backlog of cargo occurred at aerial ports of debarkation and embarkation. Until a specialized course was developed at the Air Mobility Warfare Center for Central Command mobility personnel, there was a lack of understanding of the airlift support request process (Tripp, Lynch, Roll, et al., 2006). These and other airlift problems underscore the need for a fundamental reexamination of mobility planning.

This chapter offers a spectrum of air mobility force posture options for the Future Total Force.[1] We first focus on missions supporting the Falconer AOC AMD and functional AOCs, such as the Tanker Airlift Control Center (TACC).[2] AMD and TACC air mobility command and control missions enable rapidly configured support, speedy deployment and employment, and a smooth shift to sustainment—all

[1] See Appendix C for details about current air mobility command and control operations—specifically the Air Mobility Division and the Tanker Airlift Control Center.

[2] The other functional AOCs, such as those supporting special forces, space, and strategic command missions, all have an air mobility function and need air mobility support. RAND has not studied these other AOCs in the same detail as it has the Falconer and the TACC. The TACC is devoted almost solely to the air mobility C2 mission.

expeditionary operational effects of the AEF. Specifically, this chapter evaluates what role the ANG could play in air mobility command and control in conjunction with the active component. To realize just how the ANG could add value to these mission areas, a general review of force options is needed. Incorporating potential air mobility C2 capabilities into the homeland defense mission also mandates a review. The potential for using the air mobility C2 capability to support civil mission requirements may place a premium on using a militia force.

Operational and Combat Support Requirements and Existing Force Options

The Commander of Air Force forces (COMAFFOR) and his Director of Mobility Forces (DIRMOBFOR) manage the Air Mobility Division, part of the Air and Space Operations Center. Air Mobility Command (AMC), the Air Force major command responsible for mobility forces, identifies the mobility manpower necessary for AOC operations. Most of this manpower resides in the AOC's AMD; however, mobility experts also reside in each of the three main AOC divisions—Strategy, Combat Plans, and Combat Operations.

The AMD is responsible for planning, coordinating, tasking, and executing the airlift component of the theater distribution system. There are two basic operations associated with the AOC-AMD capabilities. The first is aerial refueling tanker planning and execution.[3] This affects the laydown of forces in-theater, the combat range of joint operations area (JOA) aircraft, and the efficient deployment and sustainment of the engaged forces. The second is the management of the inflow of strategic airlift with its cargo and the efficient operation of a theater distribution network with theater-assigned or chopped (that is, temporarily allotted) aircraft.

[3] Most aerial refueling planning is done in the Combat Plans division of the AOC with execution in the Combat Operations division of the AOC. As discussed later in this report, for AMD reachback to be effective, a mature information-sharing structure and good working relationship (trust and confidence) must exist to facilitate work among all divisions in the AOC.

In the late 1990s, two ANG Air Operation Group (AOG) units were designated to augment AOCs in USAFE and PACAF. A third was later designated to work with U.S. Air Forces, Central Command (CENTAF) or the 9th Air Force (9AF). The concept was for the units to train in-garrison, participating in scheduled exercises on site with designated command and control UTCs that will be activated in time of war. Their daily mission is to train for wartime AOG operations in their assigned AOC. The AMD and other mobility requirements are partially addressed through this ANG augmentation; however, the focus of the augmentation is on the whole AOC, not just the AMD.

The TACC

The Tanker Airlift Control Center (TACC) is a functional AOC placed under the command of the operational component commander of mobility forces assigned to the U.S. Transportation Command (USTRANSCOM) and a unified or joint combatant commander. A large operational-level command and control capability, the TACC is global in reach and provides an operational-level niche for air mobility forces. The TACC is organized similarly to the Falconer AOC—it is a weapon system with planning and execution functions. The TACC interacts with joint logistics systems and USTRANSCOM and with the other USTRANSCOM service components. There is also a relationship with contractor-provided airlift capability either through specific movement contracts or through activation of the Civil Reserve Air Fleet (CRAF).

The TACC has developed an ANG augmentation CONOPS similar to the Falconer AOC augmentation plan. Given the need to develop a more deliberate training and certification program for TACC weapon system–assigned personnel, AMC and TACC leadership were attracted by the deep experience of ANG personnel in the airlift and air refueling missions. However, no ANG-TACC augmentation units have been officially formed yet.

ANG Goals, Strengths, and Limitations

ANG's deep experience with airlift and air refueling missions provides a source of experienced manpower that can be used in the AOC, particularly in the AMD. Current air mobility operations offer the opportunity to take advantage of ANG strengths, such as its skilled and experienced workforce and community support and involvement, while mitigating its limitations, such as deployment volunteer rates. The ANG also has greater latitude to recruit personnel who may not be eligible for active duty accession programs. The ANG can recruit to need and can help fill needed special skill sets for advanced AOC operations that would take the active component years to grow—for example, information technology experts who are trained in state-of-the-art information management planning. In addition, the ANG can target special experience and skill mixes to take advantage of emergent technology and new C2 processes. Air mobility missions could also benefit from ANG personnel who have years of experience working in the same region or mission capability. With experience, supervision is less critical, and innovation can be objectively evaluated and applied to meeting desired outcomes.

Falconer and functional AOC staffing requirements may be beyond what the active component can support in terms of the number of experienced military personnel needed. Civilian contractors may be able to take over certain supporting roles, but operational level command and control needs military personnel in the command chain—a role that can be fulfilled by ANG personnel. They are on call and their duty can be focused on meeting staffing requirement. However, the ANG is constrained by the fact that it is primarily an on-call force. If the primary work site is many hours or days away, it can limit access to the manpower needed for an unforeseen crisis, especially when the political decision to activate the reserve component lags the warfighter need.

Recent operations in Afghanistan and Iraq have shown that qualitative mission enhancements and operational efficiencies can be attained when some operational command and control remains in the United States. Reachback as a force-provider concept has been proven

for some of the hardest AOC tasks—such as time-critical or sensitive targeting—using active component and ANG intelligence analysts based in CONUS.[4] These capabilities leverage a few forward-deployed personnel who help gather knowledge and sequence tasks for the combatant commander. Many current air mobility missions, which require a forward-deployed command and control capability, could reach back for in-depth planning and execution support.

Reachback can overcome some of ANG's endemic limitations while providing additional value to the warfighter. A reachback mission enables more flexibility in using ANG forces with deep knowledge of the air mobility mission area. For example, forces with special experience in Theater Distribution System (TDS) network analysis can be on call as a crisis develops, providing their specialized knowledge earlier in the command's course-of-action development. This would help fine-tune force deployment planning and help create a more effective and efficient TDS. Reachback also means that the ANG expertise is not locked into one theater or problem. Without deploying the ANG in-garrison, UTCs can work on tasks in one JOA, then swing quickly to the next crisis without repositioning. Reachback can work for the active component, too.

Reachback may also provide an opportunity for several state AGs to provide forces. The current alignment of ANG units to active component units for the Falconer weapon systems can be maintained. Because the TACC is centered at one location, it would benefit from a geographically separated mirror site, which could take operations control when necessary in case of a natural disaster or attack on the primary facility. Other state AGs could participate in TACC operations using reachback. The ANG can take advantage of reachback to help it more efficiently present a more capable force, but it should guard against using reachback where there is no demonstrated mission advantage.

[4] For example, the use of the 152nd Intelligence Squadron for data exploitation for the Global Hawk.

Assignment Criteria Findings

The demand for air mobility experienced command and control operators is increasing just as the available active manpower is being constrained. The TACC has started to experiment with using contractors and government civilians on the floor for planning and execution. This places a premium on military manpower for those tasks that require military personnel.

Increased demands for experienced mobility manpower, coupled with advances in logistics and mobility information systems, reenergized the debate on where mobility command and control work can best be done. If we look for precedents in other functions in the AOC, we find that there have been successes using CONUS forces in a reachback mode in both UAV operations and intelligence data exploitation. Some of these functions have used ANG units and personnel.[5]

Working through the decision tree (see Appendix A for details), we evaluated whether air mobility command and control would be suitable for ANG participation. All sections of the decision tree indicate that air mobility C2 mission areas could be suitable for mission assignment to the ANG. Currently, the TACC is working with the ANG to identify mission areas where an ANG unit could take responsibility for and operate under TACC mission authority. These may include supporting such functions as TACC mission training and certification (personnel, software, systems, and equipment), standardization and evaluation, and discrete mission capabilities.

The AOC-AMD mission indemnifies ANG units with a critical capability that may be difficult for the active component to achieve, given the need for experienced manpower and depth of operational knowledge to meet the tiered operational demand placed on AOCs.

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[5] For example, the 152nd Intelligence Squadron, Reno, Nevada, transitioned into intelligence mission planning and exploitation for the Global Hawk UAV during OEF and OIF. First, the unit deployed to the theater. Members quickly realized that the mission could be performed from the home station with appropriate connectivity. The unit maintains a few liaison personnel located on-site in the theater AOC time-critical targeting cell or offensive operations team to ensure focus on the commander's intent. The work done by this unit is highly complex and needs robust bandwidth.

Portfolio of Candidate Mission Options

The movement of air mobility command and control from the active component to the ANG raises the questions of effectiveness and efficiency. Many of these missions will mean that some capability must be maintained on a 24-hour, seven-days-per-week (24/7) basis. The mission must be supportable over time, perhaps with participation from a number of states. However, there is precedent in the command and control mission area for this (for example, regional and sector support provided by NORAD and the U.S. Northern Command [NORTHCOM] were assigned ANG personnel). There is also the current Falconer AOC augmentation performed by three ANG AOGs. So even though the bulk of ANG force presentation historically has been at the forces level (for example, F-16 squadrons and groups) and not at the operational headquarters level, these current missions should provide some data on performance and suitability.

Base Case: Individual Augmentation of the AMD Staff

First, we consider the current AMD staffing strategy. The 7FVX1 UTC staffs the initial response package for the AOC, including approximately 20 mobility experts in the AMD. Augmentation then fills in the next level of support, the quick-response package, providing an AOC (and AMD) able to handle a 500-sortie-per-day operation. Approximately 60 additional personnel are needed to staff the quick-response package. To bring the AMD to a Tier 3 theater response package, another 60 personnel are required, bringing the total AMD requirement to 140 personnel.[6] Currently, this staffing comes from the major command (MAJCOM) staff, numbered Air Force (NAF) staff, the 15th and the 21st Expeditionary Mobility Task Forces (EMTFs), support and training organizations (such as the 505th Training Group at Hurlburt Field), from designated units, other NAFs, or other MAJCOMs (such as AMC) on an individual or small group basis. The ANG could be used to help provide some of this additional staffing on an individual volunteer basis.

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[6] See Appendix C for a notional list of AMD AFSCs.

We assume that the ANG would be able to provide about 20 percent of the additional staffing required—approximately 25 people per AMD for the highest level of response.[7] The Falconer AOC augmentation UTC (7FVX5) already provides ANG personnel with a mobility background who can, and are, being used to staff the AMD (approximately five people per level of response). The ANG also has a large pool of personnel with mobility experience from which individuals could be drawn to augment the AMD.

Although using ANG personnel for AMD augmentation would give the Air Force another staffing pool from which to fill vacant positions, these personnel would not have the benefit of working together and training as an AMD. Using personnel from different units (active/reserve from different locations) does not allow personnel the experience of training together. Thus, the transition to a quick-response package becomes difficult. In addition, this augmentation would require ANG personnel to deploy forward to work in the AMD. If the ANG is not mobilized, this augmentation would depend on individual volunteers who are available to deploy forward.

Option 1: ANG Assumes Forward-Deployed, Unit-Based AMD Augmentation Role with Partner Component

Next we consider an expansion of the present Falconer AOC augmentation partnership with the ANG. As new Falconer weapon systems are stood up, the ANG would provide a robust, unit-based AMD augmentation capability to deploy forward in a manner similar to the AOC augmentation unit. The ANG would use the active-parent AOC procedures, directives, and practices for C2 manning and operation. The unit-based approach to augmentation has added value. The partner units are able to study the needs of the parent AOCs and recruit new personnel to meet the evolving needs. They also can grow capabilities aimed directly at regional issues and special needs. Eventually, this option would benefit from the ANG's depth of experience and stable

[7] Since the ANG has contributed to AEF and contingency operations in a significant way, we assume a 20-percent volunteer rate for ANG augmentation would be obtainable, which represents the ANG proportion of the total Air Force.

workforce.[8] The ANG would establish mission partnerships and augment the AOC as new Falconer systems reach initial operational capability (IOC). If fully implemented, there would be at least six AOCs with ANG augmentation.[9] Initial discussions for an AMD augmentation UTC suggest approximately 50 personnel (see Table 3.1).

The total mobility staffing would be approximately 840 for six AOCs. Employing the augmentation UTC, 540 would remain active component personnel and 300 would be ANG personnel (see Table 3.2). All personnel would be forward-deployed. Most personnel would serve in the AMD, but some would serve as mobility experts in the other AOC divisions.

Along with this effort, the ANG should work with AMC to establish an augmentation UTC for TACC support. This would provide a means to bring in personnel at the entry level for TACC C2 work. Other functional AOCs may or may not also have a requirement for air mobility personnel.[10] Establishing an ANG unit partnership would expand the base of command and control experience and widen the participation of many different states that may have manpower available for reassignment.

Even though the augmentation partnerships have been operating beyond expectations in USAFE and PACAF, close attention will be necessary as work is expanded to include in-garrison work (Option 2). The AMD UTCs will capture ANG experience with the air mobility mission and provide career-broadening opportunities to

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[8] Currently the ANG partnership with USAFE and PACAF is valued highly, with ANG personnel working in key leadership and subject matter expert positions. As the augmentation program expands into more mobility tasks and as more tasks are done in-garrison, this trend to rely on ANG personnel should continue.

[9] The AOCs would be PACAF, Korea, USAFE, the U.S. Central Command (CENTCOM), the U.S. Southern Command (SOUTHCOM), and the U.S. Strategic Command (STRATCOM).

[10] One AOC that has not been mentioned is the AOC assigned to NORAD and NORTHCOM that is based at Tyndall AFB, Fla. The peculiar situation of the NORAD mission also has three ANG supported Sector Control command and control centers. Although the AOC at Tyndall AFB may have a role for air mobility personnel, the sectors probably would not.

Table 3.1
Proposed AMD Augmentation UTC

AFSC	Function	No.
3A071	Information Crft	2
2S071	Supply Mgmnt Crft	1
O21B3	Acft Maint	1
2A571	Aero Maint Cfmn	1
2A590	Aerospace Maint Supt	1
2T271	Air Transport Crft	2
2T271	Air Transport Crft	1
2G071	Log Planner	1
O21R3	Transportation	1
O21R3	Transportation	1
O12A3Y	Alft Navigator Genrl	1
O12A3Y	Alft Navigator Genrl	2
O12A3Y	Alft Navigator Genrl	1
O11A3Y	Alft Pilot Genrl	1
O11A3Y	Alft Pilot Genrl	1
WO11A3Y	Alft Pilot Genrl	1
1C371	Command/Control Crft	2
1C391	Command/Control Crft	1
1C371	Command/Control Jrym	1
X1A071	Inflt Refuel Crftmn	2
O11T3Y	Tanker Plt General	1
O11T3Y	Tanker Plt General	1
O12T3Y	Tanker Navigator General	2
O12T3Y	Tanker Navigator General	2
X1A271	Acft Loadmaster Crft	2
O12A3Y	Alft Navigator General	2
X1A170	Flight Engineer Supt	1
X1A071	Inflt Refuel Crftmn	2
1C072	Oper Res Mgmt Cftm	2
O11T3Y	Tanker Plt General	1
O11T3Y	Tanker Plt General	1
O12T3Y	Tanker Navigator General	1

Table 3.1—Continued

AFSC	Function	No.
X046F3	Flight Nurse	1
041A3	Health Svcs Admin	1
X4N071	Medical Svc Cfmn	1
1N071	Intell Appl Cftm	1
O14N3	Intelligence	1
3C071	Comm-Comp Sy Ops Cft	2

Table 3.2
AOC Staffing with ANG Unit-Based Augmentation

	1 AOC	6 AOCs
Active component	90	540
ANG	50	300
Total	140	840

ANG personnel, because AOC work generally requires more experienced and higher ranking personnel. This may provide some relief for units with a lot of talent but limited opportunity for promotion.

If the AMD augmentation units are colocated with AOC augmentation units, there may be a problem finding state ANG billets for reassignment. This has been a problem in the past. The NGB will have to take a role in identifying manpower that may be available in other state organizations. Adjacent states may help, but basing for these extra-state UTCs may require creative solutions.

Of course, current ANG AOC augmentation units may be located where it is difficult to support long-term recruitment of air mobility personnel. Other locations should thus be considered. Travis AFB, California, and McGuire AFB, New Jersey, may be good recruitment locations because they both house Expeditionary Mobility Task Forces in the active component. As these new mission opportunities occur, attention should be paid to locating the unit where the mission can be sustained.

This option, Option 1, would retain a core active duty capability, with the ANG serving first as augmentees and then growing into some level of air mobility expertise and deep knowledge. As a consequence, it is unlikely that the ANG in this option would become isolated from Air Force decisionmakers. This option is also easily managed by the individual state AG organizations.

Option 2: ANG Provides Regional In-Garrison Air Mobility Command and Control Utilizing Cross-Skilling

In this second option, we explore employing the ANG to provide in-garrison air mobility command and control. Instead of augmenting the AOC in a forward location, the ANG would develop and staff regional AMDs in CONUS. Since AMD taskings are also worked in the Combat Plans and Combat Operations divisions of the AOC, a well-developed information-sharing structure must be in place to link the forward and in-garrison units.

In this option, each COMAFFOR/Joint Force Air Component Commander (JFACC) would have an assigned regional AMD. Each COMAFFOR/JFACC would also retain some level of forward-deployed active component mobility expertise in each AOC division, as well as liaison support from the regional AMD. As mentioned previously, regional expertise already exists in New Jersey, California, and Illinois.

In addition, this option departs from the traditional view of the ANG as mirroring the active component and examines the effects of the ANG using highly experienced individuals to perform numerous and varied tasks—that is, cross-skilling—similar to the way contractors currently operate. This option exploits the unique differences and strengths of the ANG. There is no reason that the ANG could not achieve the same results that contractors do—if current Air Force constraints were eliminated.

For the TACC functional AOC, discussions are currently under way that would place an ANG unit in charge of TACC combat crew training in the future. This would create an infrastructure within the ANG that, in addition to the training mission, would provide a means for evaluating and testing new TACC systems and processes without

affecting operational databases and systems. It would also create a protected location for database backup and replication to ensure continuity in the event of a natural disaster or attack. The TACC ANG training cadre could include a standardization and evaluation function to help certify and evaluate TACC AOC weapon system combat crewmembers. Given its strengths of experience and mission continuity, the ANG seems well suited to the training and crew certification mission.

The TACC new mission planning effort is aimed at creating a support capability that will not just meet the daily requirement but also put the TACC in a posture to continue long-term operations. Again, this concept exploits ANG basic mission strengths. The infrastructure investment will professionalize the training mission and provide the means to work problems and new processes off line from the main operation. Care should be taken to ensure that the training mission does not become isolated from active component participation. Active forces could be provided a role within the mission, either through blended units or some other means.

In addition to AOC operational training, the TACC would also be a place for an AMD training or air mobility analytic services UTC. This would serve as a center of excellence for AOC air mobility products and services. As the air mobility data environment becomes richer, such services could include TDS network analysis, logistics planning, and cargo/passenger flow monitoring. The ANG has a large base of air mobility forces that would serve as the foundation for fulfilling this capability and sustaining it over time. Coupled with the ANG's ability to recruit to need provides a flexibility that is difficult to achieve in the active component.

This option considers building a TACC training facility and manning it with approximately 100 personnel in an ANG unit. (Initial plans place these personnel in the Illinois ANG.) The training workload would be shared with a combination of full- and part-time personnel. All work would be in-garrison at the training facility.

If the ANG were to staff two regional AMDs in-garrison (utilizing cross-skilling in each AMD), we estimate that the staffing would be approximately 280 ANG personnel (250 in-garrison and 30 forward-deployed as liaisons), with approximately 30 active component

personnel deployed forward as mobility experts in each division of the six AOCs (not including the TACC). Without cross-skilling, the typical 140-person AMD would have to increase its staffing levels to handle the additional workload. Employing cross-skilling, we estimate, provides a savings that could reduce the staffing level to that of a typical deployed AMD. The TACC training initiative currently calls for approximately 100 personnel. In total, this option would require approximately 410 personnel.

Option 3: Creating an Air Mobility Operational Command and Control Mission

The role and authority of a Director of Mobility Forces working for the JFACC in the JOA alongside the AOC-AMD needs to be studied to determine if some of these tasks and authority should move to the TACC, given its capability for a regionally focused but global view. In this option, we examined performing air mobility command and control functions at one centralized CONUS location. The logical location would be Scott AFB, Ill.—home of Headquarters AMC, the 18th Air Force (18AF), the TACC, and USTRANSCOM.

In this centralized reachback location, each COMAFFOR/JFACC would have a separate regional cell for air mobility support. The COMAFFOR/JFACCs would continue to retain their AMD liaisons and mobility expertise in each AOC division, but daily operations would be conducted in this centralized reachback location. The Air Mobility Center could also create more generic special products and services to which the combatant commanders, their AOC-AMDs, and regional in-garrison cells could subscribe.[11] For example, using the TACC as the in-garrison site, there would be cells dedicated to Central Command, Pacific Command, etc. They would be configured as belonging to the forward AOC-AMD presence but would remain in the rear with ready access to in-depth air mobility knowledge and services. One of the benefits of this option would be the potential to consolidate ANG unit management, saving overhead costs. Only one computer

[11] An example of the specialized product or service that the center would produce for AOC subscription could be a capability to analyze a TDS network operation.

helpdesk and one administrative staff would be needed. One of the risks would be that all capability would be in one location—making an excellent target for terrorists or other adversaries. For this option, we assume some economies of scale but maintain that there should be at least 280 ANG personnel (the equivalent of two AMDs) to manage the air mobility workload in-garrison and the forward-deployed liaison positions. Approximately 30 active component personnel would also deploy forward as mobility experts in each division of the six AOCs.

This option may require some changes to how UTC and units are managed to allow for cross-border participation from several states. It is not clear whether this option would result in lower ANG command administrative costs. Each state would still need to retain a Title 32 cadre to ensure that members were properly accounted for and led. (It is assumed that the member's federal duty location may be in another state while his training and administrative functions remain with his state AG.) One way of dealing with this and capturing the savings would be to assign the mission to one state and base members within that state. However, that may isolate the mission and create institutional constraints on accessions and promotions.

Alternative Staffing Solutions for Options 2 and 3

The air mobility C2 mission assumes some level of reachback in two of its options. With reachback comes some problems associated with not working on site with the commander and his AOC. Completely replacing an on-site AMD with an in-garrison ANG UTC may not be prudent. Continuing to deploy a forward element to help smooth communications and perform mission-planning tasks on-site may be more practical. Reachback generally works well when the task can be easily defined with specific and well-known end states. Air mobility tasks that need face-to-face consultation and tasks that are open-ended may not be appropriate for reachback given the current state of technology.

In addition, it may not be in the best interest of either the active component or the ANG for the majority of mobility planning and execution to be turned over to the ANG. Strategic planning for future operations should include mobility expertise, and the active component needs a way to grow that expertise. Having only five positions in

each of the six AOCs may not be sufficient above the wing C2 experience for the active component to develop mobility expertise. And the ANG may not want to assume complete responsibility for any mission. If the active component does not participate at all, it may come to undervalue both the mission and ANG participation. To address the question of balance between active component and ANG participation in the command and control mission area, we now look at sharing responsibility for mobility command and control in each of the two options previously identified in this section—at regional AMDs and at one centralized mobility center.

For Option 2, we now consider a mix of active component and ANG personnel to staff the two regional AMDs. Since we assume the ANG would employ cross-skilling, we estimate its staffing level at approximately 70 personnel in each AMD (140 personnel total, including the forward deployed liaisons). We do not assume cross-skilling for the active component; thus, we estimate the active component staffing level to be approximately 105 in each AMD.[12] The active component would continue to staff the forward-deployed location with personnel having mobility expertise in each division of the six AOCs (30 people). In the TACC, we make the same assumptions. In the TACC, the ANG staffing would be approximately 50 personnel; the active component would be approximately 70. Using both active component and ANG personnel, there would be approximately 310 active component and 190 ANG personnel, or 500 personnel in total, supporting Option 2.

Next we use the same assumptions to evaluate Option 3, one centralized reachback location for air mobility command and control. The active component staffing would be approximately 210 personnel in addition to the 30 forward-deployed personnel. The ANG, using cross-skilling, would require only about 140 personnel. The total for this option would be approximately 380.

There may be other considerations that would reduce costs or add significant value to mitigate the complexity and increased cost. One issue could be the ability to leverage air mobility C2 capability for the

[12] Since we did not assume cross-skilling for the active component, its staffing increased to handle the additional workload of the consolidated AMDs.

homeland defense and civil support mission. Another strategic opportunity would be the capability to bridge air mobility C2 expertise with Air Force Materiel Command (AFMC) logistics support capability. A key task of the AOC-AMD and the TACC is to work with joint logistics and service planners to sustain deployed forces.

Summary Findings

Although many issues associated with unit augmentation, reachback, and deployed in-garrison forces remain unresolved, there appears to be a general consensus that the ANG could prove to be beneficial to both forward presence and HD mission areas to extend the global reach of military power. However, new missions supporting the air mobility C2 mission require an understanding of how the ANG can use its strengths to add value and yet remain an ANG force. That means understanding how ANG forces are recruited, organized, sustained, and employed.

In brief, we found the following:

- Adding an AMD augmentation unit could extend current ANG Falconer AOC augmentation.
- Some AOC-AMD functional tasks may be well suited for a reachback support mission and for ANG force presentation.
- TACC is a complex operation requiring a variety of air mobility support functions, many of which could be improved through ANG involvement.
- Utilizing the ANG to provide forces working command and control missions via reachback could yield gains in both effectiveness and efficiency.
- ANG growth in the air mobility C2 mission area may currently be constrained by the ability of the NGB and individual states to release manpower from other missions.

Table 3.3 summarizes the staffing requirements for each of the options discussed in this chapter. The base case assumes seven AOCs

(including the TACC). To maintain the capabilities outlined in the DoD Strategic Planning Guidance and the Quadrennial Defense Review,[13] two AOCs would be fully staffed with 140 personnel each; and the TACC with 100 personnel, two AOCs would be staffed with the quick response package, 80 personnel each, and the remaining two AOCs would be staffed with the initial response package, just 20 personnel each. We assume the ANG could support approximately 20 percent of the AMD staffing requirement at each of these levels. Some of these ANG augmentees could come from AOC augmentation packages (approximately 5 per level of engagement). The others could come from individual ANG volunteers. Option 1 ties augmentation units to a specific AOR, creating six 140-person AMDs (not including the TACC). This option assumes the ANG would develop a 50-person

Table 3.3
Air Mobility Staffing Summary

Manpower	Baseline	Option 1[a]	Option 2	Blended Option 2	Option 3	Blended Option 3
Active component	464	540	30	310	30	240
ANG	116[b]	300	380	190	280	140
Total	580	840	410	500	310	380

[a] Does not include augmentation for the TACC.

[b] We assume the ANG could support approximately 20 percent of the AMD staffing requirement because the ANG has contributed significantly to past AEF and contingency operations on a voluntary basis. We set the volunteer rate at 20 percent, which is the ANG proportion of the total force. In addition, part of the requirement can be satisfied using ANG authorizations in the current Falconer AOC augmentation UTC (7FVX5).

[13] The guidance specifies that capabilities will be created to: ensure homeland defense; deter aggression in four major areas of the world, and engage in a number of small scale contingencies if needed; and if deterrence fails in the four areas of strategic importance, to be able to engage in two major contingency operations (MCOs) simultaneously; with the ability to win one decisively while engaging in the other until the first is won; and then win the second MCO.

AMD augmentation unit, reducing the active component requirement to approximately 90 personnel per AMD. Option 2 assumes three regional AMDs—two Falconer AOC-AMDs and the TACC functional AOC-AMD. The ANG would assume the reachback staffing responsibilities as well as the forward-deployed command liaison functions in Option 2. There would still be a small forward-deployed active component consisting of mobility support personnel in each AOC division. The Falconer AOC-AMDs could be staffed at 140 personnel each plus five active component personnel forward-deployed to each of the six AOCs (30 active component total). The TACC could have 100 personnel for a total of 380 ANG and 30 active component in Option 2. Alternative staffing for Option 2 could include blending. Blending Option 2 would result in 310 active component personnel (105 in each regional AMD, 70 in the TACC, and 30 forward-deployed) and 190 ANG personnel (70 in each regional AMD and 50 in the TACC). For Option 3, we assume one centralized AMD with 280 ANG personnel and 30 active component to serve as mobility expertise in each of the six AOCs. Again employing alternative staffing methods, such as blending, Option 3 would result in 240 active component personnel (210 in the mobility center and 30 forward-deployed) and 140 ANG personnel in the mobility center).

CHAPTER FOUR

Potential COMAFFOR Warfighting Operations Support Postures

In this chapter, we apply our methodology to the COMAFFOR staff, another key part of the Warfighting Headquarters construct—one of the two core areas highlighted in PBD 720 as a focus for the Air Force. Recent military operations in Bosnia, Kosovo, Afghanistan, and now in Iraq have increased the awareness of the importance of the COMAFFOR's staff (called the AFFOR) functional capability at the operational level. The staff is the operational commander's instrument for shaping the combat power of the force presented across time, maintaining service administrative control, and providing combat support sustainment capability to maintain the desired level of combat power—all necessary to support the AEF.[1] The Air Force has experimented with how best to meet staff requirements, generally keeping COMAFFOR capability at the NAF level, but sometimes pulling it back to the MAJCOM when necessary to maintain operational tempo in the joint operations area or to better coordinate theater-wide combat support, such as was done during the Kosovo operation.

The chapter offers a spectrum of options for assigning portions of COMAFFOR staff mission to the ANG to provide an additional level of warfighting headquarters support. This method of augmentation has had some success in meeting USAFE and PACAF AOC manpower requirements. Designed to provide augmentation in tiers

[1] See Appendix D for background information on current COMAFFOR (AFFOR) staff postures and Warfighting Headquarters initiatives. Also see Appendix E for a detailed listing of AFFOR staff duties by functional area.

that are tied to operational requirements, the relationships between the gaining command and the supporting ANG AOGs have grown in importance in maintaining experience levels and aiding in continuity of operations. The use of the ANG for the COMAFFOR staff mission could offset the historic shortfalls in meeting staffing requirements when drawn from the active component. Thus, active component staffing requirements could be reduced and personnel used elsewhere—in other critical mission areas or toward the end-strength manpower reductions—while capitalizing on the strengths of the ANG.

Operational and Combat Support Requirements and Existing Force Options

The Air Force representation to the combatant commander is the COMAFFOR. The COMAFFOR plans and executes all air and space operations in the AOR. The COMAFFOR is also responsible for the care and feeding of all Air Force personnel engaged in operations in the AOR. To help him or her fulfill these responsibilities, the COMAFFOR commands two organizations: the AOC and an AFFOR staff. The AOC function typically concentrates on prosecuting the operation. The AFFOR staff primarily concentrates on enabling the forces to accomplish the assigned missions by ensuring that all required support is available (care and feeding).

In the past, the COMAFFOR staffing requirements were drawn from personnel in a NAF. The 1990-era NAFs were undermanned, with some functional staff positions not represented. This resulted in forces dealing directly with MAJCOM functional staff in what was called a "skip echelon" concept. Also, the Air Force emphasis has historically been on the AOC and on operational-level air and space tasking order (ATO) development and C2 functions at the expense of a providing a full-time staff.

After the initial campaign in Afghanistan during OEF, the combatant commander and supporting MAJCOM recognized the need to build a forward staff—not just an AOC but also a fully functioning staff. These experiences influenced the present operational-level

headquarters restructure, now under way, resulting in the creation of the Warfighting Headquarters (WFHQ) (U.S. Air Force, September 2003).

The WFHQ construct being implemented today is a component command structure that includes a Falconer AOC and a fully functional staff centered on COMAFFOR warfighting tasks. A potential problem with this operational level restructure is identifying enough manpower to maintain a sufficient level of AOC and staff manning from peacetime to crisis and to a fully engaged wartime operations.

Currently, following a WFHQ construct, operations in Southwest Asia are being supported with a forward staff and staff from the CONUS. ANG personnel in ANG-led AOGs already augment AOCs in PACAF and USAFE with success. The relationship that has developed is built on leveraging the ANG military experience gained by working in both regions. In addition, the ANG AOG commanders have been able to recruit the baseline and niche mission specialties needed by the Falconer AOC, providing active duty commanders with a more fully manned capability. Their UTCs have been built around the specific needs of the active AOGs operating the in-theater AOCs while still providing the foundational manpower necessary to move the two active AOCs to a higher level of activity (Tier 2) in a crisis. If properly configured, the AFFOR staff function may be a good potential mission for ANG participation.

ANG Goals, Strengths, and Limitations

If the force is to be successfully integrated to fully support the proposed WFHQ staff functions, shortfalls in manpower and knowledge must be addressed. This will require some creative solutions. Current AFFOR staff positions offer the opportunity to take advantage of ANG strengths, such as a skilled and experienced workforce and community support and involvement, while mitigating ANG limitations, such as

unit deployment times.[2] It is also useful to note that since the WFHQ concept is still evolving, it could benefit from being operated by a stable and experienced work force.

There is some evidence that in situations where the process and/or desired result is not readily apparent, a more experienced and mature force can help to work through the problems more effectively. Active duty personnel may not be using state-of-the-art civilian skills (for example, information management and technology), whereas the ANG, which has more recruitment latitude, may be able to find military ANG personnel with the necessary staff skills.

The active component may be able to recognize many of the same efficiencies as the ANG. Historically, however, the active component has had difficulty allowing individuals to gain deep knowledge in single career fields. As previously mentioned, the ANG also has some added flexibility in recruiting to need for high-value and emergent career specialties. Local National Guard organizations have an added incentive for attracting personnel who may be at mid-career or have deep roots in the community. As units are tasked to provide a capability over time, they can help even out experience shortfalls and create an execution strategy for developing and fielding a mission capability. ANG costs increase as more personnel are needed to deploy, or when the mission requires a large 24/7 presence.[3]

Finally, the ANG force is ultimately a military force. It can be used where a contractor or government civilian work force cannot be used. The unique ability to help bridge civilian specialties may be valuable in this context.

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[2] The ANG can support sizable deployment commitments if given the opportunity to aggregate individual volunteers and to rainbow personnel from several units to form a complete unit from the parts of several different units.

[3] Discussions with 1AF personnel on a pre–9/11 Roles and Missions (RAM) study commissioned by Maj Gen Larry Arnold, 1AF/CC, January and June 2005.

Assignment Criteria Findings

To be successful, a commander needs access to experienced personnel who know and understand the military challenges in his or her AOR. The WFHQ staff will need experienced and mature personnel for long-term outlook and program management skills. Active duty personnel generally rotate through headquarters assignments in two- to three-year tours, which can make maintaining a knowledge base with sufficient depth difficult. In the past, government civilians have provided some functional depth, but may not be appropriate if a military person is needed in the position.

Past experience with using the ANG to augment the AOC seems to indicate that the WFHQ staff may be a good potential mission for ANG participation. The long-term focus on AOR challenges would play to ANG strengths and its ability to provide continuity of mission over time to active commanders. If properly configured, the warfighting staff augmentation would allow some level of in-garrison work, either on the CONUS headquarters site or via staff reachback from ANG home stations.

For these reasons, we use the decision tree (see Appendix A for details) to evaluate whether the warfighting headquarters mission would be suitable as a potential mission for the ANG. All sections of the decision tree indicate that the AFFOR staff could be suitable for mission assignment to the ANG. However, ANG personnel engaged as a warfighting headquarters staff must have access to the active duty core staff on a regular basis during peacetime. Their training should be built around key issues and programs that the headquarters is dealing with. This will allow spin-up time to be minimized when the unit is activated to augment COMAFFOR staff during a crisis.

In addition, because the decision to activate the ANG is almost always a political process that can lag the military need, the activation process should be thought out, with deliberate operational thresholds as triggers. This is a serious consideration in selecting the ANG or other reserve forces for augmentation missions. Without an acceptable solution, the active force could find itself in the position of moving into

a crisis without access to the manpower and experience it needs to prepare and prosecute military operations.

Portfolio of Candidate Mission Options

As the Air Force moves to the warfighter headquarters construct,[4] each of the nine proposed WFHQs will need a staff to support it during peacetime, with the ability to increase staffing levels to provide a surge capability during wartime operations. In this section, we evaluate options for using the ANG to augment the WFHQ AFFOR staff during wartime operations.

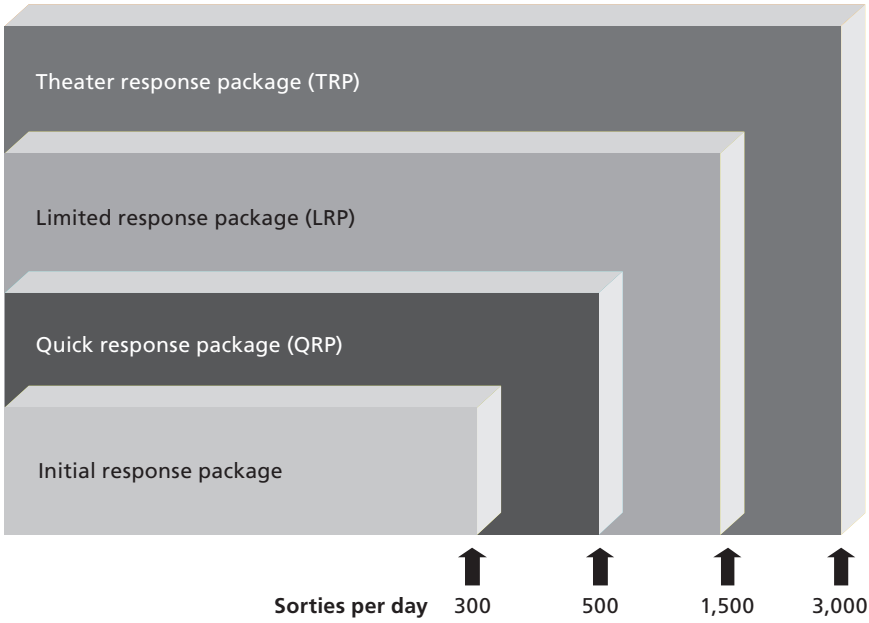
The augmentation of AFFOR staff positions by the ANG raises the questions of effectiveness and efficiency. If the ANG were to augment AFFOR staff during wartime operations, it would mean that some capability must be maintained on a 24/7 basis. However, there is precedent in the C2 mission area for this level of support (for example, regional and sector support provided by ANG personnel assigned to NORAD and NORTHCOM). The ANG also augments the Falconer AOC with three ANG Air Operations Groups in this sort of support. So even though historically the bulk of ANG force presentation has been at the forces level (for example, F-16 squadrons and groups) and not at the operational headquarters level, these current missions should provide some data on performance and suitability.

Base Case: Individual Augmentation Using AFFOR Staff UTC

First, we consider the current AFFOR staffing strategy. The NAF and/or MAJCOM staff provide the peacetime, standing AFFOR staff. We assume that the standing AFFOR staff would be the initial response package, staffed to work with an AOC flying approximately 300 sorties per day (see Figure 4.1). As the WFHQs are stood up, their staff will become the peacetime AFFOR staff.

[4] The full warfighter headquarters end-to-end operation was considered in this study to include non-AOC command and control functions performed for the COMAFFOR and staff.

Figure 4.1
Levels of AFFOR Staffing



SOURCE: USAF (2002b), p. 17.
RAND *MG539-4.1*

Table 4.1 lists the approximate number of personnel needed for a standing peacetime AFFOR staff.

Augmentation then fills in the next level of support, the quick response package, providing a staffing-level able to handle a 500-sortie-per-day operation (see Figure 4.1). To bring the AFFOR staff to the next level, approximately 80 personnel are needed. Currently, this staffing comes from the MAJCOM staff, support, and training organizations (such as the former Air Force Command and Control Training and Innovation Group), from designated units, other NAFs, or other MAJCOMs on an individual or small-group basis. The ANG could be used to help provide some of this additional staffing. We assume the ANG would be able to provide approximately 20 percent of the

Table 4.1
Proposed Standing AFFOR Staffing Levels

Position	Staffing
CC	15
A1	5
A2	16
A3	16
A4	71
A5	5
A6	22
A7	6
A8	3
A9	2
JA	5
PA	2
HC	2
SE	4
SF	5
SG	4
OSI	2
Total	185

additional staffing required—approximately 16 people per AFFOR staff.[5]

Although using ANG personnel for AFFOR staff augmentation would give the Air Force another staffing pool from which to fill vacant positions, the benefit to the mission is less than optimal. Individual or small groups of ANG personnel used to augment an AFFOR staff would be functional experts. They would have deep knowledge in their functional areas, but they would not have the benefit of working together and training as a functional AFFOR staff. Using person-

[5] Since the ANG accounts for approximately 20 percent of the total Air Force, we assume that a 20-percent volunteer rate for ANG augmentation would be obtainable.

nel from different units (active/reserve from different locations) does not allow personnel the experience of training together or of performing unique AFFOR staff functions. Thus, the transition to a quick-response package becomes difficult. In addition, this augmentation would require ANG personnel to deploy forward to work with the AFFOR staff. If the ANG is not mobilized, this augmentation would be dependent on individual volunteers available to deploy forward.

Option 1: Provide Unit-Based Augmentation Using a Force-Provider Construct

In this case, we consider using the ANG to provide augmentation using a unit-based, force-provider construct. Individual ANG units could be tasked to augment the standing AFFOR staff during wartime operations, bringing the AFFOR staff to the next level of support, the quick-response package. We will call this an AFFOR augmentation UTC.

Similar to the Falconer AOC augmentation UTC and the proposed Air Mobility augmentation UTC, the AFFOR augmentation UTC would consist of a variety of AFSCs used to supplement the existing peacetime AFFOR staff. This AFFOR augmentation unit could deploy anywhere in the world to supplement an existing WFHQ. Table 4.2 outlines a proposed AFFOR staff augmentation UTC.

This type of augmentation allows for the benefits of a unit-based approach. A unit of 80 ANG personnel can train together and function as a staff on a daily basis. When asked to augment the peacetime AFFOR staff, system, tools, and processes will already be in place within the unit. As a unit, these personnel will train together, be educated together, and participate in exercises together. As the WFHQs are stood up, the ANG could assume responsibility for augmenting AFFOR staffs during contingency operations. This augmentation would help sustain expanded operations when a crisis develops into a more protracted engagement. Eventually, this option would benefit from the ANG's depth of experience and stable workforce.

DoD Strategic Planning Guidance and the Quadrennial Defense Review specify that the Air Force should have the capability to be able to engage in two major contingency operations simultaneously. Since

Table 4.2
Proposed AFFOR Augmentation

Position	Staffing
CC	1
A1	2
A2	2
A3	2
A4	30
A5	5
A6	6
A7	10
A8	4
A9	2
JA	2
PA	2
HC	2
SE	2
SF	4
SG	2
OSI	2
Total	80

this AFFOR augmentation capability could be deployed to any WFHQ, three AFFOR augmentation units would be required if this option is implemented—one for each contingency with a backup for AEF rotation if a contingency lasts longer than an AEF cycle. The total ANG personnel requirement would be approximately 240. Exploiting the ANG strengths, we anticipate AFFOR UTC augmentation by unit would be more effective, but not necessarily more efficient, than other forms of augmentation.

Option 2: Provide Unit-Based, AOR-Specific Augmentation Using a Force-Provider Construct

The AFFOR staff can be more regionally or functionally unique when compared to similar staff positions in other headquarters. By definition, staff positions require less rote work and more functional expertise and judgment. AFFOR staff workloads evolve under the guidance of a commander and the WFHQ's operational environment. In this option, we evaluate providing unit-based augmentation with AOR-specific orientation. Using a force-provider construct as in Option 1, we assign individual ANG units to specific theaters or areas of responsibility to provide augmentation.

In this option, the ANG unit would use the active component partner AFFOR procedures, directives, and practices for manning and operating the C2 operation. During contingencies, the ANG unit would already be trained and equipped to work with the partner active component AFFOR staff. This sort of augmentation would take full advantage of ANG strengths—deep knowledge and expertise.

The ANG partner units would be able to study the needs of the parent AFFOR staff and may be able to recruit new personnel to meet evolving needs of the staff. They also can grow capabilities aimed directly at AOR issues and special needs. Given time and experience, a better understanding of the entire requirement could drive efficiencies within the ANG augmentation unit.

To maintain the capabilities outlined in the DoD Strategic Planning Guidance and the Quadrennial Defense Review, the augmentation of each AFFOR staff would require the participation of two ANG units. Considering only the four main Falconer WFHQs,[6] the total ANG personnel requirement would be approximately 640 personnel (4 WFHQs × 2 units × 80 personnel per unit). If two contingencies occur in the same AOR and last longer than an AEF cycle, further augmentation could be provided by units tied to other AORs or by another level of augmentation built into each augmentation unit.

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[6] Air Force Central Command (AFCENT), Air Force Pacific Command (AFPAC), Air Forces, Europe (AFEUR), and Air Forces, Korea (AFKOR).

In this option, because the ANG unit would be working in the same theater or area of responsibility in every exercise or contingency, over time they could develop efficiencies in their work practices that may not be possible with single augmentation (the base case) or unit augmentation in differing locations (Option 1). The ANG unit could tailor itself to best meet the needs of the gaining active component AFFOR staff. With experience and practice, the ANG may be able to reduce the staffing requirement in the larger functions (for example, the A4 or A7). Or perhaps the ANG could develop a working relationship with the active component AFFOR staff whereby it would not need to staff some functions (for example, the A1 or A2), relying on the active component AFFOR staff for those functions. Using a conservative estimate, we assume ANG efficiencies—once personnel are trained—of about 10 percent, because of deep knowledge and extensive experience. This could reduce the total staffing requirement to approximately 576 ANG personnel.[7]

COMAFFOR Center of Excellence

As the Air Force drives deeper into the warfighting headquarters and COMAFFOR construct and gains experience with an operationally focused operational level headquarters, it may become evident that some functional tasks could be done satisfactorily from CONUS. A key question for the ANG in evaluating these options will be the degree of centralization necessary to meet the demand for services. Discussions with PACAF and USAFE personnel have indicated that there is added value in an ANG unit-based, AOR-specific presentation (Option 2). ACC has indicated that it would prefer not to assign a UTC to a specific AOC (Option 1), maintaining more centralized control. Another alternative construct, a Center of Excellence, assumes that they both may be right. There may be some staff tasks that the ANG could perform in a construct that places the unit in a direct partnership with a

[7] Eighty personnel = 10 percent savings = 72 personnel. 72 x 8 units = 576 total ANG personnel.

COMAFFOR staff. There may also be some more-generic rote tasks that do not require direct partnership. In addition, some tasks may require deep knowledge over a functional area or may involve highly specialized analytical staff tools or instruments. Each of the options could be enhanced by creating a centralized COMAFFOR command function support center where forward-deployed operational-level commanders could reach back for functional staff and operational force management resources.

The ANG has had the most success in augmenting the AOC and in performing reachback activity where the tasks can generally be well defined, with clear processes and expectations for performance. There may be staff work that will fit these criteria, work that does not require specialized knowledge of the region or an ongoing relationship with the COMAFFOR staff and/or senior leadership.

More centralization may make it easier for ANG commanders to meet the mission demand with a larger pool of manpower. But more centralization may make it difficult for ANG state organizations to fully participate in this new mission area. There are also questions about crossing state boundaries for doing in-garrison work. At this stage in the analysis, these limitations do not appear to be serious, but they must be deliberated and decided prior to launching new mission capabilities to meet warfighters' demand for staff support.

As technology improves, it may be possible to manage disparate, geographically separated, in-garrison units, each dedicated and assigned to its own WFHQ, from a lead site with enabling functional support. These units could provide training, server backup and replication capability, and operational testing and evaluation.

There is also the question of balance between active and ANG participation in the C2 mission area. There is some concern that isolating ANG personnel in dead-end mission areas with no participation by the active component would lead to undervaluing the ANG's contribution. This is why we did not consider turning the entire AFFOR staff capability over to the ANG. Likewise, the ANG should identify areas in active duty organizations where new command and control systems and processes are developed. Involving ANG personnel in these areas would not only best utilize their experience but would also help main-

tain ANG currency and creditability as the mission evolves. These positions could also serve as a means to broaden ANG experts and help career progression. They could include positions with the Air Force Air and Space Doctrine Center and the Air Force Weapon School, and development assignments with the AFMC and the Air Force Command, Control, Intelligence, Surveillance and Reconniassance Center (AFC2ISRC).

More than the other options, this option requires a strong sense of when the work is "training" and when the work can only be accomplished in a U.S. Title 10 or federal status. Centralizing deep expertise in a COMAFFOR Center of Excellence would not be very useful if the individual COMAFFOR did not have ready access to that expertise. How personnel would be activated needs to be a deliberate process that can work quickly.

Other Implementation Considerations

If the ANG were to consider assuming responsibility for AFFOR staff augmentation, it may need to consider geographic locations where the recruitment area could support the types of skills and experience needed for the position. Although personnel can be recruited from adjacent states, the friction of getting to the duty location can work against retaining an Air Guardsman over time. Likewise, there must be promotion opportunity—while not as great as that of the active component, it still is important to consider when selecting missions where the ANG can have a positive impact.

BRAC is another consideration. Looking only at installations where expeditionary combat support (ECS) is affected, the May 2005 DoD BRAC plan calls for closing three ANG installations and realigning 16 others where ECS functions are currently staffed (see Appendix G for a listing of the installations). Personnel from these installations may be candidates to assume a COMAFFOR augmentation mission. Current projections show that ECS personnel affected by BRAC at these 19 installations may well exceed the number of personnel that would be required to staff any of the options discussed in this chapter.

If an ANG installation is being realigned, personnel could remain on site. If the installation is being closed, the unit may have to relocate. If unit-based augmentation with AOR-specific alignment (Option 2) is desired, geographic location may be considered. It may also make sense to colocate the AFFOR augmentation units with the AOC augmentation units. Since they will work together during wartime operations, they would use the same systems, train together, and go to war together if colocated. For example, ECS units in Missouri and Kansas could work with the existing AOC augmentation unit in St Louis to augment PACAF. The ECS units in Massachusetts and Connecticut could work with the existing AOC unit in Syracuse, N.Y., to support USAFE. The unit in Illinois could support the U.S. Transportation Command (USTRANSCOM).

Since ACC has expressed a desire for more AOC augmentation units, these ECS BRAC closures and realignment units may be a good source of functional expertise to staff both AFFOR and AOC augmentation units.

Summary Findings

Increasing ANG participation in the COMAFFOR roles and responsibilities provides an opportunity both to significantly reduce active duty participation and to improve the execution of this warfighting function. The deep knowledge and experience resident in the ANG, coupled with task-specific training and a single mission focus on these functions, could significantly improve support and help to further define the roles of missions of the AFFOR staff. Additionally, pending QDR and BRAC reviews drive the need to review the mix of mission assignments among the active and reserve components.

This chapter has shown that the movement of responsibilities for AFFOR staff UTCs from the active component to the ANG to be a viable option. Clearly the ANG is ready and able to fill manning document requirements on a single person or single function capability (the base case) with little or no training and no major modifications to the present system. The concept of continuing to staff these require-

ments with individuals drawn from various units who have little or no interaction prior to assignment and a complete lack of formal training appears to downplay the importance of these opportunities.

Establishing ANG units with a specific focus on providing COMAFFOR staff capabilities (Options 1 and 2) presents an opportunity both to improve the process and to reduce the number of active duty personnel required to perform the assigned mission. The concept of creating ANG units to focus on specific regions (Option 2) further enhances their ability to perform the assigned mission. The ability to work face to face on a daily basis with the active component WFHQ that the unit will augment in time of crisis is bound to strengthen the relationship. The ANG should be able to focus training and process improvements on areas that warfighters identify as most affecting their mission. The ANG unit could improve its training and exercise opportunities by reducing its coordination requirements to a single WFHQ. Additionally, by focusing on a single AOR, the unit should have a better understanding of regionally specific issues as well as an improved view of the requirements and challenges it will face.

The Air Force has long benefited from exercises and training. Units assigned staff responsibilities should be given the opportunity to participate in exercises. Once the ANG is given a defined responsibility, it should be positioned to develop and implement COMAFFOR staff training processes. Additionally, once these staffs begin to operate and train together and work with the standing active component WFHQ, they may be able to create synergies that will allow for further staffing reductions.

We find that all three options could improve COMAFFOR staff support. However, the unit-based option with units assigned to specific areas of responsibility (AORs) holds the most promise for significantly improving COMAFFOR support. If a decision to utilize the ANG in this area is made, reachback should be considered in unit design. The idea of providing some portions of COMAFFOR staff functions from CONUS appears desirable. Improvements in technology, coupled with continually improving communications capability, have reduced the need for some face-to-face interaction. The ANG may be well suited to support the WFHQ if significant portions of that support could

be located in CONUS. As the ANG gains expertise and capability in this area, this may allow the active component to reduce manpower requirements needed to support COMAFFOR responsibilities.

Table 4.3 summarizes the manpower effects of the three options.

Table 4.3
Summary of AFFOR Augmentation Options

Manpower	Baseline Individual Augmentation	Option 1: Unit-Based Augmentation	Option 2: AOR-Specific, Unit-Based Augmentation
AFFOR staff	185	185	185
Augmentation unit	80	80	72–80
Augmentation required	2 units	3 units	8 units
Total ANG participation	32[a]	240	576–640

[a] We assume the ANG could support approximately 20 percent of the AFFOR staffing requirement (16 personnel per AFFOR), since the ANG accounts for approximately 20 percent of the total Air Force.

CHAPTER FIVE

Intermediate-Level Maintenance Options for Supporting the Future Total Force

In this chapter, we evaluate intermediate-level maintenance (ILM), the area from which a large portion of the manpower end-strength reductions will come.[1] BRAC calls for the retirement of a significant number of legacy aircraft, leaving the ANG with a large number of highly trained and highly experienced personnel with no aircraft to support and operate (DoD, 2005a, Appendix Q). In addition, initiatives sponsored by the Future Total Force (FTF)[2] (which include many of the BRAC-approved realignments) also affect total force staffing, basing, and employment. We therefore evaluated the potential of the Air National Guard to conduct some or all ILM functions for active component flying units, in addition to meeting ANG ILM requirements in the post-BRAC environment. (See Appendix F for information on current ILM processes.) ILM is a necessary warfighting capability that enables rapidly configured support, speedy deployment and employment, and a smooth shift to sustainment, all expeditionary operational effects of the AEF.[3] Implementation of the FTF initiatives (listed in Appendix H) has implications for the organizational and reporting structure, equipment utilization and maintenance, and staff-

[1] *Intermediate-level maintenance* (ILM) consists of repairing failed line replaceable units (LRUs), which have been removed from the aircraft, in a shop or on a test bench.

[2] FTF is now called total force integration (TFI).

[3] New aircraft, even those currently under development, will continue to have an ILM requirement.

ing composition at active component, ANG, and, if formed, associate bases.[4]

This chapter offers a spectrum of ILM force-posture options for the future total force. Specifically, it evaluates post-BRAC options in which the ANG assumes responsibilities to support active component ILM needs, in addition to meeting ILM needs for ANG-assigned aircraft, by developing and fielding new component maintenance squadrons (CMSs) and equipment maintenance squadrons (EMSs). It also evaluates post-FTF options in which the ANG assumes responsibilities to support maintenance needs at active bases. The specific options evaluate staffing mix, taking into account both BRAC and proposed FTF initiatives. If using the ANG in the ILM mission area could offset active component staffing requirements, active component staffing could be used elsewhere—in other critical mission areas or toward end-strength manpower reductions—while capitalizing on the strengths of the ANG.

Operational and Combat Support Requirements and Existing Force Options

The maintenance career field is the largest set of personnel authorizations in the Air Force. Almost one-quarter of total authorized end strength of 359,300[5] personnel are in the maintenance area.[6] Table 5.1 presents the Air Force FY05 manpower authorizations in the aircraft/munitions maintenance specialty areas for the ANG and for the CONUS-based Air Combat Command and Air Mobility Command. The table also shows how these authorizations are apportioned between organizational and intermediate-level units.

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[4] Associate bases involve the sharing of equipment by the active and reserve components.

[5] See http://www.globalsecurity.org/military/agency/end-strength.htm.

[6] Roughly 83,854, or 23 percent. See Consolidated Manpower Database (CMDB), as of September 30, 2004. Data file provided by the Air Force Directorate of Personnel.

Table 5.1
Air Force FY2005 Manpower Authorizations

	Air Combat Command	Air Mobility Command	Air National Guard	
			Full-Time	Part-Time
Organizational-level authorizations	19,124	9,171	6,606	9,227
Intermediate-level authorizations	16,191	3,660	5,788	11,878
Total authorizations	35,315	12,831	12,394	21,105

SOURCE: CMDB as of September 30, 2004. Data file provided by the Air Force Directorate of Personnel.

The AEF concept substitutes deployment and employment speed for presence. It relies on deployment packages consisting of only what is absolutely necessary to support the deploying unit while relying on reachback to the extent possible. During recent operations, AEF rotational experience has supported deployed operations in Southwest Asia and elsewhere with minimal deployment of ILM personnel and equipment. Units deploy for 90 days or more with their aircraft, operators, and flightline maintenance. Rather than deploying full ILM personnel and equipment to the forward operating location and then rotating them back as replacement units arrive, component pipelines are established to evacuate failed line replaceable units (LRUs) and to resupply with serviceable spares. Component repair is variously accomplished at centralized intermediate repair facilities (CIRFs) in the region, at the unit's home station, at an Air Logistics Center, or at some other point in the general Air Force logistics system.

So, current AEF operations imply that a CONUS-based flying wing's flightline maintenance units will participate heavily in its AEF rotational deployment. In particular, four sections within the Maintenance Group have heavy deployment requirements: Aerospace Ground Equipment (AGE) Flight, Conventional Munitions Flight, and the

Fuels and Egress sections in the Accessories Flight.[7] The remainder of the wing's ILM units, however, will experience much less AEF deployment activity.

ANG Goals, Strengths, and Limitations

ILM operations that are not subject to frequent deployments offer the opportunity to take advantage of ANG strengths such as a skilled and experienced workforce and community support and involvement while mitigating ANG limitations such as deployment volunteer rates.

The ILM workload is technically complex and demanding. It is an area where depth of experience counts. Evidence suggests, for example, that a seasoned, well-experienced jet engine intermediate maintenance (JEIM) team can complete an engine rebuild in half the time required by a typical active duty JEIM team, which typically includes a large percentage of trainees. Thus, the ILM function is particularly well suited to benefit from the high expertise levels and stable work force teams that can be established and sustained by ANG units.[8]

Active duty flying units usually rotate their personnel from base to base every few years—for career development needs and to share overseas tours of duty requirements. Although active duty personnel rotate fairly frequently, the typical CONUS base itself is actually quite stable. The Air Force establishes a flying unit at a given base, and the unit usually operates there for decades. Thus, the ILM mission at a given CONUS location is also quite stable. Nothing about the ILM mission itself requires frequent permanent change of station personnel moves to operate or sustain it. In fact, the constant rotation of new people in the active force (particularly relatively inexperienced new people) is a constant challenge to accomplishing the ILM mission. A

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[7] The shop utilization data are from interviews with 20th Fighter Wing (FW) and 1st FW maintenance organizations.

[8] Discussions with members of the Engine Management Shop, 1st FW, Langley Air Force Base, Va.

stable, deeply experienced ANG unit could prove to be more effective and more efficient in this role.

Although it is difficult to precisely quantify its effect at this point, the standard AEF rotational tempo may eventually affect ANG retention and recruitment, particularly for part-time ANG personnel. Under AEF procedures, however, ILM personnel have a relatively low percentage of tasking in AEF deployments. This level of involvement should be such that it can be well supported by a traditional ANG mix of full-time and part-time personnel.

Assignment Criteria Findings

There are several good reasons to provide LRU resupply in lieu of deployed ILM. For example, it will reduce the size of the deployment package, thus increasing the speed and ease of unit deployment and reducing the airlift requirement. It would also reduce the unit's forward-deployed footprint and its support burden (billeting, medical, force protection, etc.) at the forward operating location. This can be especially important because AEF operating locations have tended to be bare-base environments where support is problematic.

Working through the decision tree (see Appendix A for details), we evaluated ILM operations as a potential mission area for the Air National Guard. All sections of the decision tree indicated that the ILM mission would be well suited for ANG participation. The ILM function could be organized as a stand-alone unit with its own chain of command, operating policies, schedules, and work rules. As such, an ANG ILM squadron could be an organic unit, reporting to the state AG and available for state tasking. The squadron could operate on an active duty base (essentially as a tenant unit) or at its home ANG base whose federal function would be to support the active wing's flying mission. From the flying wing's perspective, the ANG ILM unit would simply act as a source of supply for serviceable spare components, much as the Defense Logistics Agency (DLA) and AFMC do today.

Forming ANG ILM squadrons could enable the Air Force to capture and retain a stable base of dedicated, well-trained maintenance

expertise that might otherwise be lost due to force structure reductions in the ANG (from BRAC and FTF initiatives). The active component could expect to benefit in other ways as well. For example, the addition of a stable ANG ILM workforce at an active component base would reduce the aggregate maintenance training requirement at that base while at the same time providing a much larger pool of maintenance expertise that could be exploited to perform maintenance upgrade training for the active duty personnel who require it.

Transferring the ILM function at an active component base to the ANG would also free up a significant number of maintenance manpower authorizations in the active force. These authorizations could be applied against critical shortages in other highly stressed career areas, or they could simply be applied against mandated reductions in total end strength.

For these reasons, the ILM mission area may be a reasonable mission area for the ANG. In the next section we develop the ANG ILM concept further by illustrating an example based on the F-16 aircraft.

Portfolio of Candidate Mission Options

To understand how force structure changes (from BRAC and proposed FTF initiatives) could affect ILM and ANG support of active flying units, we consider the case of the F-16. This aircraft is flown by both the ANG and the active component in the Air Combat Command (ACC). BRAC force structure changes include the retirement of a number of the older versions of this aircraft, many of which are assigned to ANG wings, well before F-35 replacement aircraft will be available. FTF initiatives include converting ANG and selected ACC F-16 bases to associate bases, which involves the sharing of equipment by the ANG and active component.

Manpower authorizations at any specific unit are based on the number of assigned aircraft, the wartime flying hour program assigned to the aircraft, and other factors. Exact authorizations can vary from base to base. The following analysis is based on standard planning factors and represents generic manpower requirements as estimated by

ACC using the Logistics Composite Model (LCOM).[9] Tables 5.2 and 5.3 compare notional ILM manpower requirements at an ACC F-16 wing (Table 5.2) and the comparable manning at three ANG F-16 units (Table 5.3).

Table 5.2
F-16 Maintenance Authorizations in an Active Component Wing

ACC F-16 Wing	No.
Aircraft assigned	72
Total maintenance authorizations	1,852
Total ILM authorizations (CMS/EMS)	856
"High deployment" specialists	360
"Moderate deployment" specialists	496

SOURCE: 2003 ACC LCOM Analysis for Shaw AFB, S.C.

Table 5.3
F-16 Maintenance Authorizations in Three ANG F-16 Wings

	Dannelly AGS,[a] Ala. 15 PAA[b] BRAC: 18 PAA		McEntire AGS, S.C. 15 PAA BRAC: 24 PAA		Hector AGS, N.D. 15 PAA BRAC: 0 PAA	
Aircraft Assigned	Full-Time	Part-Time	Full-Time	Part-Time	Full-Time	Part-Time
Total maintenance authorizations	110	299	122	294	151	285
Subset of ILM authorizations	60	133	63	137	74	150

SOURCE: Air Force unit manning document (UMD), FY05.
[a] AGS = Air Guard Station.
[b] PAA = Primary assigned aircraft.

[9] LCOM is a statistical simulation model that the Air Force uses to gauge direct maintenance man-hours as well as the Air Force–wide regulations that establish ceilings on available hours.

Many ILM shops have a low or moderate deployment requirement; that is, a typical ILM shop will only send one or two specialists to accompany an AEF rotational deployment. On the other hand, some ILM shops have a heavier participation in AEF deployments. Specifically, the AGE Flight, the Fuels section and Egress section in the Accessories Flight, and the Conventional Munitions Flight have traditionally deployed at rates that approach those of the flightline maintenance units.[10] Table 5.2 shows the breakdown for these two types of positions at Shaw AFB with 360 positions designated "High deployment" and 496 positions "Moderate deployment." These positions represent the workload that could form the basis of the ANG ILM squadron.

Dannelly Field Air Guard Station (AGS), McEntire AGS, and Hector International Airport AGS are examples of three typical ANG F-16 operations. Under the 2005 BRAC, Dannelly Field AGS will increase from 15 PAA to 18, McEntire AGS will increase to 24 PAA, and Hector AGS will lose all its aircraft. As presented in Table 5.3, these ANG F-16 units have similar authorizations for the current maintenance staffing for 15 PAA and similar staffing levels of part-time and full-time authorizations.

The subset of full-time authorizations for ILM ranges from 45 percent to 51 percent of total maintenance authorizations. Both Dannelly Field and McEntire gain F-16s under BRAC, with a resulting increase in maintenance requirements and, subsequently, authorizations to meet those requirements. In contrast, Hector AGS is scheduled for deactivation under BRAC 2005, and all 436 maintenance personnel represent potential candidates available to staff other existing ANG units receiving addition aircraft and/or a newly formed ANG ILM unit if they were willing and able to relocate to a new unit site. Based on the current manning figures (see Table F.2 in Appendix F), the increase in PAA at Dannelly Field and McEntire AGS would require an additional 96[11] full-time maintenance authorizations, of which 53 would be required for ILM.

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[10] Data from interviews with 20th FW maintenance organizations.

[11] Twelve additional PAA x 8 full-time authorizations per PAA = 96 maintenance authorizations to meet the increased maintenance requirements.

Prior to BRAC, the active component had several ACC bases with F-16s, including Cannon AFB, N.M.; Nellis AFB, Nev.; Shaw AFB, S.C.; and Hill AFB, Utah. Luke AFB, Ariz., is the Air Education and Training Command (AETC) F-16 base.[12] Table 5.4 shows the number of PAA for each of these bases pre- and post-BRAC. Cannon AFB is losing all its F-16s. Prior to BRAC, Mountain Home AFB, Ida., had 18 F-16s in addition to 42 F-15s; post-BRAC, it retains only F-15s. The post-BRAC increase of aircraft at Hill AFB is driven by the integration of the Hill Air Force Reserve unit into a reserve associate unit.

Table 5.4
Number of Active Component F-16 Bases Pre-and Post-BRAC, by PAA

Active Component F-16 Base	Current PAA	Post-BRAC PAA
Cannon AFB	60	0
Nellis AFB	45	50
Shaw AFB	72	72
Mountain Home AFB	18	0
Hill AFB	60	72
Luke AFB	166	129

Scenario Implications of BRAC

The force structure changes resulting from the 2005 BRAC provide opportunities to rethink how off-equipment maintenance is conducted. As presented in Table 5.5, the current BRAC proposal calls for the inactivation of ten ANG F-16 units, an increase in PAA at 11 ANG F-16 bases, and five bases that remain at their current PAA level.[13]

[12] Eglin AFB, Florida, and Edwards AFB, California, AFMC bases also have a small number of F-16s for training.

[13] We exclude Tucson AGS, which has 61 F-16 pre- and post-BRAC. It is non-combat-coded.

Table 5.5
Number of ANG F-16 Bases Pre- and Post-BRAC, by PAA

	Number of ANG F-16 Bases[a]				
	Post 2005 BRAC by Squadron Size				
Current	0 PAA	15 PAA	18 PAA	21 PAA	24 PAA
15 PAA	9	4	9	1	1
18 PAA	1[b]	0	1[c]	0	0
Total	10	4	10	1	1

[a] Excludes Tucson AGS training (non-combat-coded) ANG F-16 base.

[b] Springfield-Beckley AGS, Ohio, ANG F-16 training.

[c] Lackland AGS, Tex., ANG F-16 training

As presented in Table 5.6, before BRAC, the ANG had 457 assigned F-16 aircraft, of which 153 have been lost from ANG bases and 42 relocated to other ANG bases. The result is a net PAA loss of 111 F-16 aircraft, for a total post-BRAC force structure of 346 F-16 ANG PAA. The ten deactivated F-16 ANG bases could be expected to make available a total of about 1,229 full-time maintenance technicians,[14] of whom 677 are currently assigned to ILM shops, plus an additional 3,135 part-time technicians. The increases of 42 PAA at the eleven ANG bases would require 337 additional full-time maintenance authorizations and an additional 861 part-time technicians.[15] On net, then, if ANG maintenance personnel relocated to other ANG bases, as many as 892 full-time ANG maintenance positions could potentially be reassigned to ANG ILM units.

On the active component side for the purposes of a BRAC analysis, we exclude Hill AFB, which is already scheduled to integrate with a reserve unit; Cannon and Mountain Home AFBs, which are scheduled to lose their F-16 aircraft; and Nellis AFB, because of its unique mission and alternative maintenance concepts. Accordingly, in the post-BRAC scenarios, the CONUS F-16 beddown includes two large active

[14] Data file provided by the Air Force Directorate of Personnel: Consolidated Manpower Database (CMDB), as of September 30, 2004.

[15] Eight full-time authorizations per PAA x 42 PAA = 337 (rounded); and 20.5 part-time ANG authorizations per PAA x 42 PAA = 861 additional authorizations.

Table 5.6
Impact of BRAC and FTF on ANG F-16 Force Structure and Available Maintenance Authorizations

Force Structure	No. of Authorizations	
Current ANG F-16 Force structure (PAA)	457	
ANG F-16 PAA lost due to BRAC	153	
ANG F-16 PAA gained due to BRAC	42	
Net Post-BRAC ANG PAA loss	111	
Post-BRAC ANG F-16 force structure	346	
	Full-Time ANG MX[a]	**Part-Time ANG MX**
Post-BRAC untasked ANG MX authorizations (maximum available for new tasking)	1,229	3,135
Post-BRAC net untasked ANG MX authorizations ("minimum" available for new tasking) (UTE = 15.0)	892	2,274

[a]MX = Maintenance.

component F-16 wings: Luke AFB, Arizona, with 129 aircraft, and Shaw AFB, South Carolina, with 72 aircraft.

As presented in Table 5.7, the two active F-16 bases (Luke AFB and Shaw AFB) have total maintenance authorizations of 4,316 and 1,872, respectively.[16] As a result of BRAC 2005, Luke AFB retains 129 F-16s, which would reduce total maintenance requirements to an estimated 3,354 maintenance authorizations.[17] Shaw AFB retains its F-16 aircraft after BRAC and, accordingly, its post-BRAC maintenance authorizations remain the same. Luke AFB and Shaw AFB have post-BRAC ILM maintenance authorizations of 1,548 and 856, respectively.[18] As shown in Table 5.2, Shaw AFB has authorizations for 496 moderate-deployment ILM positions, and the remaining 360 are

[16] From Table 5.2, there are approximately 26 manpower authorizations per aircraft (1,852/72) for Shaw AFB. Multiplying the average aircraft authorization by 166 aircraft (pre-BRAC) at Luke AFB yields a total of 4,316 estimated maintenance authorizations.

[17] Average aircraft authorizations per F-16 (26 per PAA) x 129 aircraft = 3,354 (estimated).

[18] From Table 5.2, there are approximately 12 ILM manpower authorizations per aircraft (856/72). Multiplying the average ILM aircraft authorization by 129 aircraft at Luke AFB

Table 5.7
Impact of BRAC on Active F-16 Force Structure and Available Maintenance Authorizations at Shaw AFB and Luke AFB

	Luke AFB	Shaw AFB
Current PAA	166	72
Current MX authorizations	4,316	1,872
Post-BRAC PAA	129	72
Post-BRAC MX authorizations	3,354	1,872
Post-BRAC ILM authorizations	1,548	856
High deploying		360
Moderately deploying		496

in higher-deploying positions. This distinction is not needed for Luke AFB because, as a training base, its aircraft and associated personnel do not deploy.

Scenario Implications of FTF

One Future Total Force (FTF) initiative involves transforming active and ANG bases into associate bases. This initiative would embed ANG pilots in active wings and active duty pilots in ANG units. To keep these additional pilots proficient, the units may need to increase aircraft utilization (UTE) rates.[19] The templates for an active associate base and classic associate base reveal the mix of pilot experience levels that are required to achieve these goals with associated UTE rates not to exceed 18.4 at ANG or active bases (Sobczyk, 2005). Embedding pilots from one component into the other provides benefits to the Air Force through the supply of (generally) more experienced ANG pilots who are available to train less experienced pilots at an active base and to provide training to active duty pilots at an ANG base. Although the current FTF templates do not illustrate possible associate constructs for non-pilot AFSCs, there may be training benefits to the active Air Force by having experienced ANG maintenance technicians available

yields a total of 1,548 estimated authorizations for ILM at Luke AFB, which is reduced from 1,992 estimated ILM authorizations pre-BRAC (12 x 166 F-16 PAA).

[19] *UTE rate* is defined as sorties per PAA per month.

to train less-experienced active duty personnel at both active and ANG bases.

For the purposes of maintenance requirements under FTF, the critical planning factor is the UTE rate, which is driven by the requirement for training sorties and flying hours based upon the final mix of pilot experience levels. The current UTE rate at a typical ANG F-16 base is estimated at 15.0, whereas an active component F-16 base has a UTE rate of 16.4.[20] These differences are due, at least in part, to the different experience ratios of the pilots in the ANG and active component. Under FTF, each ANG unit could increase its UTE rate from 15.0 to 18.4. Table 5.8 illustrates the resulting increase in sorties per base from this change. The increase from a UTE rate of 15 to 18.4 at an ANG base is about a 23 percent increase in sorties per PAA, all else being equal. However, as presented in the table, an ANG F-16 base with 15 PAA that increases to 18 PAA post-BRAC—such as Dannelly AGS (see Table 5.3), a 20 percent increase in PAA—would experience a 47 percent increase in the number of sorties (106 additional sorties) across its fleet. Similarly, McEntire AGS, which increases under BRAC from 15 to 24 PAA (a 60 percent increase in PAA) nearly doubles the percentage of sorties.

Because maintenance requirements are based on aircraft utilization and not on total aircraft, maintenance requirements could be

Table 5.8
Sorties per ANG F-16 Base at UTE Rates of 15 and 18.4

	15 PAA	18 PAA	21 PAA	24 PAA
15 UTE rate	225	270	315	360
18.4 UTE rate	276	331	386	442
Increase in sorties for a 15-PAA base to a FTF UTE rate and post-BRAC PAA of 15, 18, 21, or 24 aircraft (%)	23	47	72	96

[20] These data are derived from FY05 programmed flying hour data and force structure (Air, Space and Information Operations, Plans and Requirements offices).

expected to increase up to 23 percent for ANG F-16 bases that remain at 15 PAA post-BRAC.[21] If each of the combat-coded post-BRAC ANG F-16 base increased its UTE rate from 15.0 to 18.4 post-FTF, we estimate that these bases could require 487 additional full-time and 1,240 part-time maintenance authorizations to cover the increased maintenance requirements.[22] Further, if all these authorizations were filled by ANG maintainers made available through BRAC closures, the net pool of available ANG maintenance personnel that could potentially be reassigned to create new ANG ILM units would be reduced to 405 full-time and 1,034 part-time personnel.[23]

Active F-16 bases also are affected by the FTF initiative. In the 2005 BRAC, both Cannon and Mountain Home Air Force Bases lose F-16s, thus making trained maintenance personnel available for reassignment. To the extent that the FTF template for embedding pilots in ANG units (and vice versa) holds for maintenance personnel, these maintenance authorizations may be available for assignment at ANG F-16 units. As shown in Table 5.9 and described earlier, the personnel authorizations at Luke and Shaw AFB after BRAC are estimated to be 2,404 in for the ILM mission. As a training base, Luke AFB is assumed to be unaffected by the increased utilization rates in the FTF initiatives. Accordingly, Shaw AFB is projected to increase its UTE rate under FTF from 16.4 to 18.4, but Luke AFB is projected to maintain the same utilization rates both post-BRAC and post-FTF. Maintenance authorizations for Shaw AFB are estimated to increase by roughly 12 percent.[24] We assume that this ratio will hold for ILM authorizations as well.

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[21] Combat-coded bases only.

[22] This straight-line correspondence between UTE rate and maintenance authorizations may overestimate the actual requirements. However, maintenance requirements do increase with utilization rates.

[23] From Table 5.6, reducing the post-BRAC net untasked ANG full-time MX authorizations of 892 by 487 yields 405 post-FTF net untasked ANG full-time MX authorizations.

[24] Twelve percent is the increase in active sortie utilization rates under FTF: (18.4 – 16.4)/16.4 = 0.12.

Table 5.9
Estimated Maintenance Personnel Authorizations Required Post-BRAC at Active F-16 Bases and Post FTF at Luke AFB and Shaw AFB

	Luke AFB	Shaw AFB
Post-BRAC PAA	129	72
Post-BRAC MX authorizations	3,354	1,872
Post-BRAC ILM authorizations	1,548	856
High deploying ILM		360
Moderately deploying ILM		496
Post-FTF ILM authorizations	1,548	969
High deploying		404
Moderately deploying		556

Analysis of Options

We now present our evaluation of two options for employing the ANG in the ILM mission, each with two variations in the staffing mix of full- and part-time personnel in an ANG unit and two variations in the UTE rate at the two active duty bases.

In the first option, the ANG assumes responsibility for all active ILM missions at Luke AFB and for positions with low or modest deployment requirements at Shaw AFB. The active component at Shaw AFB retains responsibility for sections with high deployment requirements and the ANG maintains ILM responsibilities for ANG units.[25] In the second option, the ANG again assumes responsibility for the ILM missions at Luke AFB and for the moderately deploying positions at Shaw AFB, but this option includes an additional increase of 25 percent of active authorizations in the ANG sections of the ILM at Shaw AFB.[26]

[25] All options evaluate the active ILM mission only. The ANG also has responsibilities for ANG F-16 maintenance, which we examine in the section on Implementation after determining active ILM requirements for each option.

[26] We also evaluated an option in which the ANG assumed responsibility for all ILM positions at Shaw AFB. In reality, the ANG may have difficulty meeting the deployment requirements for sections of the CMS and EMS with high active deployment demands. We excluded this option from consideration. As demonstrated below, augmentation of such an option with active duty personnel would (a) increase the estimated annual personnel funding

The two variations in UTE rates were discussed above. For a classic associate base, we assumed an existing UTE rate of 16.4; for the FTF analyses, we used an 18.4 UTE rate.

An important organizational consideration is the appropriate mix of full-time and part-time ANG personnel who would be most beneficial to the ANG ILM mission. Currently, ANG flying units operate their ILM functions with approximately one-third full-time technicians or Active Guard/Reserve (AGR) members and two-thirds part-time drill status ANG members.[27] Generally speaking, the drill status members only make a substantive contribution to the unit's day-to-day maintenance workload when they are fully activated. The normal peacetime training mission of the ANG wing is actually supported by the full-time maintenance technicians and AGRs. In contrast, the typical active duty counterpart ILM organization needs most if not all its assigned manpower to accomplish its peacetime training program.

There are three important reasons why ANG ILM units can successfully operate at home station with only one-third of their authorized total manpower. First, these manpower authorizations are based on wartime flying hour programs, which are significantly higher than normal peacetime operating tempos. Note that this situation also holds for the active duty units. Second, in some cases the peacetime flying activity of an ANG unit is lower than that of a comparable active component unit. For example, the programmed flying hours per assigned aircraft for the A-10 in ACC is almost twice as high as that in the ANG.[28] On the other hand, flying hours per aircraft for the F-16 and F-15 are very similar between the ANG and the active component units.

The third reason the ANG can perform its ILM tasking with about one-third of its total authorized strength is its high skill levels and deep expertise, which contribute to high maintenance productivity. The LCOM model, which is used to establish maintenance man-

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requirements by $67,000 per authorization and (b) decrease the number of active authorizations made available.

[27] CMDB file.

[28] FY05 President's Budget data, provided by AF/XOOTF.

power authorizations, is based on the concept of an "average worker" who provides an average level of productivity. In practice, active duty units are chronically short of fully qualified technicians and are overstaffed with trainees. As a result, they tend to be less productive than the average or notional unit, and they often have a difficult time meeting their peacetime workload requirements. In contrast, ANG ILM units normally have a maintenance staff that is well above the LCOM average in terms of experience, expertise, and hence productivity.

Exact comparisons of unit productivity are difficult to obtain, but the general outline is clear. For example, active duty JEIM shops need to work hard to accomplish their peacetime missions while utilizing their full manpower authorization, even though this authorization is based on their much higher wartime workload. Overtime and additional weekend duty is often required to catch up to the peacetime workload and to eliminate backlogs.[29] On the other hand, ANG units routinely accomplish their peacetime workloads with what amounts to one-third of their total authorized strength. ANG ILM units have higher experience levels than do the active component and, because of skill mix and lower training requirements, they are more productive as well. The exact mix of full-time and part-time staffing would need to be carefully determined. It seems unlikely that it would be lower than the current mix of one-third full-time and two-thirds part-time. Given the historic productivity of ANG operations, it also seems unlikely that the mix would need to be higher than three-fourths full-time and one-fourth part-time. We therefore evaluated the implications of each of these full-time/part-time mixes in the options.

In Option 2, the active component operating command may desire to retain some of its maintenance capability in the moderate deploying sections at Shaw AFB to provide extra deployment capacity and flexibility or to reduce the requirement for ANG participation in AEF rotational deployments. For our analysis, we considered an option in which the active wing retains 25 percent of this manpower. The assignment of some active component personnel to ANG-operated

[29] Discussions with members of the Engine Management Shop, 1st Fighter Wing (FW), Langley Air Force Base, Va.

ILM squadrons could provide additional expeditionary capability, an increased depth of knowledge for active duty personnel when they are rotated to organizational level assignments, and a source for recruiting ANG participants. We have previously suggested that an ANG ILM unit could potentially accept the standard peacetime training workload and AEF deployment rotational workload associated with all moderately deploying ILM back-shop activity, except Fuels, Egress, AGE, and Munitions. In the case of the ACC wing with 72 assigned aircraft, moderately deploying positions represented 496 authorized positions prior to FTF (see Table 5.9). If this responsibility were transferred to the ANG, the active component operating command could gain up to 496 manpower slots. If instead the active component retained 25 percent of these positions (124 slots), total staffing for moderately deploying sections would be 620, and the active component would free up 372 authorized slots (496 – 124). Under the FTF initiative, moderately deploying ILM positions at Shaw AFB are estimated at 556 authorizations.

Base Case: Active Component Maintains Responsibility for ILM

In the base case, the active component would retain all responsibility for ILM at both active F-16 bases. In this scenario, the CONUS F-16 beddown includes two large active component F-16 wings post-BRAC: Luke AFB, Ariz., with 129 aircraft, and Shaw AFB, S.C., with 72 aircraft. The total number of ILM maintenance authorizations at these active bases in 2003 is estimated at 2,404.[30] In addition, we estimate that Shaw AFB would have authorizations for about 496 moderate deployment ILM positions,[31] and the remaining 360 are in higher-deploying positions. Using an average annual funding requirement of $67,000 for an active duty maintainer,[32] the total annual personnel

[30] See Table 5.7.

[31] See Table 5.7.

[32] "Average annual funding per maintainer" is an aggregate statistic. Personnel costs differ across units due to differences in individual ranks, time in service, geographic location, and so forth. Based on observed rank structures for the CMS and EMS at Hill AFB and working with standard programming costs by rank, we created

funding requirement of the base case is $161.6 million, with $33.2 million[33] of this for personnel in moderately deploying ILM positions at Shaw AFB.

As presented in Table 5.9, the post-FTF baseline scenario requires increasing the UTE rate at Shaw AFB from 16.4 to 18.4, resulting in an increase in maintenance personnel authorizations to meet the higher maintenance requirements. The associated active authorization funding for 104 additional ILM authorizations resulting from this change increases to $6.97 million.[34] Total ILM maintenance authorization funding at Shaw AFB and Luke AFB after FTF is estimated at $168 million. Table 5.10 summarizes the authorizations and funding requirements for the base case assumptions.

No authorizations would be freed up for the active component in the base case.

Table 5.10
Base Case ILM Authorizations and Funding Requirements for an All-Active ILM

	Base Case, Post-BRAC, 16.4 UTE Rate	Base Case, Post-FTF, 18.4 UTE Rate
Total active ILM authorizations	2,404	2,508
High deploying ILM (Shaw only)	360	404
Moderate or nondeploying ILM	2,044	2,104
Authorizations made available	0	0
Total authorization funding ($M)	161.1	168.0
High deploying ($M)	24.1	27.1
Moderate deploying ($M)	137.0	141.0

a weighted average of the annual "amount billable to nonDOD entities" (Source: OPR: SAF/FMBOP). This yields estimates of the average annual funding for a full time maintenance technician of $67,000 per year.

[33] Calculated as follows: 2,404 ILM authorizations × $67,000 per authorization yields $161.1 million in annual personnel funding requirements; 496 MD ILM positions × $6,000 = $33.2 million.

[34] There were 856 ILM maintenance authorizations at Shaw AFB prior to FTF. Increasing this figure by 12 percent yields an additional 104 ILM slots (with rounding).

Option 1: Using ANG to Provide All Moderate and Nondeployment ILM Capability

In this option, the ANG ILM unit would accept full responsibility for the F-16 ILM at Luke AFB and for moderate deployment positions at Shaw AFB, which we estimated in Table 5.10 at 2,044 authorizations after BRAC and 2,104 authorizations after FTF. The active component would retain all 360 positions (post-BRAC) and 404 positions (post-FTF) in the high-deployment sections of the Shaw AFB ILM.

Option 1a: In this variation, the ANG would staff these positions with one-third full-time ANG technicians and two-thirds drill personnel, replicating the staffing mix at an ANG ILM facility. Thus, post-BRAC authorizations in this option would consist of 675 full-time ANG (2,044 × .33) and 1,369 part-time ANG (2,044 × .67). Under FTF, ANG authorizations are estimated as 694 full-time and 1,410 part-time positions, based on a total of 2,104 moderate or nondeploying positions as presented in Table 5.10.

The mix of full-time and part-time ANG staffing in the ILM determines the required authorization funding. The annual funding requirement of an ANG technician is estimated at $75,000 per year; drill pay for an ANG maintainer is approximately one-quarter of annual funding, or $18,750.[35] Because full-time guardsmen draw drill pay for required drill duty, the funding for a full-time ANG technician is equal to $93,750 ($75,000 + $18,750).

[35] According to correspondence from ANG/LGYM, July 26, 2005, "[T]he full time cost [for ANG] is around $72–75K." To be conservative, we assume the full-time funding is the higher figure of $75,000 annually and drill costs are one-quarter of these or $18,750. The choice of annual ANG and active component individual funding levels affects the breakeven funding point in the analysis, but changes neither the number of authorizations made available nor the relative ordering of the results for any options. Using the funding figures in this report, a staffing mix of about 65 percent full-time ANG and 35 percent part-timers has roughly the same total annual funding requirement as an all-active ILM. We also conducted analyses assuming equal funding requirements for AGR and active of $60,000 per year. Assuming an additional $15,000 in drill pay for AGR, a staffing mix of 75 percent full-time and 25 percent part-time ANG has funding requirements equivalent to an all–active component ILM. Thus, the larger the difference between AGR and active funding requirements, the lower the breakeven point for ANG staff mix.

The estimated active authorizations made available and funding requirements for Option 1a are presented in Table 5.11. The calculations for the ANG ILM funding requirements are as follows:

- Post-BRAC: (675 AGR × $93,750) + (1,369 drill × $18,750) = $88.9 million.
- Post-FTF: (694 AGR × $93,750) + (1,410 drill × $18,750) = $91.5 million.

Active average annual funding requirements are the same as in the base case of $67,000 per year. The calculations for the active, high-deploying ILM funding requirements at Shaw AFB are as follows:

- Post-BRAC: 360 active ILM authorizations × $67,000 = $24.1 million.
- Post-FTF: 404 active ILM authorizations × $67,000 = $27.1 million.

Option 1b. As in Option 1a, the ANG ILM unit accepts full responsibility for the ILM at Luke AFB and the moderate-deploy-

Table 5.11
Option 1a: Moderate and Nondeploying ANG ILM Estimated Staffing Authorizations and Funding, Assuming 1/3 Full-Time and 2/3 Part-Time ANG Staffing Mix

	Post-BRAC 16.4 UTE Rate	Post-FTF 18.4 UTE Rate
Total active authorizations	360	404
Total ANG authorizations	2,044	2,104
Full-Time ANG	675	694
Part-Time ANG	1,369	1,410
Total ILM authorizations	2,404	2,508
Active authorizations made available	2,044	2,104
Total ILM authorization funding ($M)	113.0	118.6
Active authorization funding ($M)	24.1	27.1
ANG authorization funding ($M)	88.9	91.5

ment positions at the Shaw AFB F-16 ILM facilities. The active component retains responsibility for the high-deployment positions.

However, the ANG would staff these positions with three-fourths full-time ANG technicians and one-fourth drill personnel. Post-BRAC, the authorizations in this option would consist of 1,533 full-time ANG (2,044 × .75) and 511 part-time ANG (2,044 × .25). Based on 2,104 moderately deploying and nondeploying ILM positions post-FTF, we estimated full-time ANG staffing at 1,578 and part-time staffing at 526.

As in Option 1a, the same number of authorizations filled by the ANG would be made available to the active component—2,044 authorizations post-BRAC and 2,104 authorizations post-FTF.

The estimated active authorizations made available and the funding requirements for Option 1b are presented in Table 5.12. The fund ing requirements for the active component ILM remain the same as in Option 1a. The calculations for the ANG ILM funding requirements are as follows:

Table 5.12
Option 1b: Moderate and Nondeploying ANG ILM Estimated Staffing Authorizations and Funding, Assuming 3/4 Full-Time and 1/4 Part-Time ANG Staffing Mix

	Post-BRAC 16.4 UTE Rate	Post-FTF 18.4 UTE Rate
Total active authorizations	360	404
Total ANG authorizations	2,044	2,104
Full-time ANG	1,533	1,578
Part-time ANG	511	526
Total ILM authorizations	2,404	2,508
Active authorizations made available	2,044	2,104
Total ILM authorization funding ($M)	177.4	184.9
Active authorization funding ($M)	24.1	27.1
ANG authorization funding ($M)	153.3	157.8

- Post-BRAC only: (1,533 AGR × $93,750) + (511 Drill × $18,750) = $153.3 million.

- Post-FTF: (1,578 AGR × $93,750) + 526 Drill × $18,750) = $157.8 million.

Option 2: Using ANG to Provide All Moderate and Nondeployment ILM Capability; Active Increase of 25 percent in the ANG Moderate-Deployment ILM

In this option, the ANG ILM unit again would accept full responsibility for the ILM positions at Luke AFB and moderate deployment positions at Shaw AFB F-16 ILM facilities, estimated at 2,044 authorizations post-BRAC and 2,104 authorizations post-FTF. The active component would retain all positions in the high-deployment sections of the ILM at Shaw AFB. On top of this staffing, the active component at Shaw AFB would add an additional 25 percent of the moderate deployment authorizations to provide expeditionary capability, training opportunities, and to relieve OCONUS PCS rotational stress.

Option 2a: As in Option 1a, the ANG would staff the moderately deploying positions with one-third full-time ANG technicians and two-thirds drill personnel, replicating the staffing mix at an ANG ILM facility. Post-BRAC and post-FTF staffing would remain the same for the ANG as in Option 1a. However, the active component would retain 124 positions (496 moderate deployment ILM positions at Shaw × .25) in the post-BRAC scenario and 139 positions (556 × .25) in the post-FTF scenario within the moderately deploying ILM squadrons.

Because the active component would retain some positions taken by the ANG in Option 1, fewer authorizations would be freed up to the active component in this variation. In the post-BRAC and post-FTF scenarios, 1,920 and 1,965 authorizations would be made available to the active component, respectively. The personnel funding requirements for full- and part-time ANG personnel and for active component maintainers would remain the same as in Option 1.

The estimated personnel authorizations made available and total funding requirements for Option 2a are presented in Table 5.13.

Table 5.13
Option 2a: Moderate-Deployment and Nondeploying ANG ILM with Active Component Augmentation Staffing Authorizations and Funding, Assuming 1/3 Full-Time and 2/3 Part-Time ANG Staffing Mix

	Post-BRAC 16.4 UTE Rate	Post-FTF 18.4 UTE Rate
Total active authorizations	484	543
Total ANG authorizations	2,044	2,104
Full-time ANG	675	694
Part-time ANG	1,369	1,410
Total ILM authorizations	2,528	2,647
Active authorizations made available	1,920	1,965
Total ILM authorization funding ($M)	121.3	127.9
Active authorization funding ($M)	32.4	36.4
ANG authorization funding ($M)	88.9	91.5

Option 2b: In this option, the ANG ILM unit would accept full responsibility for the moderate and nondeployment positions at two active component F-16 ILM facilities. On top of this staffing, the active component would retain an additional 25 percent of the moderate deployment positions to provide expeditionary capability. The ANG would staff these positions with three-fourths full-time ANG technicians and one-fourth drill personnel.

Assuming the ANG would staff these positions with three-fourths full-time ANG technicians and one-fourth drill personnel, the staffing in this option would be the same as Option 1b. As in Option 2a, the active component retains 124 positions post-BRAC and 139 positions post-FTF within the moderately deploying ILM squadrons.

This variation frees up 1,920 authorizations post-BRAC and 1,965 slots post-FTF to the active component.

The estimated active authorizations made available and funding requirements for Option 2b are presented in Table 5.14. In the post-BRAC environment with reductions in the F-16 force structure, the

Table 5.14
Option 2b: Moderate and Nondeploying ANG ILM with Active Component Augmentation Staffing Authorizations and Funding, Assuming 3/4 Full-Time and 1/4 Part-Time ANG Staffing Mix

	Post-BRAC 16.4 UTE Rate	Post-FTF 18.4 UTE Rate
Total active authorizations	484	543
Total ANG authorizations	2,044	2,104
Full-time ANG	1,533	1,578
Part-time ANG	511	526
Total ILM authorizations	2,528	2,647
Active authorizations made available	1,920	1,965
Total ILM authorization funding ($M)	185.7	194.2
Active component ($M)	32.4	36.4
ANG ($M)	153.3	157.8

transition to an ANG staffed ILM has potential benefits, for example, leveraging the experiences of a highly skilled workforce and freeing up authorizations to the active component for other purposes. Table 5.15 summarizes the ANG and active component staffing and funding authorizations in the post-BRAC (pre-FTF) world.

The FTF environment post-BRAC has the potential benefit of expanding the training opportunities of experienced ANG maintenance personnel at both active and ANG bases. We analyzed the options as if the ANG would assume duties for all or some of the ILM activities at two post-BRAC active bases. Table 5.16 summarizes the ANG and active component staffing and funding authorizations in the post-BRAC and post-FTF world under this possibility.

As a manpower sizing exercise, it is useful to consider how the options would play out under the 2005 BRAC and FTF proposals. As presented in the options above, an ANG ILM Squadron manpower requirement for the CONUS F-16 fleet could be on the order of 2,044 (post-BRAC) to 2,104 (post-FTF) total full-time authorizations in the moderately deploying sections of an active ILM.

Table 5.15
Summary of Options for BRAC Only

	Base Case Active Component Retains All ILM	Option 1: ANG Maintains Modest Non-Deployment ILM Positions Only	Option 2: Option 1 and Active Authorization Increase
Total ILM authorizations	2,404	2,404	2,528
Active component authorizations made available	0	2,044	1,920
Annual personnel funding requirements (ANG + active component) ($M)	161	113–177	121–186

Table 5.16
Summary of ANG ILM Options, Post-BRAC and Post-FTF

	Base Case Active Component Retains All ILM	Option 1: ANG Maintains Modest Nondeployment ILM Positions Only	Option 2: Option 1 and Active Authorization Increase
Total ILM authorizations	2,508	2,508	2,647
Active component authorizations made available	0	2,104	1,965
Annual personnel funding requirements (ANG + active component) ($M)	168	119–185	128–194

Two active duty bases and ten ANG bases lose their F-16 aircraft as a result of BRAC. On the ANG side, this could be expected to make available a total of about 1,229 full-time plus an additional 3,135 drill status members. Thus, the ANG-wide pool of fully trained, displaced F-16 full-time personnel would represent about 60 percent (1,229/2,044) of the moderate-deployment ANG ILM unit requirement at Shaw and Luke Air Force Bases.

It should also be noted that the BRAC proposal includes increasing the number of aircraft at ANG F-16 units that are not proposed for closure. We estimate that an additional 337 full-time maintenance authorizations would be needed to support these larger units. Some fraction of the available pool of 1,229 displaced full-time technicians may choose to relocate to one of these units instead of to a newly formed ANG ILM unit. Thus, the pool of 1,229 technicians represents an upper limit on the number of experienced, full-time ANG F-16 technicians who might be available through relocation to staff these units. If all full-time technicians at the ten ANG units losing F-16 assets were to transfer to the remaining ANG F-16 wings, there would still be a pool of 892 displaced full-time technicians who could relocate to staff the ANG ILM units. Furthermore, the expected increase in utilization rates under FTF at ANG and active bases could increase maintenance requirements by an estimated 486 full-time authorizations at the remaining ANG bases and by an estimated 113 authorizations at Shaw AFB, further reducing the net pool of displaced full-time ANG maintenance personnel.

As presented in Table 5.17, if FTF is fully implemented and all the full-time displaced ANG F-16 maintenance personnel relocate to other ANG bases, there would be only 405 untasked maintenance authorizations available for new missions. In contrast, because two active bases close and Luke AFB loses 37 of its original aircraft, an estimated 1,380 F-16 active ILM personnel are displaced post-BRAC, whereas Shaw AFB gains only 113 authorizations under FTF.[36] Any active ILM positions assumed by the ANG would displace additional active maintenance authorizations. This may provide opportunities for staffing active personnel at ANG bases under the FTF scenario. However, it is clear that even if displaced ANG personnel do not relocate to other ANG bases, ANG unit moves may not be sufficient to staff these new ILM units.

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[36] Displaced active ILM authorizations are estimated at 12 authorizations per PAA × 115 PAA. We estimated total F-16 maintenance authorizations at these three bases at 26 authorizations per PAA × 115 PAA, yielding total 2,990 displaced maintenance slots.

Table 5.17
Active and ANG F-16 PAA and Estimated Maintenance Authorizations: Pre-BRAC, Post-BRAC, and Post-FTF

	ANG	Active Total[a,b]	Shaw[b]	Luke[b]	Mountain Home, Cannon AFB [b]
Pre-BRAC PAA	457	316	72	166	78
Post-BRAC PAA	346	201	72	129	0
Net PAA loss	111	115	0	37	78
Pre-BRAC full-time MX authorizations	3,671	3,784	856	1,992	936
Post-BRAC full-time MX authorizations	2,779	2,404	856	1,548	0
Post-BRAC net untasked MX authorizations ("minimum" available for new tasking) (15 UTE)	892	1,380	0	444	936
Post-FTF full-time MX authorizations	3,266[c]	2,517	969	1,548[d]	0
Post-FTF net authorization loss (gain)	(486)	(113)	(113)	0	N/A[e]
Post-FTF net untasked MX authorizations ("minimum" available for new tasking) (18.4 UTE)	405	1,267	(113)	444	936

[a] Active F-16 bases include Shaw AFB, Luke AFB, Cannon AFB, and Mountain Home AFB (only the 18 F-16 at Mountain Home AFB).

[b] Authorizations at active bases include ILM shops only.

[c] Assumes increased utilization at ANG F-16 bases except training bases: Tucson AGS and Lackland AGS.

[d] No change in utilization rates for Luke AFB under FTF initiative.

[e] N/A indicates not applicable.

MX = maintenance.

Summary Findings

Our analysis of ILM operations for the ANG suggests the following:

- A portion of current ILM operations at active component flying wings forms a mission that is well suited to the characteristics of the ANG.
- The ANG's deep experience with ILM missions could provide efficient operation of ILM functions while also providing reserve surge capability through drill positions.
- Given the AEF tasking requirement of some ILM specialty areas, the active component could retain some ILM authorizations to enhance expeditionary capability.
- The concept of an ANG-staffed ILM organization should not significantly affect the OCONUS PCS requirement for the active component.[37]
- Implementation efforts could involve voluntary relocation of individual guard technicians at closing guard units to new ILM units being formed at active duty air bases. However, ANG unit moves may not be sufficient to form these new ILM units.

In the options examined above, full- and part-time ANG maintenance personnel are expected to take over large portions of off-equipment repair and maintenance at active bases. Such an arrangement makes sense from a number of perspectives, including retaining highly skilled assets displaced by BRAC and leveraging the wish for ANG personnel to limit deployment requirements (although not entirely) while simultaneously freeing up active personnel for other missions. An FTF construct that places active maintenance personnel on ANG bases provides obvious training benefits for the Air Force. The structure of such an arrangement needs to be carefully reviewed because relatively few of the displaced active and ANG maintenance personnel can be absorbed.

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[37] See the section in this chapter entitled "Specific Implementation Issues" for discussion of PCS requirements.

Finally, it is worth noting that unit cohesion is a particular ANG strength. Preliminary research conducted at RAND suggests that organizational issues, such as differences in training requirements, funding procedures, and day-to-day work schedules, shape the most efficient and effective structure when merging two parties. Initial results of this research suggest that blending reserve and active army battalions is best done at the company level or above. The Air Force could undertake a similar analysis to determine the most effective level for merging maintenance sections in the ANG and the active component.[38]

Table 5.18 summarizes the authorization impacts and annual funding requirements of the three optionsincluding a summary of the results using the higher utilization rates under FTF.

Table 5.18
Summary of Base Case and ILM Options for Notional F-16 Case at Luke AFB and Shaw AFB

	Base Case Active Component Retains All ILM	Option 1 ANG Maintains Modest and Nondeployment ILM Positions Only		Option 2: Option 1 and Active Authorization Incease	
		Post-BRAC	Post-FTF	Post-BRAC	Post-FTF
Total ILM authorizations	2,404 (BRAC) 2,508 (FTF)	2,404	2,508	2,528	2,647
Active component authorizations made available	0	2,044	2,104	1,920	1,965
Annual personnel funding requirements (ANG + active component)($M)	161–168	113–177	119–185	121–186	128–194

[38] See unpublished RAND research by Danielle Vogenbeck and Harry Thie entitled "Applying Social Network Analysis to Model Organizational Change Strategies: The Case of the Blended Army Unit."

Specific Implementation Issues

Since the ILM mission options outlined in this chapter affect a large number of personnel and because they would require a shift in the manner in which current operations are conducted, some issues require further investigation. In this section we discuss some implementation issues that should be considered before assigning portions of the ILM mission to the ANG.

Perhaps the biggest obstacle to successful implementation of an ANG ILM supporting an active base is the relocation issue. The quickest and simplest way to implement this concept would be for a unit to move. For example, the maintenance activities at a deactivating F-16 ANG unit might move to an active duty base. However, an entire ANG F-16 maintenance operation is too small to staff an active duty wing ILM function as envisioned in this concept. The ANG unit could only serve as an initial cadre that would need to grow over time to the size that was required. However, several units could move to an active duty base to form the new unit.

Yet the feasibility of a unit move may be questionable, since it may require long-distance relocation.[39] Another option might be to utilize closing ANG units as literal "back shops" in the sense that off-equipment maintenance for active aircraft would be conducted at an ANG base that is not colocated at an active wing.[40] We explore first the implications of ANG maintenance personnel moving to active bases.

Colocated ANG ILM

An evaluation of the 2005 BRAC proposal for the F-16, shown in Figure 5.1, illustrates the issue. Each box represents an active or ANG F-16 base. The black boxes show the active and ANG units that are losing some or all of their aircraft, white boxes show bases that retain their pre-BRAC aircraft, and gray boxes show bases that gain PAA. The first number in a box represents the current (pre-BRAC)

[39] In addition, there may be restrictions stemming from the 2005 BRAC that preclude the ability of ANG units and personnel to cross state boundaries.

[40] This concept is similar to CIRF (Centralized Intermediate Repair Facility).

estimated full-time authorizations for ILM; the second number shows the estimated ILM authorizations post-BRAC at these installations; the third number shows the estimated ILM authorizations post-FTF assuming increased utilization rates at the various bases.[41]

As illustrated in Figure 5.1, no ANG units that are proposed to lose their F-16 flying mission are also close to the remaining large wings at Luke AFB and Shaw AFB. There may be some opportunities for ANG-to-ANG transfers—however, again, there is a mismatch in location as well as in the number of ILM maintenance slots resulting from BRAC and the increases at relatively nearby ANG bases. Similar situations arise when we look at the BRAC proposed F-15 and A-10 beddowns.

This suggests that an ANG ILM unit implementation strategy might emphasize physical proximity rather than specific MDS level experience. That is, given the deep experience of ANG maintenance personnel, we might look to cross-train individuals across weapon systems in order to support relatively short-distance relocations. To explore this thought, consider the post-BRAC beddown map of all MDS shown in Figure 5.2.

Here we see the emergence of some candidates for intrastate moves. As shown in Table 5.19, for example, ANG C-130 support personnel at Will Rogers AGS, Okla., could form the initial cadre for an ANG ILM unit at Tinker AFB, Okla. Similarly, ANG maintenance personnel at McGuire AGS, N.J., might form the nucleus of an ANG ILM unit for KC-10s and C-17s at McGuire AFB.

In general, this analysis suggests some intrastate opportunities for unit moves of ANG maintenance organizations having aircraft that may be retired or relocated. However, full implementation of the concept on a large scale would require the long-distance relocation of a large number of individual guard personnel from closing units to the newly formed ILM units.

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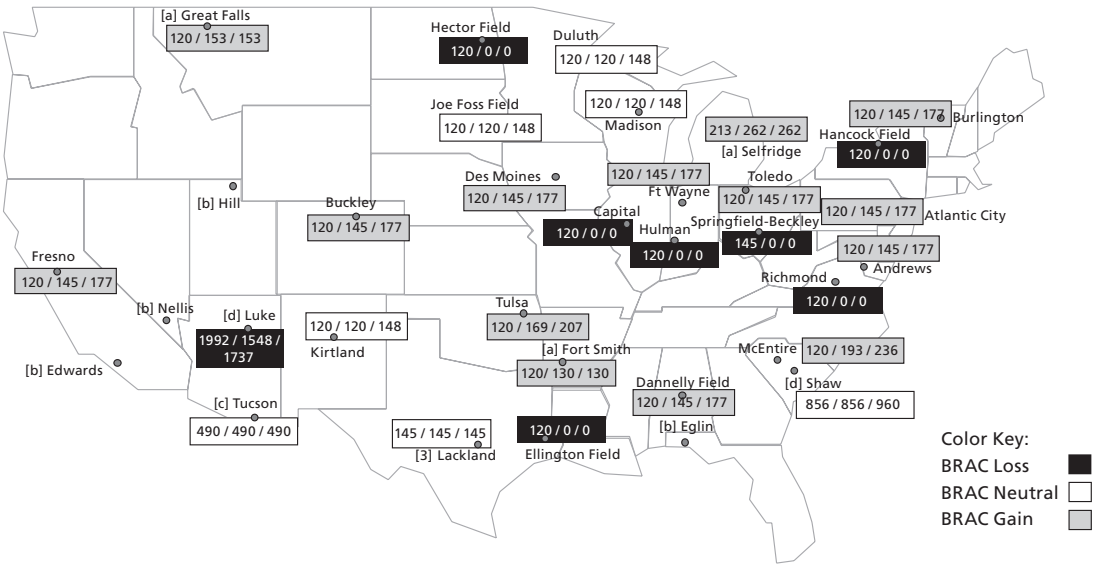
[41] We exclude Tucson AGS and Lackland AGS from the FTF analysis. We also exclude Hill AFB, Edwards AFB, Nellis AFB, and Eglin AFB.

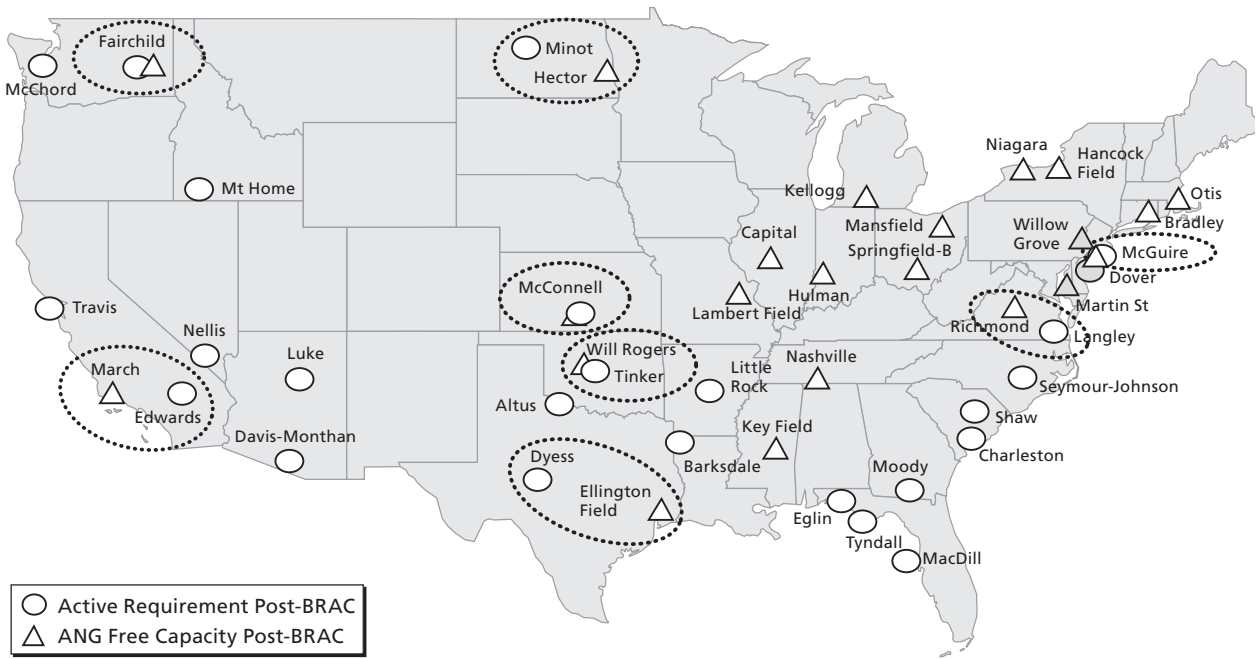
Figure 5.1
F-16 Options



NOTES: [a] Great Falls AGS loses 15 F–16s, gains 15 F–15s. No FTF assumed; Ft. Smith AGS loses 15 F–16s, gains 18 A–10, no FTF assumed; Selfridge AGS loses 15 F–16s and 8 C–130s, gains 24 A–10 and 8 KC–135, no FTF assumed. [b] Active bases not included in possible BRAC offset. [c] ANG bases not included in FTF analysis. [d] Estimated Full-Time maintenance authorizations at ANG bases and ILM-only maintenance authorizations at active bases (Luke AFB and Shaw AFB).

RAND *MG539-5.1*

Figure 5.2
Generic Aircraft Options



RAND *MG539-5.2*

Table 5.19
Proximity Intrastate Candidates for ANG Relocation

ANG Base	Number of Aircraft	Aircraft MD	Proximity Candidate	Number of Aircraft	Aircraft MD
Fairchild, Wash.	8	KC-135	Fairchild, Wash.	30	KC-135
Will Rogers, Okla.	8	C-130	Tinker, Okla.	24	E-3A
McConnell, Kan.	9	KC-135	McConnell, Kan.	48	KC-135
Hector, N.D.	15	F-16	Minot, N.D.	12	B-52
March, Calif.	9	KC-135	Edwards, Calif.	33	Multiple MDS
Ellington Field, Tex.	15	F-16	Dyess, Tex.	30 32	B-1 C-130
McGuire, N.J.	8	KC-135	McGuire, N.J.	12 30	C-17 KC-10
Richmond, Va.[a]	15	F-16	Langley, Va.[a]	48 18	F/A-22 F-15

[a] Initiatives already in progress.

Off-Site ANG ILM

A general characteristic of the ANG is that individual guardsmen tend to be deeply rooted in their communities and are not required to routinely relocate as are their active duty counterparts. As a result, it may be difficult to staff a newly formed ANG ILM unit by voluntary moves. On the other hand, the most experienced and highly trained individuals, whose expertise would be most valuable, would tend to be the full-time guard technicians with many years of ANG employment. Thus the most valuable technicians may in fact be more likely to relocate in order to preserve their retirement benefits.

An alternative implementation concept might be to move some active ILM shops to ANG bases. In our analysis of the F-16 ILM, there are 2,044 active authorizations assigned to moderately deploying sections of the ILM at Luke and Shaw AFBs. The ANG has ten F-16 bases that are losing aircraft, which makes about 1,229 experienced maintenance personnel available. Off-site ILMs could be stood up at these closing bases, which have equipment as well as trained maintainers, to meet some of the ILM needs at the two active bases. It is

conceivable that one or more of the ANG bases could be expanded to accommodate an even greater share of the active ILM requirements.

Impact of BRAC and FTF on ILM PCS

The new and expanded missions are affected by BRAC and to some extent by FTF. The ILM mission is particularly sensitive to both these initiatives. We use the ILM mission to explore the implications of BRAC and FTF on active rotational pools and alternative implementation scenarios. Although the discussion may not directly translate to the other proposed missions, the insights gained suggest that the broader aspects of a mission need to be considered.

Under BRAC, active and ANG bases lose F-16 aircraft (as well as other MDS). The FTF initiative aims to increase the utilization rates of the remaining aircraft to preserve pilots. The initiative further is intended to transform virtually all active and ANG bases into associate bases, also as a way to preserve pilots and to share limited equipment.[42]

Table 5.20 presents the estimated CONUS and OCONUS maintenance authorizations for all F-16 bases. The three columns show the pre-BRAC requirements, the post-BRAC requirements after the deactivation of 104 active F-16 airframes and the post-FTF requirements assuming increased utilization rates from 16.4 to 18.4 UTE for active bases.[43] The table also shows estimated maintenance authorizations for ANG F-16 bases for the three periods (pre-BRAC, post-BRAC, and post-FTF), with a breakdown for full- and part-time slots.

After BRAC, the ANG loses about 3,000 full- and part-time maintenance positions, although with UTE rate increases as a result of FTF, it would lose only about 1,400 slots relative to its pre-BRAC staffing requirements. If roughly half the

[42] Training (non-combat-coded) bases are assumed to have neither a utilization increase nor associate basing.

[43] FTF utilization rate increases are based on Hill AFB and Shaw AFB in CONUS and all OCONUS F-16 bases.

Table 5.20
Estimated Active and ANG F-16 Maintenance Authorizations: Pre- and Post-BRAC and Post-FTF

		Pre-BRAC		Post-BRAC		Post-FTF
		PAA	MX Slots	PAA	MX Slots	MX Slots
Active component					**16.4 UTE**	**18.4 UTE**
CONUS	MX	427	11,102	323	8,398	8,855
	ILM		5,124		3,876	4,087
OCONUS	MX	198	5,148	198	5,148	5,776
	ILM		2,376		2,376	2,666
TOTALS	**MX**	**625**	**16,250**	**521**	**13,546**	**14,630**
	ILM		7,500		6,252	6,752
ANG					**15.0 UTE**	**18.4 UTE**
	MX	**457**	**13,036**	**346**	**9,870**	**11,596**
	Full-time		3,671		2,779	3,265
	Part-time		9,365		7,090	8,330
TOTALS (active component + ANG)		**1,082**	**29,286**	**867**	**23,416**	**26,226**

CONUS active ILM slots are in low-deploying shops post-FTF,[44] then there are about 2,000 active authorizations potentially available for the Guard. It is possible that some ANG bases could create specialties to supply off-equipment maintenance to the remaining active F-16 bases, providing a centralized resource from their bases.

However, both BRAC and FTF take a toll on the OCONUS active rotational pool, which needs to be considered before assigning away authorizations. Because of BRAC, the active component loses 111 F-16 PAA in CONUS and none OCONUS. The active maintenance ratio of 11:5 CONUS to OCONUS subsequently falls to 8:5 due to BRAC, substantially changing the PCS rotational pool for this aircraft. Further, because FTF is assumed to affect all combat-coded bases, including OCONUS bases, the ratio worsens because few

[44] The proportion is likely to be higher than this because only Shaw AFB and Hill AFB are combat-coded active CONUS F-16 bases.

combat-coded bases remain in CONUS post-BRAC. If the ANG absorbed, say, up to 2,000 CONUS ILM slots, the ratio comes close to 1:1 for the active PCS pool.

FTF Associate Base Template

In addition to increasing aircraft utilization, the FTF initiative calls for associate basing for nearly all active and ANG bases. The template for embedding pilots at either base is roughly 75/25, where 75 percent of the pilots are resident (for example, active pilots on an active base) and 25 percent are embedded (for example, ANG pilots on an active base). Although the templates for staffing the rest of an associate base are not fully developed, we used this 75/25 split to construct notional requirements for classic associate and active associate bases. Building on the numbers in Table 5.20, we assigned maintenance slots at every CONUS combat-coded base—for Classic Associate and ANG Associate.[45] The results of this exercise are presented in Table 5.21.

The first column in the table is the total maintenance authorizations shown also in the last column of Table 5.20. When these slots are assigned according to the 75/25 crew ratio template, there is a redistribution among the ANG and active F-16 bases. Only one CONUS active base (Shaw AFB) is assumed to be available to the ANG for

Table 5.21
Notional F-16 Maintenance Requirements Distributed by FTF Crew Ratio Template (75/25)

Operating Location	F-16 MX Workload (Total slots)	ANG Slots	Active Slots
Active bases	14,630	525	14,105
ANG bases	11,596	9,261	2,335
All locations	26,226	9,786	16,440

[45] We exclude OCONUS from associate basing constructs since embedding ANG pilots overseas appears infeasible.

a classic associate,[46] yielding only 525 ANG slots on active bases under FTF. In contrast, nearly all the ANG bases are combat-coded, yielding more than 2,300 slots to the active component on active associate bases. In total, then, the active component would have 16,440 authorizations, up from 14,630 if no blending of maintenance staff occurred under FTF. The ANG on the other hand, loses slots, falling from 11,596 if there is no blending of maintenance staff to 9,786.

This exercise has two implications. First, in light of the PCS rotational stress imposed by BRAC on the active component, the blending of active maintainers into active associate bases might provide some relief. Second, the template that was created to preserve pilots may not be the best template for other staffing decisions at associate bases. Preserving the depth of experience and skill of the ANG in maintenance is also a valuable goal. Accordingly, assigning the ANG a "disproportionate" share (more than 25 percent) of the maintenance requirements under the FTF associate basing makes sense. More discussion is needed to understand how to meet the PCS requirements of the F-16 while balancing the desire to retain skilled technicians in the ANG.

[46] Hill AFB is a classic Air Force Reserve associate base.

CHAPTER SIX

Overarching Concepts and Conclusions

This report has presented a methodology that can be used to investigate the role that the ANG could play in assuming some of the missions the active component may not be able to fully staff under current manpower constraints.[1] Transferring some missions to the ANG would employ available ANG personnel while freeing up some active component personnel for use in other critical mission areas—at little to no cost to the total force. We evaluated four mission areas[2] to illustrate how the methodology could be applied to develop a portfolio of potential missions for assignment to the ANG.

In each mission area evaluated, we provided a range of implementation options that could be considered by Air Force leaders for assignment to the ANG. The four mission areas discussed in this report—Predator support, air mobility command and control, COMAFFOR warfighting support, and base-level intermediate maintenance—provide insights into specific functions and roles for which the Air National Guard may be well suited—because of its depth of knowledge and experience—to support the warfighter. This chapter will address the overarching principles and concepts that we garnered through the evaluation of each of these mission areas.

In general we found the following:

[1] We did not consider contractor, civilian, host nation, or other types of mission support because we are looking at using existing personnel to meet existing mission needs, a zero cost alternative.

[2] We also evaluated missile maintenance but did not find it to be a suitable ANG mission.

- Both the Air Force and the ANG could benefit from a continual review of assigned roles and missions.
- Several mission areas and specific roles are well suited for ANG assignment.
- The ANG may need to consider the demographics or other characteristics of an area before assigning new roles or missions.

The ANG, by its very nature, is made up of units possessing deep knowledge and a highly experienced workforce. The traditional ANG unit recruits experienced people from the active component or the civilian sector, enabling the unit to spend more time on direct production tasks and less time performing initial or upgrade training than a comparable active unit. A highly experienced workforce requires much less supervision and should be able to react and work more effectively in an emerging or dynamic environment.

Historically, ANG members remain in the same location much longer than their active component counterparts do, which enhances deep knowledge, especially when working with single mission types or small career fields. Additionally, utilizing the ANG in missions similar to active component missions creates a back-up or surge capability. This can be particularly attractive when workload or mission requirements are anticipated to be at one level during steady-state operations and at a much higher level during major contingencies. Many of the specific duties and responsibilities we have recommended for transfer to the ANG appear to lend themselves to a reachback or CONUS-based operations. Although the ANG is able to support overseas rotations, it may be much more effective and efficient when a majority of its workload can be accomplished from within CONUS. Well-defined tasks with specific outputs or products that can be completed in-garrison are ideal missions for the ANG. Transferring traditional roles and missions from the active component and assigning emerging new requirements to the ANG may reduce the number of personnel required to complete a mission. Additionally, by transferring the workload from the active component to the ANG, active component personnel could be used to fill other high-demand/low-density requirements. Finally the ANG is a military force and, as such, has significant advantages over contrac-

tor or civilian workforces when tasked to perform wartime duties and responsibilities.

Further anticipated manpower reductions (through FY11) only heighten the need for a continued review of roles and missions within the different components of the total force. The end of the cold war, the transition to an AEF force structure, the overall force drawdown based on BRAC, associate basing and increased aircraft utilization in the FTF initiative, and next-generation aircraft acquisition, as well as recent National Guard response to such CONUS emergencies as the 2005 hurricanes,[3] have created a need for this review. Additionally, history shows that the Air Force has been in a constant state of organizational flux since its inception. The Air Force should anticipate that change will continue and the total force may be well served by putting in place a process to regularly review each component's support to the warfighter. This review process should center on exploiting the strengths and minimizing weaknesses of each component, taking into consideration both the state and federal roles of the ANG. Also, the Air Force should investigate how each component of the total force could adapt to meet changing requirements. This adaptation may cause a fundamental reconsideration of roles and missions and a reexamination of how support is provided. Employing a construct and methodology similar to the PAF-developed process used to complete the studies described in this report, the Air Force may be able to identify other mission areas where ANG participation could better serve the warfighter.

When considering new roles and responsibilities, the ANG may need to examine the demographics or other characteristics of an area before assigning new roles or missions. Many of the future missions may drive a need for specific skill sets that may already be resident in the ANG today; some may need to be acquired. The ANG's ability to hire from the active force or the civilian sector to meet these emerging or specific skill set requirements should be expanded. The ability of a unit to support recruitment of these required skill sets is a key to suc-

[3] See Appendix I for more information about the National Guard response to Hurricane Katrina.

cessful implementation. One way to exploit this ability is to assign missions to ANG units at or near an active unit performing the same mission or an ANG unit performing a similar mission. This could lead to the creation of more effective and efficient resource bases. For example, assigning AMD support to a unit at or near the TACC at Scott AFB, Ill., may allow for better training and utilization. Similarly, assigning COMAFFOR augmentation for the Pacific AOR to a unit at or near the Missouri ANG unit tasked with AOC augmentation may create synergies. Individual state organizations left to their own devices may not recognize these possible advantages.

The ANG and the active component are two distinctly different organizations and every effort should be made to exploit the unique capabilities and advantages resident in each organization. Transformation may lead the ANG away from the traditional role (backfill flying units that had been the backbone of the ANG force-provider construct), to a more nontraditional support provider construct. This new support may provide opportunities for ANG units and members to focus on above-wing-level support. This new support may place a larger responsibility on the ANG to become the process owners and the trainers for warfighter-required capabilities. It may require the ANG to hire and train individuals capable of providing specific skill sets at specific locations inside CONUS. Additionally, opportunities may exist to further consolidate operations both within the ANG and across the ANG and active bases. These consolidations should result in both process improvement and improved resource utilization. This new support construct can satisfy total support requirements and maintain the ANG's stated goals of being ready, relevant, and unit based, while providing effective and efficient support. Simultaneously, this support construct holds the promise of transferring a significant number of personnel requirements from the active component to the ANG.

APPENDIX A

Mission Assignment Decision Tree

Applying the methodology and analytic framework outlined in Chapter One, we used the decision tree (see Figure A.1) to evaluate various roles and missions subject to mission assignment criteria. The decision tree was developed to help nominate potential candidate missions for assignment to the Air National Guard (ANG) for the reasons outlined in Chapter One.[1]

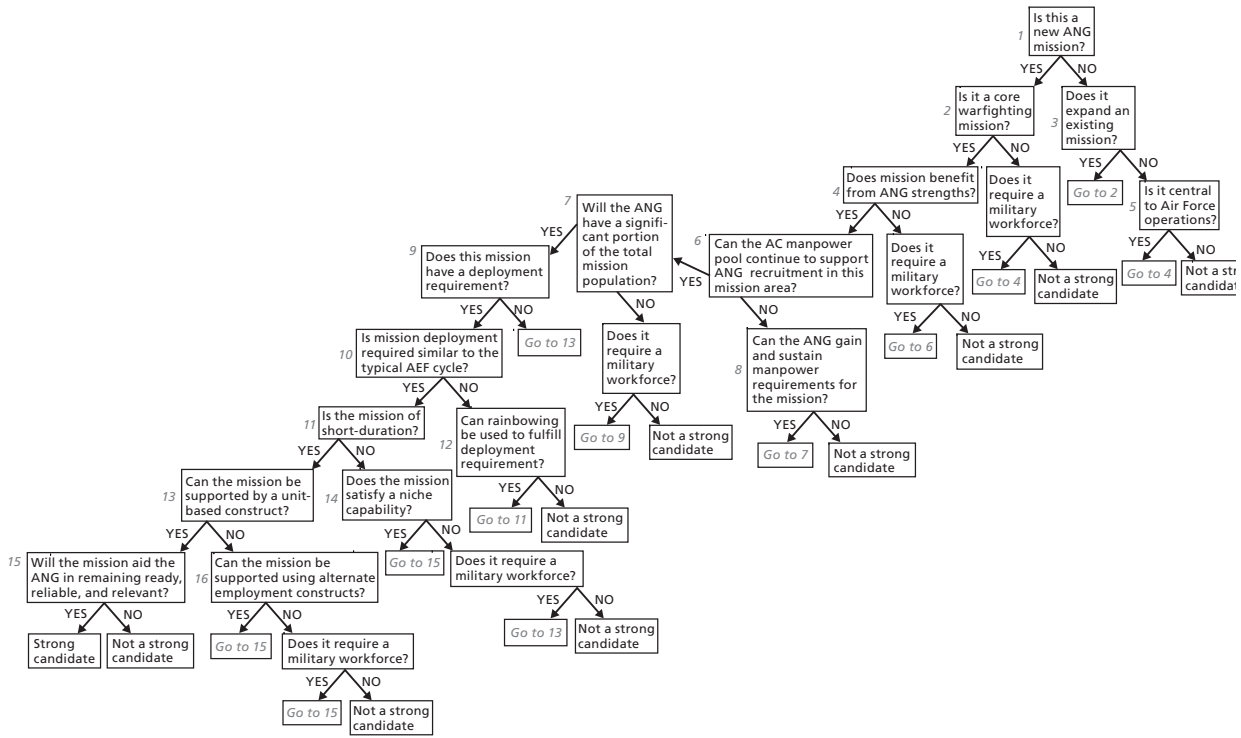
The decision tree can be applied to any mission. It is a series of question to which the answer is either "yes" or "no." The answer to a question routes the user down the tree until reaching the end of a branch. The end of the branch will either offer the mission as a strong candidate mission for ANG support or not. However, even if a mission is "not a strong candidate," the ANG may still be assigned that mission responsibility if, from a total force perspective, it is required for the good of the total force. The ANG may be asked to accept mission assignments that support best employment practices of the total force.

In this appendix, we present our evaluations of five mission areas: Predator operations and support (see Chapter Two); air mobility command and control (see Chapter Three); commander of Air Force forces staffing (see Chapter Four); intermediate-level maintenance (see Chapter Five); and intercontinental ballistic missile maintenance.[2] Based on

[1] These reasons include end-strength reductions in the active duty and force structure reductions in the ANG.

[2] Missile maintenance is not included as a chapter in this report because it was determined not to be a candidate mission when the decision tree was applied.

Figure A.1
Mission Assignment Decision Tree



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our assumptions, the first four mission areas appear to be suitable for assignment to the ANG. However, intercontinental ballistic missile maintenance did not appear to be a good potential ANG mission. Each mission area will be discussed in detail in this appendix.

It is important to note that assumptions can make a difference in the outcome of the decision tree. Therefore, two people evaluating the same mission may come up with a different decision. There is no one right answer. The decision tree is a means to have a structured dialog about a mission and to record the pertinent assumptions and decisions within the discussion. The decision tree is a fairly coarse filter, but it does allow the research to be better focused on potential missions.

Predator Operations and Support

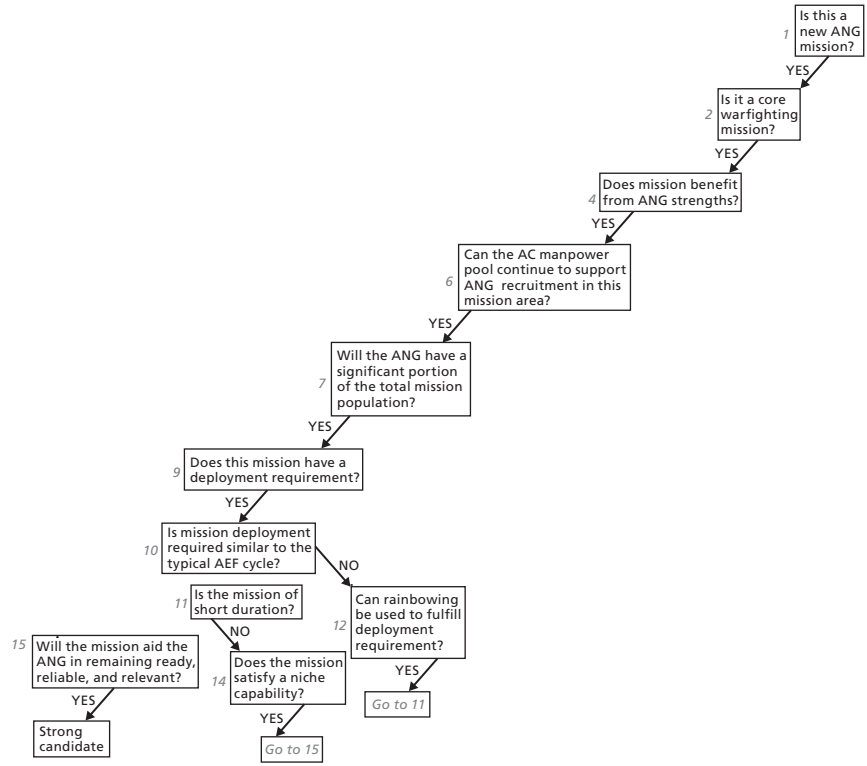
Following the questions in the decision tree (see Figure A.2), we believe that the Predator mission would be a new, core warfighting mission that would benefit from the strengths of the ANG (such as a skilled and experienced workforce that may be able to take advantage of cross-skilling opportunities). Assuming that the active component would maintain the majority of the Predator mission, there should be a large enough manpower pool to support ANG recruitment while still maintaining a significant portion of the total mission in the ANG.[3]

The Predator mission does have deployment requirements for launch and recovery of the air vehicles. However, rainbowing and volunteerism (at a rate of at least 10 percent) would allow the ANG to meet the deployment requirement without any mobilization. Larger deployment requirements would require either higher volunteer rates or partial or full mobilization.

The mission may or may not be of short duration, but it does satisfy a niche capability, allowing the ANG to remain ready, reliable, and relevant. Therefore, using the decision tree, we concluded that Predator

[3] We did not consider contractor support because of limitation set by PBD 720 on future constractor support.

Figure A.2
Predator Mission Assignment Decision Tree



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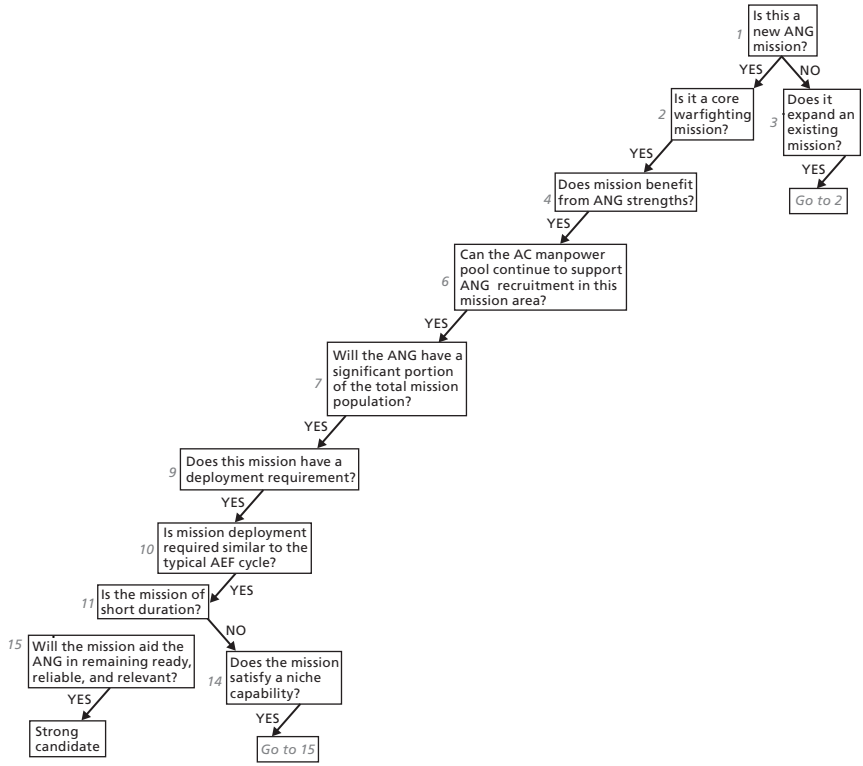
operations and support would be a good candidate mission for assignment to the ANG.

Air Mobility Command and Control

The ANG has some experience augmenting the Air Mobility Division (AMD) within the Air and Space Operations Center (AOC). Therefore, air mobility command and control would not be a new mission area for the ANG; rather, it would expand an existing mission (see Figure A.3). Command and control of mobility air is a core warfighting mission that could benefit from ANG strengths such as the

Figure A.3
AMD Mission Assignment Decision Tree



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rich background the ANG has with airlift and refueling missions. We assume the active component would maintain a large portion of the air mobility C2 mission, so there should be enough of a manpower pool to support ANG recruitment while still maintaining a significant portion of the total mission in the ANG.

The manner in which air mobility command and control is tasked today requires deployment. As operational tempo increases and an AOC builds up for full-scale operations, the AMD is augmented by staff from the major command, the associated headquarters staff, and the numbered Air Force. Deployment for these operations is similar to deployment during a typical AEF cycle.

Working in an AMD may or may not be a short-duration mission, depending on the length and level of engagement of the AOC. Air mobility command and control does, however, satisfy a niche capability, allowing the ANG to remain ready, reliable, and relevant in serving the warfighter. Therefore, through our answers to the decision tree, we concluded that air mobility command and control would be a good candidate mission for assignment to the ANG.

Commander of Air Force Forces Staffing

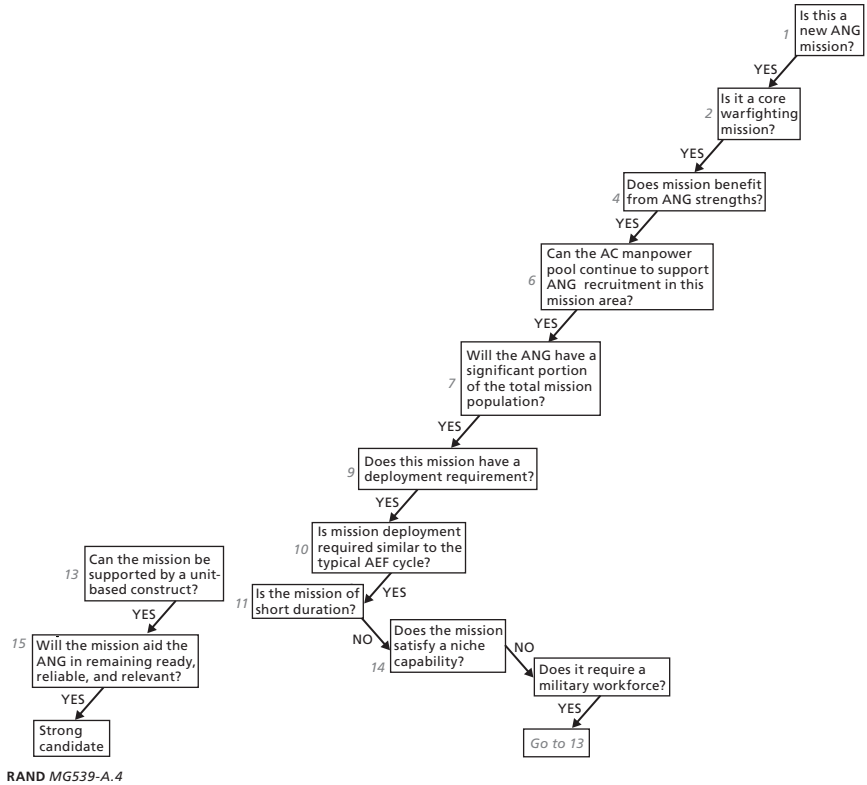
The Air Force forces (AFFOR) staff is the staffing function complementary to the AOC. We believe the AFFOR staff could be a new, core warfighting mission that would benefit from the strengths of the ANG (such as an experienced workforce that could provide continuity of mission over time). Assuming the active component would maintain the majority of the AFFOR staff mission, there would be a large enough manpower pool to support ANG recruitment while still maintaining a significant portion of the total mission in the ANG (see Figure A.4).

The manner in which AFFOR staffing is augmented today requires deployment. As operational tempo and AOC buildup increase, the AFFOR staff is augmented by staff from the numbered Air Force. Deployment for these operations is similar to deployment during a typical AEF cycle.

Augmenting the AFFOR staff may or may not be a short-duration mission, depending on the length and level of engagement of the AOC. In addition, this mission does not satisfy a niche capability. However, the AFFOR staff is best served by a military workforce working directly for the COMAFFOR.

The AFFOR staffing mission can be supported by a unit-based construct and does aid the ANG in remaining ready, reliable, and relevant to the warfighter. Therefore, we concluded that AFFOR staffing would be a good candidate mission for assignment to the ANG.

Figure A.4
AFFOR Staff Mission Assignment Decision Tree



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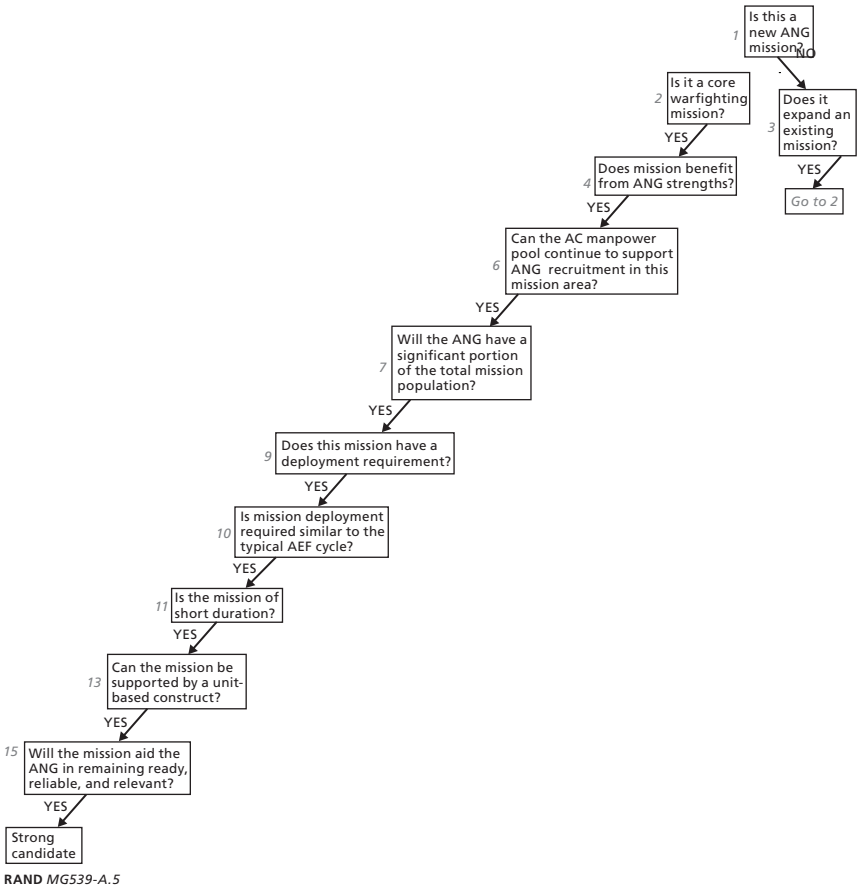
Intermediate-Level Maintenance

Intermediate-level maintenance (ILM) is not a new ANG mission (see Figure A.5). However, supporting active component ILM operations would be an expansion of the existing mission. ILM is a core warfighting mission that could benefit from ANG strengths, such as a skilled and experienced workforce.

The maintenance career field is one of the largest in the Air Force. Even after assigning a significant portion of the total mission

Figure A.5
ILM Mission Assignment Decision Tree



to the ANG, there would be a large manpower pool to support ANG recruitment.

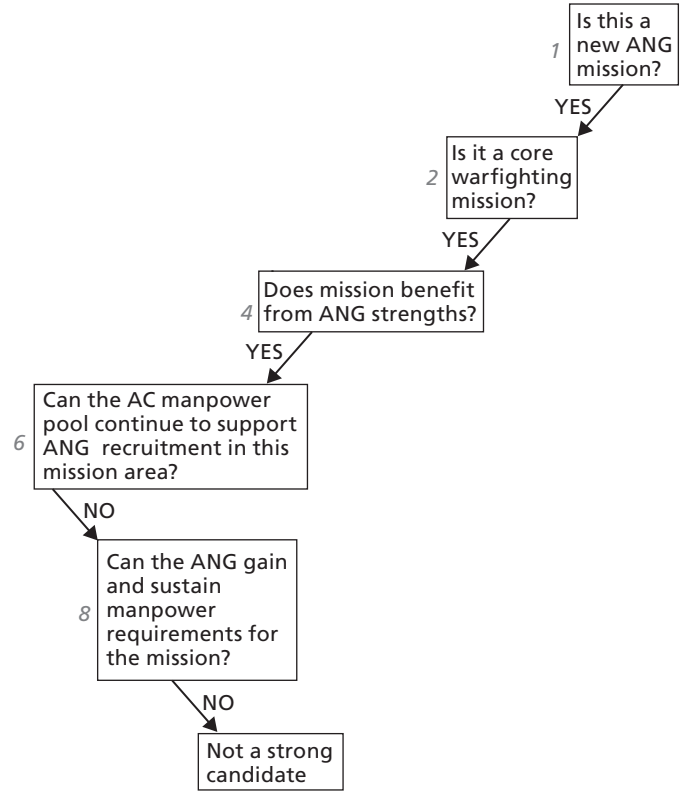
ILM does require AEF rotation to support deployed operations; however, recent operations in Southwest Asia and elsewhere have experienced minimal deployment of ILM personnel and equipment. Providing ILM support to the active component can be achieved using a unit-based construct, allowing the ANG to remain ready, reliable, and relevant to the warfighter. Therefore, we concluded that providing ILM

support to the active component may be a good candidate mission for assignment to the ANG.

Intercontinental Ballistic Missile Maintenance

Providing intercontinental ballistic missile maintenance support to the active component would be a new mission area for the ANG (see Figure A.6). Missile maintenance is a core warfighting mission that

Figure A.6
Intercontinental Ballistic Missile Maintenance Mission Assignment Decision Tree



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would benefit from the strengths of the ANG (such as an experienced and skilled workforce). However, the missile maintenance career field is a very small one. If portions of the mission were assigned to the ANG, the active component may not be able to support a large enough pool of manpower for future ANG recruitment. In addition, the ANG may not be able to gain and sustain the manpower requirements for the mission. To support the missile maintenance mission, the ANG would have to implement a personnel reliability program (PRP), which may be difficult for the ANG to support. A PRP requires a controlled environment in which doctors can monitor what prescription and non-prescription medications personnel are taking. A PRP also requires that supervisors are able to maintain constant control over their employees. Outside an active duty base on a civilian economy, a PRP may be difficult to maintain. For these reasons, we do not consider missile maintenance to be a suitable mission for assignment to the ANG. Therefore, this report does not have an individual chapter on missile maintenance.

APPENDIX B

Predator Operations and Support

This appendix outlines background information about the Predator system operations and support. Because unmanned aerial vehicles (UAVs) provide a core warfighting capability that supports the AEF, they may be a good potential candidate for mission assignment to the ANG using the mission assignment criteria we have outlined. (See Chapter Two for application of the mission assignment methodology to Predator operations and support.)

Current Operations

There are two basic operations associated with the Predator system:

- launch and recovery of the air vehicle
- command and control (C2) of the vehicle.

The first operation consists of storage and maintenance actions—including both scheduled routine maintenance and unscheduled maintenance tasks or those attributed to flight—plus the actual launch and recovery of the air vehicle. Currently, the launch and recovery element (LRE) accomplishes the C2 of airborne air vehicles if the vehicle is within line-of-sight (LOS).

The second operation, C2, includes the collection, exploitation, and dissemination of data received from the air vehicle while it is over the target area using satellite links through a ground control station (GCS) if the vehicle is beyond line of sight (BLOS).

Today the Air Force supports Predator operations through one active component squadron at Creech AFB, Nevada, the 757th Maintenance Squadron; and a permanent ground control station (GCS) at Nellis AFB, Nevada, the Predator Operation Center–Nellis (POC-N), supported by the 11th and 15th Reconnaissance Squadrons. The POC-N controls vehicles airborne in Southwest Asia. The POC-N both operates the air vehicle and exploits and disseminates the data from the air vehicles. This distributed-operation GCS has the capability to control vehicles anywhere in the world if the proper communication lines are available.

A launch and recovery element is currently designed to handle a single orbit. An orbit is defined as the ability to provide surveillance over the target area for a specified amount of time. The number of air vehicles required to support the orbit is independent of the number of personnel deployed.[1] Currently, LRE support consists of a deployment package of approximately 44 active component personnel. Recent experience has shown that when contractors are used for LRE operations, the manning is reduced to approximately nine people. Realistically, the LRE is capable of continually launching or recovering air vehicles. Each process takes approximately one hour. A single LRE handling one air vehicle at a time could conceivably launch or recover 24 vehicles per day.

Each GCS workstation is manned with an air vehicle operator and a sensor operator and is supported by an intelligence image analyst and a targeting officer (see Table B.1). These personnel work a six-hour shift. Currently, the POC-N has six GCS workstations assigned. There are four communications electronics maintenance technicians, one communications repair supervisor, and two contractors supporting all six workstations, with one GCS supervisor overseeing all work. These support personnel work eight-hour shifts. The largest manpower pool supporting Predator GCS consists of the operators. To maintain a 24-

[1] Long sortie durations, highly reliable systems, and simplistic repair processes all combine to reduce maintenance impacts on flying operations. For more information on this and other UAV support issues, see Drew, Shaver, and Lynch (2005).

Table B.1
Notional GCS Manning Requirements

		1 Station	2 Stations	4 Stations	6 Stations
GCS Supervisor	1				
Operator		1	2	4	6
Sensor Operator		1	2	4	6
Targeting Officer		1	2	4	6
Image Analyst		1	2	4	6
Communication Repair Supervisor	1				
Communication/ Electronic Repair Technician	4				
Contractors	2				
Total per shift	8	4	8	16	24
Total per Day	24	16	32	64	96
Total per day GCS plus Station		40	56	88	120
Total per day GCS/Station plus 2 LRE		54	70	102	134

hour, seven-day-a-week-operation of a single workstation, a pool of 40 personnel would need to be available each day.

Currently, each GCS workstation is only capable of handling one air vehicle per station. After an air vehicle is launched by the LRE, vehicle C2 is transferred to the GCS. The Air Force is experimenting with multiple air vehicle control (MAC), which would allow each GCS to handle more than one air vehicle. The concept behind MAC is that inbound and outbound air vehicles (to and from the target area) would only be monitored by the operator. The air vehicle would be on autopilot except over the target area; the pilot would also fly it if an emergency arose.

The original GCS was designed to deploy anywhere in the world and be totally self-sufficient. Designed for transport by tractor-trailers, the system consisted of a complete command and control console with a launch and recovery capability, sensor operator control and data exploitation area, an antenna array, plus power generation and air conditioning capability. However, use in recent operations took advantage

of reachback capability for all but the launch and recovery operation and has driven the requirement for a suitcase-sized launch and recovery workstation.

Current Predator Support

Currently, all maintenance and flying training support is being conducted at the 757th Maintenance Squadron at Creech AFB, Nevada. The 757th was originally manned to support two reconnaissance squadrons, a test and evaluation group, as well as flying training. Initial staffing was approximately 390, but initial requirements were overestimated. The current staffing is approximately 335 with a projected drawdown to 220 by the end of FY06. Some of the drawdown resulted from refined requirements estimates. Other slots have been transferred to the contractor.[2] When the 757th reaches the final 220 positions, it will be expected to support a standing deployment capability to support continuous operations 365 days a year, 24 hours a day—much like operations today. It is also expected to support continuing training at Creech AFB as well as a surge capability for a pop-up deployment of a short duration.

The Air Force has been examining the use of contractors to provide support. The contractor had recently taken over the Test and Evaluation Group (TEG) at Creech AFB. The Air Force was also in the process of transferring some of the Flying Training Unit (FTU) responsibilities to the contractor. The contractor is required to provide all maintenance and upkeep on both the air vehicles and the control stations. Although this process is still being developed, experience has shown that the contracting force will be approximately one-half the comparable active component force. These actions could create some imbalance between the manpower slots that are subject to deployment

[2] General Atomics (GA), the original equipment manufacturer (OEM), is the contractor currently supporting Predator. It currently supports test operations at CONUS sites as well as staffing at one deployed location. The field services representatives or technical experts provided by GA are part of the procurement contract; as such, they are not part of this sustainment contract.

and in-garrison nondeployable positions. The Air Force has enjoyed recent successes using contractors to perform launch and recovery operations in deployed environments.[3] As mentioned previously, the Air Force was able to replace 44 active component individuals with nine contractor personnel (see Table B.2). There are several reasons for these marked savings using the contractor:

- The contractor workforce is highly skilled, and each individual is capable of performing more than one type of operations and support function.
- The contractor did not always use the same repair processes as the active component, and contractors are not bound by the same duty day requirements as is the active component.

Table B.2
Notional List of LRE AFSCs[4]

AFSC	Description	AC	Contractor
2A390	Maintence Supervisor	1	
2A3X3	Crew Chiefs	13	
2W1X1	Weapons Loaders	3	
2A7X3	Structural Repair	1	
2A3X2	Avionics	5	
2E1X1	Satellite Wideband Telemetry Repair	5	
2E2X1	Communications Networks	5	
2SOX1	Supply	2	
2A6X2	AGE	2	
	LRE Pilots and Sensor Operators	7	
Total		44	9

[3] In the future, contractor support may be limited by restrictions in PBD 720. Thus, it may not be a viable option for Predator support.

[4] The number of personnel listed under each AFSC in this table is an approximation. These numbers change as operations evolve. Operations in different environments may require a different configuration of AFSCs.

Additionally, the Air Force has realized additional savings because of these reduced operational requirements. Some base support that was provided for the active component personnel was not provided for the contractor. For example, the contractor was responsible for his or her own billeting and messing facilities, and because the workforce was much smaller, the force protection requirement was reduced.

Adjustments have been made to the contract that may cause the contract force to enlarge slightly. However, today the active component mans one deployment location with 37 maintainers plus 7 operators (44 personnel). Even if the contractor doubles its present size of 9, the number would still be less than half the current active component manning.

Air Vehicles

Measuring the size of the Predator fleet is challenging. At a production rate of approximately two air vehicles a month and an attrition rate of seven a year (including combat losses), current fleet size is still dynamic. For example, in mid-March 2005, there were 12 air vehicles at Creech AFB, 20 deployed, three at the test site, and eight expected to be delivered from the manufacturer in the next two months. The Air Force has plans to purchase over 100 additional air vehicles.

Given the future plans for a 220-person Predator squadron, the active duty squadron at Creech AFB could support a fleet size of about 25 air vehicles. The current contractor-supported deployment location requires another 10–15 air vehicles. There are approximately 15 air vehicles required outside the primary Predator mission area, for example, training or test. In addition, the Air Force has suffered attrition of about 25 air vehicles. This would leave approximately 120 air vehicles available to be distributed from the 200 air vehicles expected to be purchased. This may be a mission area that could benefit from partial assignment to the ANG (see Chapter Two).

APPENDIX C

Air Mobility Command and Control

This appendix presents background information about air mobility command and control. Because command and control of Air Force mobility forces is a core warfighting capability that supports the AEF, it may be a good potential candidate for mission assignment to the ANG using the mission assignment criteria outlined in this report. (See Chapter Three for application of the mission assignment methodology to air mobility command and control.)

The Air Mobility Division

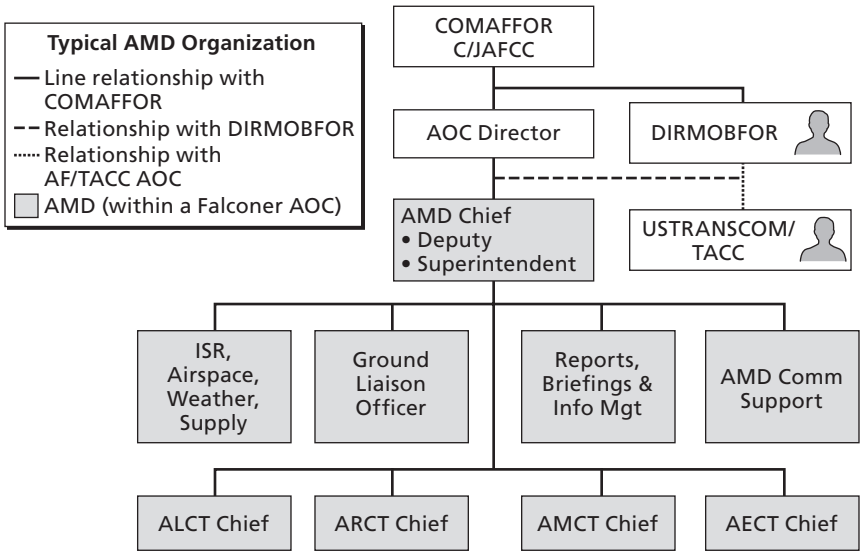
The Air Mobility Command (AMC) is the Air Force major command responsible for mobility forces.[1] In 1995, the Air Force established the Falconer Air and Space Operations Center (AOC), a weapon system that consists of the tasks and support systems needed by the commander of Air Force forces (COMAFFOR) and, specifically, the Joint Forces Air Component Commander (JFACC). The Falconer AOC is optimized specifically for the production and execution of an air tasking order, or ATO. Air Combat Command (ACC) is the major command responsible for defining Falconer AOC operations. (PACAF and

[1] The reserve components and the Air Education and Training Command (AETC) have responsibility for accessions and for initial and initial support and combat crew training for air mobility missions. In this activity, AMC defines the mobility mission requirements. AMC also has lead responsibilities for addressing foundational mobility requirements that are assigned to other commands with an air mobility mission (such as PACAF and USAFE).

USAFE are also key strategic partners.) AMC is responsible for identifying the mobility manpower necessary for Falconer operations. Most of this manpower resides in the AOC's Air Mobility Division or AMD (see Figure C.1 for an organizational chart of the typical AMD).[2] However, mobility experts also reside in each of the three main AOC divisions—Strategy, Combat Plans, and Combat Operations. The AMD focus is on the theater operation.

Processes in the AMD include creating a component mobility and combat support deployment and sustainment strategy, planning the next few day's fight, and commanding forces in accordance with the overall desired course of action. AMD tasks help shape the combat

Figure C.1
Typical AMD Organizational Structure



SOURCE: USAF (2005b), p. 89; and discussions with AMD and AMC personnel.
RAND *MG539-C.1*

[2] "In coordination with the Director Mobility Forces (DIRMOBFOR), the AMD plans, coordinates, tasks, and executes the theater air mobility mission" (USAF, 2005b, page 88).

force, providing core functional support within AOC processes in concert with the total air mobility effort.

The TACC

The TACC, a functional AOC, was created in the early 1990s at Headquarters AMC, Scott AFB, Ill., and placed under the command of the operational component commander of mobility forces assigned to the U.S. Transportation Command (USTRANSCOM), a unified or joint combatant commander.[3] The TACC differed from previous operational-level command and control capability in that it was global in reach and did not report to an Air Mobility Command numbered Air Force.[4] Over the past decade, what began as a modest investment in people and equipment has grown into a large operational-level C2 capability.

In 2004, the TACC was acknowledged as an Air Force AOC, filling that operational-level niche for air mobility forces. That designation also brought with it weapon system status (like the Falconer), with the requirement to train, certify weapon system operators, and manage a more precise configuration control over TACC systems and processes.

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[3] Tanker aircraft supporting the Strategic Air Command, and later USSTRATCOM Single Integrated Operational Plan alert missions, were under the command of a functional USSTRATCOM task force commander who was also the 15th Air Force Commander. These forces are not being integrated into the TACC C2 mission capability, and the essential command and control relationships are forming to better support the full range of USSTRATCOM missions.

[4] In the first of several changes prompted by the Chief of Staff of the Air Force (CSAF) warfighter headquarters initiative, the TACC now reports to the commander of the newly activated 18th Air Force. Both 15th and 21st Air Forces were inactivated and almost all AMC forces are now assigned to 18th Air Force.

Current Air Mobility Operations

There are currently at least six operational Falconer AOCs, and others are being planned. Each AOC has three major divisions (Strategy, Combat Plans, and Combat Operations) and two supporting divisions (the Intelligence, Surveillance, and Reconnaissance Division [ISRD] and the AMD). Each AOC-AMD workstation is manned by an officer or enlisted functional expert with air mobility expertise. Many are rated officers or enlisted flight crewmembers with mobility force–level qualification and experience. (See Table C.1 for a notional list of the AMD AFSCs.) This workforce can be divided into three eight-hour or two 12-hour shifts for 24-hour operations.

Two basic operations are associated with the AOC-AMD capabilities. The first major operation is aerial refueling tanker planning and execution.[5] This affects the laydown of forces in the theater, the combat range of JOA aircraft as well as the efficient deployment and sustainment of the engaged forces. The second operation is the management of the inflow of strategic airlift with their cargo and the efficient operation of a theater distribution network with theater-assigned or chopped aircraft.

Current TACC Operations

The AMC TACC is a functional AOC, but its organization is similar to the Falconer AOC—a weapon system with planning and execution functions—now organized under 18th Air Force. There are major differences in the general workflow and the type of data flow within the TACC C2 processes. There is increased interaction with joint logistics systems and USTRANSCOM and the other USTRANSCOM service components. There is also a relationship with contractor-provided airlift capability, either through specific movement contracts or through activation of the Civil Reserve Air Fleet (CRAF). There is a history

[5] Most aerial refueling planning is done in the Combat Plans division of the AOC with execution in the Combat Operations division. As discussed later in this report, for AMD reachback to be effective, a mature information-sharing structure and good working relationship (trust and confidence) must exist to facilitate work among all divisions in the AOC.

Table C.1
Notional List of AMD AFSCs

AFSC	Function	No.
01XA3Y	Airlift Operations	25
01XT3Y	Tanker Operations	19
046F3	AE Operations	5
X1A2X1	Airlift Plans	8
1C072	Airlift Plans	4
X1A071	Intra-Theater Tanker Plans	9
X1A190	Inter-Theater Tanker Plans	2
X4N071	AE Plans	4
2G071	Airlift Requirements	1
2T271	Airlift Requirements	8
021R3	Airlift Requirements	4
R2T251	Airlift Requirements	1
015W4	Weather	1
014N3	Intelligence	3
013M3	Airspace	1
021B3	Logistics	2
1C171	Airspace	1
1C3X1	Reports & Briefs	12
1N071	Intelligence	3
2A571	Logistics	3
2A590	Logistics	2
033S3	Communications	1
2E1X1	Communications	2
3C051	Communications	6
2S071	Supply	2
3A071	Info Management	4
3S071	Personnelist	1
R041A3	TAES Manager	2
U033S3	Information Warfare	1

Table C.1—Continued

AFSC	Function	No.
U1N071	Information-In-Warfare	1
U3C071	OPSEC/Military Deception/PSYOP	2
	Total	140

NOTE: The number of personnel listed for each AFSC is an approximation. These numbers change as operations evolve. Operations in different environments may require a different configuration of AFSCs.

of in-depth, centralized mission planning and flight following in the TACC AOC that does not exist in the Falconer AOC. In the Falconer AOC, this is a unit responsibility using information from the ATO and special instructions. Diplomatic clearances are also a major task within the TACC command and control operation.

Augmentation

In the late 1990s, given the ongoing forward presence for Northern and Southern Watch, Korea, and other areas needing ad hoc and a continuous AOC presence, sufficiently trained and experienced manpower became a problem for the active component to sustain. In spite of progress in easing manpower requirements, a large AOC required approximately 1,400 to 1,700 personnel. Sometimes, when operational tempo was especially heavy, manpower numbers would approach 2,000 personnel, counting support and personnel protection functions. The operational tempo created a large unfunded manpower requirement. Part of this has been met by a tiered approach to designating manpower—the Falconer AOC is organized to grow as air operations activity grows in scope and responsibility. Tier 1 is for normal steady state (peacetime) operations. Tier 1 augmentation (Tier 2) allows limited operations for short crisis. Tier 3 can support a large-scale regional conflict.

Finding sufficiently trained personnel to meet AOC operations and support requirements generally was very difficult. Talks began among the ANG and PACAF and USAFE about augmentation units, which would help tier-up AOC readiness in a crisis leading to a general war. At that time, two ANG Air Operation Group (AOG) units were designated to augment AOCs, with USAFE and PACAF becoming the gaining commands. A third AOG was later designated to work with CENTAF or 9AF, where ACC became the gaining command.[6] The concept was for the units to train in-garrison, participating in scheduled exercises on-site with designated command and control UTCs being activated in time of war. The unit fiscal structure was based on this training/deploy-to-fight concept, with the overseas commands accepting a role for the ANG-AOGs assigned to their theaters. Augmentation units receive funding from the NGB and Air Force for training. Additional funding for operational training and deployment is the responsibility of the gaining Air Force command and assigned combatant commander, depending on how forces are deployed. This concept required the construction of an AOC training infrastructure in the home unit location.[7] It was different from previous active duty C2 augmentation schemes using the reserve components in that the forces were recruited, managed, trained, and deployed as a unit to meet a variety of AOC tasks, including air mobility functional tasks.[8] The emphasis in these early AOGs was on planning and execution skills, but each UTC reflected the specific need of the AOC it was augmenting.

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[6] A fourth unit was designated to augment the air component in Korea, but this unit is an Air Force Reserve Command (AFRC) unit. 1AF and the ANG assumed the NORAD CONUS regional air defense mission in the mid 1990s, but, like the TACC, this operational-level command and control facility was not designated as an AOC until after the 9/11attacks. Historically, these ANG units were Tactical Air Control Centers (TACCs), which were deployed ground radar systems supporting the aerospace control authority. In many ways the modern AOC is an outgrowth of the Tactical Air Control Center System (TACCS).

[7] The training AOC is almost exactly the same as operational systems. It differs in depth, breadth, and operational connectivity.

[8] Previous augmentation, if it was part of a documented program, was generally through the use of reserve Individual Manpower Augmentees (IMAs). IMAs generally do not have a reserve unit to report to. They are assigned to and receive evaluations from the active unit they augment.

The AMD and other mobility requirements were partially addressed in this initial force buildup.

In addition, the Air Force also has enjoyed recent successes utilizing contractors to perform AMD operations in the Pacific theater at PACAF. To meet the requirement for military oversight and authority, a single field-grade officer per shift maintains oversight. In this one case, the Air Force was able to create a separate AMD aimed at managing peacetime air mobility force movement. Using a contractor work force has given the active component experience and additional manpower it did not have previously.[9]

Currently, three Falconer AOCs with AMD requirements receive ANG augmentation. Requests from two others (PACAF and USAFE) for an additional air mobility UTC are being worked by state and NGB staffs.[10] The primary problem has been identifying sufficient personnel billets in the State for reassignment to this mission.

Augmentation for the TACC

The TACC has also developed a CONOPS for ANG augmentation. In the past, AMC relied on reserve IMAs for augmentation manpower. The unfunded requirement has become more pressing to AMC with the new need to develop the more deliberate training and certification program for TACC weapon system–assigned personnel. AMC and TACC leadership were attracted by the deep experience of ANG personnel in the airlift and air refueling missions. There were also units nearby that were already recruiting in the St. Louis and Southern Illinois area (one, in St. Louis, was already engaged in AOC augmentation for PACAF and was looking for personnel billets for expanded AMD operations). The TACC AOC took on increased mission responsibility in 2003–2004 with the inactivation of both AMC regional numbered air forces and the standup of 18AF. The C2 facility is also in the

[9] Contractor support is not considered as an option in this report because PBD 720 focuses on reducing future contractor support.

[10] According to RAND discussions with Missouri and New York ANG commanders and state officials in 2004, these trial requests to establish an AMD augmentation UTC have been in the range of 45–50 personnel.

midst of a mission transformation with promise of increased automation that is changing how air mobility C2 is handled. Unfortunately for the active component, the demand for experienced air mobility C2 operators is increasing just as the available active manpower is being constrained. The TACC started to experiment with using contractors and government civilians on the floor for planning and execution. This places a premium on military manpower for those tasks that require military personnel. Currently, the TACC is working with the ANG to identify mission areas where an ANG unit could take responsibility for and operate under TACC mission authority. These may include supporting functions like TACC mission training and certification (personnel, software, systems, and equipment), standardization and evaluation, and discrete mission capabilities.

Two Illinois ANG field-grade officers are currently assigned to the TACC plans directorate located at Scott AFB. Plans are being made at AMC, the NGB, and headquarters USAF for additional UTCs to perform C2 supporting functions, such as TACC combat crew training and other missions enabling TACC operations. The concept is for the 126th Air Refueling Wing, Illinois ANG, to assume the ANG UTC.

Since the active component is already working with the ANG to develop an ANG augmentation UTC, the AMD, as well as the TACC, may be mission areas that could benefit from partial assignment to the ANG (see Chapter Three for mission assignment options).

APPENDIX D

Command of Air Force Forces Warfighting Support

This appendix presents background information about the commander of Air Force forces (COMAFFOR), his/her staff, and the Warfighting Headquarters. Since the COMAFFOR and his/her staff (called the AFFOR[1]) are essential to core warfighting capabilities that support the AEF, the staff function may be a good potential candidate for mission assignment to the ANG using the mission assignment criteria outlined in this report. (See Chapter Four for application of the mission assignment methodology to AFFOR staff functions.)

THE COMAFFOR and the AFFOR Staff

A unified combatant commander (COCOM),[2] who has either a geographic command (such as CENTCOM, PACOM, or EUCOM) or a functional command (such as TRANSCOM or STRATCOM), is given operational, tactical, and administrative command over troops employed in operations in his/her area of responsibility (AOR). A representative from each service component—Army, Navy, Air Force, and

[1] See Appendix E for a detailed listing of AFFOR staff duties by functional area.

[2] By nontransferable command authority established by U.S. Code Title 10, a combatant commander is the commander of a broad continuing mission composed of significant assigned components of two or more military departments that is established and so designated by the President, through the Secretary of Defense with the advice and assistance of the Chairman of the Joint Chiefs of Staff (DoD, 2005b).

Marines—reports directly to the combatant commander to help achieve his/her campaign objectives.[3] The Air Force representation to the combatant commander is the commander of Air Force forces (COMAFFOR). During military operations, the combatant commander may name a joint task force commander to carry out operational plans in the AOR. In this case, the COMAFFOR would report to the Joint Task Force Commander (see Figure D.1) and may serve as the Joint Air and Space Forces Component Commander.

The COMAFFOR is also responsible to the secretary of the Air Force and MAJCOM commander (if appropriate) through the administrative control chain of command. Some COMAFFOR operational responsibilities include (USAF, 2004a, p. 31)

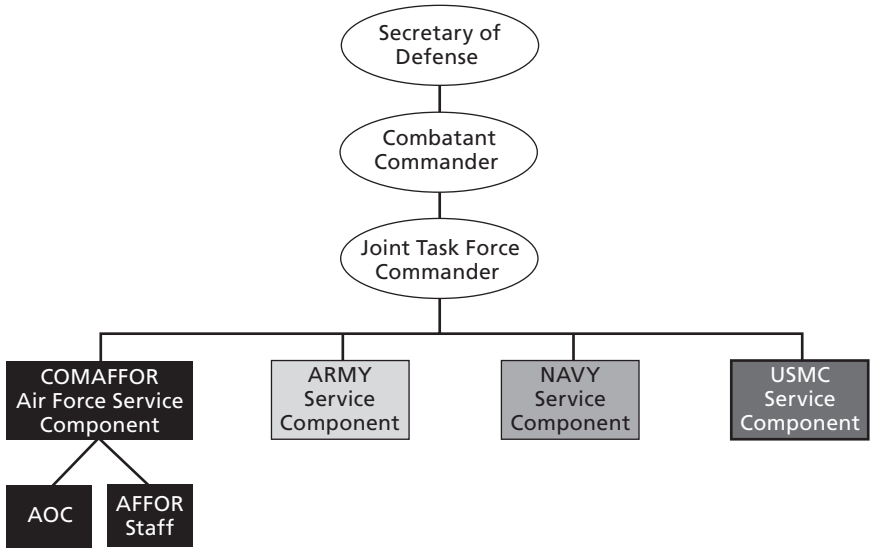
- preparing air and space plans
- developing and recommending courses of action
- making air apportionment recommendations
- tasking, planning, coordinating, and allocating the daily air and space effort
- conducting joint training.

In addition to operational responsibilities involved with working for the COCOM, the COMAFFOR also has service responsibilities, some of which include (USAF 2004a, p. 32)

- nominating specific units of the Air Force for assignment to the theater

[3] Forces can be presented through functional components wherein the functional component commander is responsible for forces with specific discrete capabilities. Historically, Air Force and Navy forces assigned to meet USSTRATCOM requirements were employed by functional task force commanders responsible for such specific operational capabilities as strategic bombing, aerial refueling, and intercontinental ballistic missile and submarine-launched ballistic missile strike capabilities employed through discrete functional USSTRATCOM task forces. Each of these task forces contained forces assigned to one service. Recently, the commander, USSTRATCOM, has created Joint Component Functional Commands for mission capabilities such as ISR and information operations that include forces from all services.

Figure D.1
Typical Unified Command Chain of Command



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- organizing, training, equipping, and sustaining assigned and attached Air Force forces for in-theater missions
- maintaining reachback to the Air Force component rear and supporting Air Force units
- providing liaisons to other service components and coalition partners
- maintaining internal administration and discipline.

The COMAFFOR plans and executes all air and space operations in the AOR. The COMAFFOR is also responsible for the care and feeding of all Air Force personnel engaged in operations in the AOR. To help him or her fulfill these responsibilities, the COMAFFOR commands two organizations: the air and space operations center (AOC) and an Air Force forces (AFFOR) staff (see Figure D.1).

The AOC function typically concentrates on prosecuting the operation. The combatant commander identifies objectives and the AOC

matches available Air Force capabilities and builds an air tasking order to enable the accomplishment of those objectives (operational C2). The AFFOR staff primarily concentrates on enabling the forces to accomplish the assigned missions by ensuring all required support is available (care and feeding).

When the COMAFFOR and JFACC are deployed forward, the staff function can be assigned a lower priority. For example, during Operation Enduring Freedom (OEF), to keep the number of deployed personnel within host nation constraints, a CENTAF AFFOR staff was not deployed forward. As a consequence, the deployed Combined Air and Space Operations Center (CAOC) personnel were gradually drawn into performing staff functional tasks. Many of the rear staff functions were split between 9AF at Shaw AFB, S.C., and for CENTAF special operations, Air Force Special Operations Command at Hurlburt Field, Fla., with augmentation provided by the MAJCOM at Langley AFB, Va. (this was Air Combat Command). As OEF progressed, the commander reorganized his deployed personnel to better complete the assigned missions.[4]

Today the Air Force is changing the organizational structure of operational-level air and space warfare and placing more emphasis on the role of the COMAFFOR in presenting forces and advising the unified combatant commander on how best to employ air and space power. To properly command forces at the operational level, the COMAFFOR needs a sufficiently resourced and configured staff and a dedicated C2 capability. The basis for the C2 capability is the Falconer AOC, which is a weapon system aimed at discrete JFACC tasks. (Generally the COMAFFOR is also named the JFACC.)

Unlike the AOC—a weapon system with very specific objective tasks and supporting command and control systems—the COMAFFOR staff has historically not been as well defined. Although the AOC is evolving to definitive billet positions with qualifications and currency requirements, the personnel qualifications for the COMAFFOR staff—except for some billets that require professional certifica-

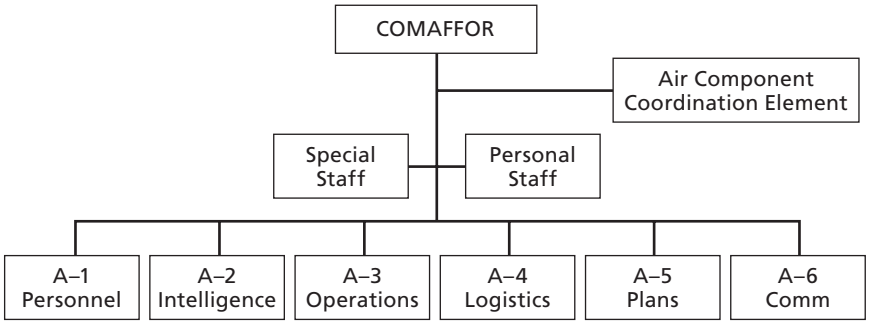
[4] Discussions with General T. Michael Moseley, formally 9AF Commander, COMAFFOR and JFACC, during OEF, spring 2004.

tion—have in the past been more generic. Generally, in the past, the only requirement for many of its positions has been that the person be experienced and have had a fully qualified Air Force Specialty Code (AFSC) in the pertinent functional area. A staff position may require some command review and/or interview prior to assignment; compared to the AOC, however, jobs generally have none of the AOC's weapon system qualification and currency requirements. As the roles and responsibilities of the COMAFFOR staff become better defined (see Appendix E), it could become more like the AOC, with required qualifications and certifications.

During military operations, the AFFOR staff comes from the numbered Air Force (NAF) staff. (Figure D.2 illustrates a notional AFFOR staff.) Decisions in the early 1990s to employ a "skip echelon" approach to manning NAFs created a lean staff structure in which some functional areas were represented by the parent MAJCOM staff. As NAF headquarters became engaged in an operation, the staff and AOC personnel would posture personnel for 24/7 operations. Deployment UTCs were created to help augment the NAF and associated headquarters staff.

The priority was generally always on the AOC and operational command tasks, with the staff COMAFFOR combat support func-

Figure D.2
Notional AFFOR Staff



SOURCE: USAF (2004a), p. 87.
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tional areas being handled on an ad hoc basis. Sometimes the traditional COMAFFOR functions were "pulled back" to the MAJCOM commander and staff.[5] Further study of the AFFOR staff, its functions, and it staffing by the Air Force has resulted in the emergence of a warfighting headquarters construct.

Warfighting Headquarters

Currently, the Air Force is in the midst of organizing operational-level warfighting headquarters (USAF, 2003b). The WFHQs are a mixture of MAJCOMs and subordinate NAFs tied operationally to the specific areas of responsibility (AORs) and functional unified combatant commanders they serve. Generally, these headquarters will be commanded by a COMAFFOR working for the COCOM and the Secretary of the Air Force or Air Force MAJCOM commander as appropriate. Each WFHQ will consist of a headquarters staff working with an AOC for a COMAFFOR-tasked commander. Each new WFHQ will focus only on the needs of the combatant commander to which it is assigned. The Air Force has adopted a naming protocol that identifies each WFHQ as the Air Force component for a specific unified commander (for example, AFEUR for Air Force Europe). The expectation is that the headquarters will be in a position to be more proactive in gathering information about an AOR or functional command and in applying that information or knowledge to the unique problems associated with military operations in that area.

As the Air Force moves to the Warfighting Headquarters construct, there will be nine WFHQs—five with Falconer AOCs, two with functional AOCs, and two with tailored AOCs (see Figure D.3)—if the proposed construct is implemented.

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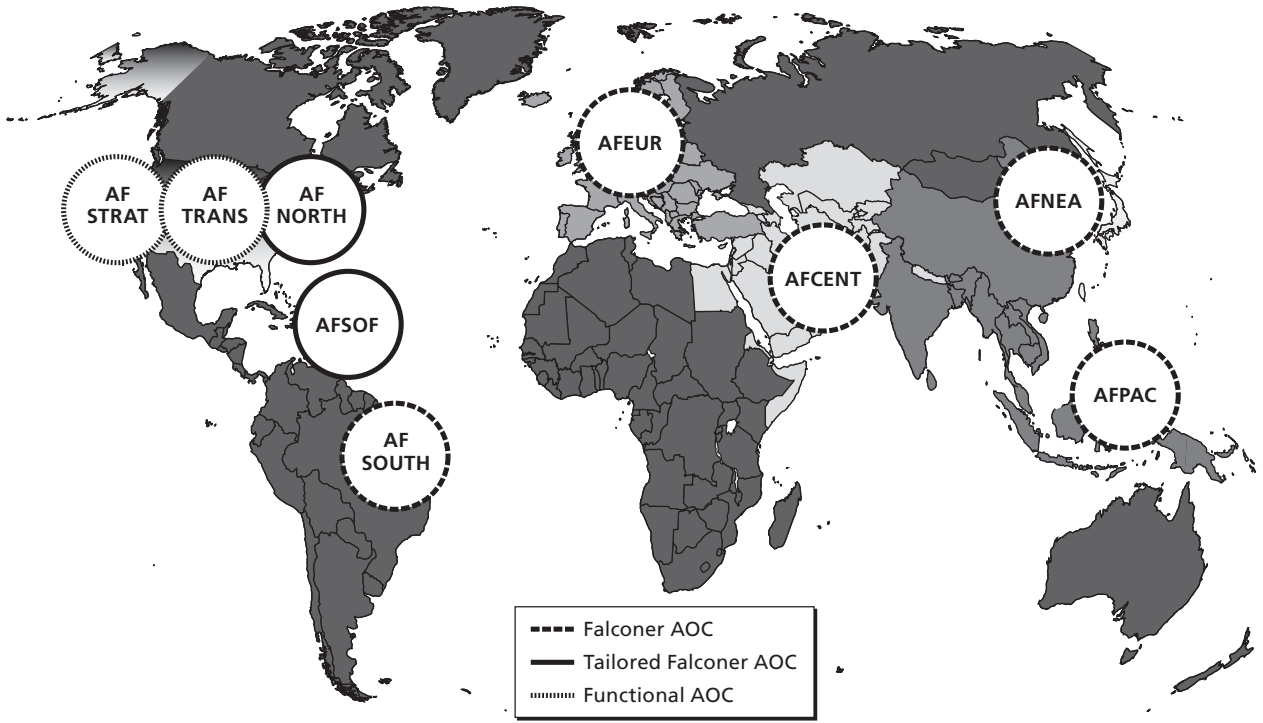
[5] During the operation over Kosovo, the 16AF Commander focused on JFACC tasks, and the USAFE Commander formally moved functional combat support responsibility to the USAFE staff. Likewise, during the initial Operation Iraqi Freedom (OIF) operations, Air Combat Command stepped up its combat operations support to supplement and assist 9AF Commanders. (Discussion with ACC staff and CAT general officer steering group, April 2003.)

Figure D.3
Proposed Warfighting Headquarters



SOURCE: Clark (2005), slide 5.

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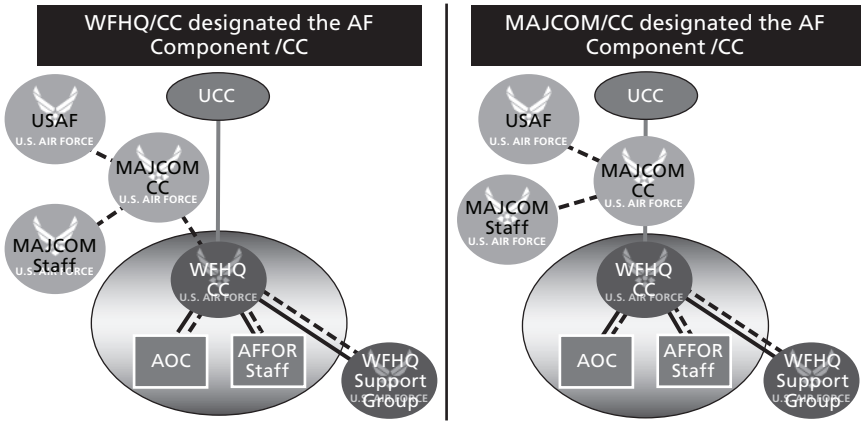
It is assumed, in most cases, that the WFHQ commander will be named the COMAFFOR for operations in that WFHQ's area of responsibility, employing the WFHQ AOC and AFFOR staff. Even if the MAJCOM commander is named COMAFFOR instead, the WFHQ AOC and AFFOR staff will still be employed (see Figure D.4).

Figure D.5 illustrates the composition of a warfighting headquarters. On the left side is the AOC—with five divisions, responsible for the air tasking order. On the right is the AFFOR staff—with nine divisions, responsible for deliberate and crises action planning and theater engagement.

Usually, the staff is also tasked with functional program management tasks. In the reorganization, some of these duties will be pulled back to ACC and AFMC headquarters staff. The intent is to focus the warfighting headquarters on warfighting tasks. However—particularly for combat support and some infrastructure management

Figure D.4
Proposed Warfighting Headquarters Organizational Template



SOURCE: Clark (2005), slide 10.

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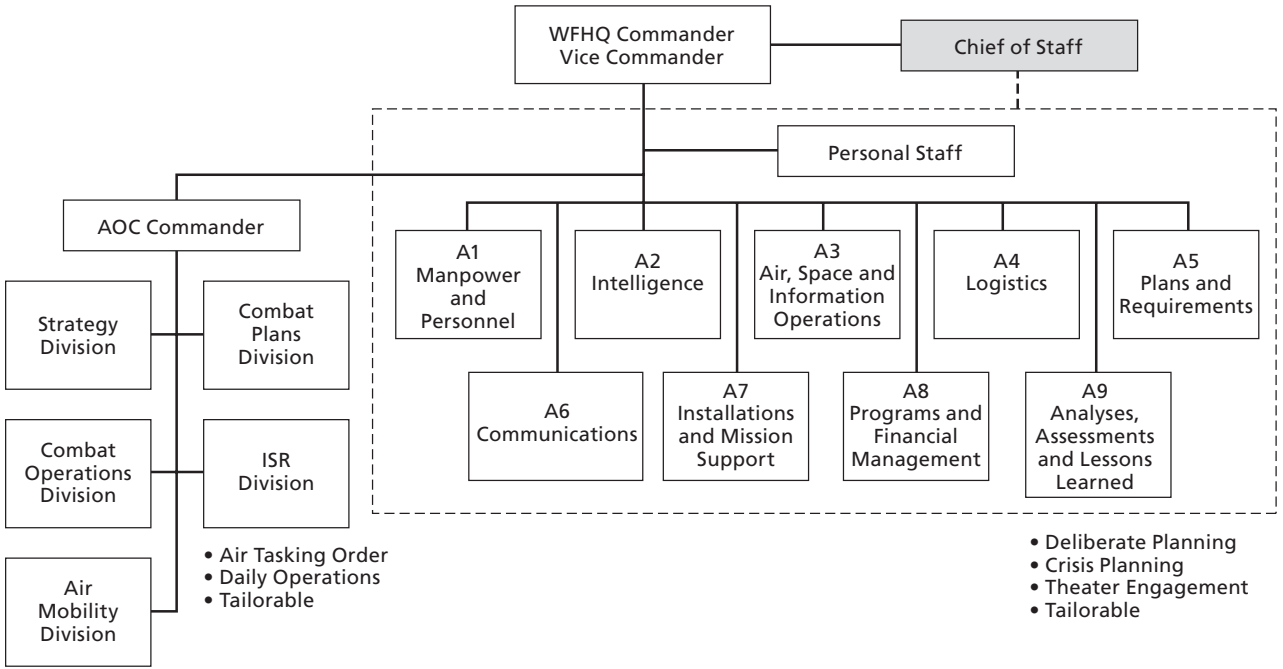
Figure D.5
Warfighting Headquarters Internal Construct



SOURCE: Clark (2005), slide 7.

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tasks generally thought to be more support oriented—some of these activities help shape and sustain the combat force, providing the true combat power for any timeline. Retaining functional leadership will be important to enable COMAFFOR's long-term planning and resource responsibilities in working with the unified command assigned.

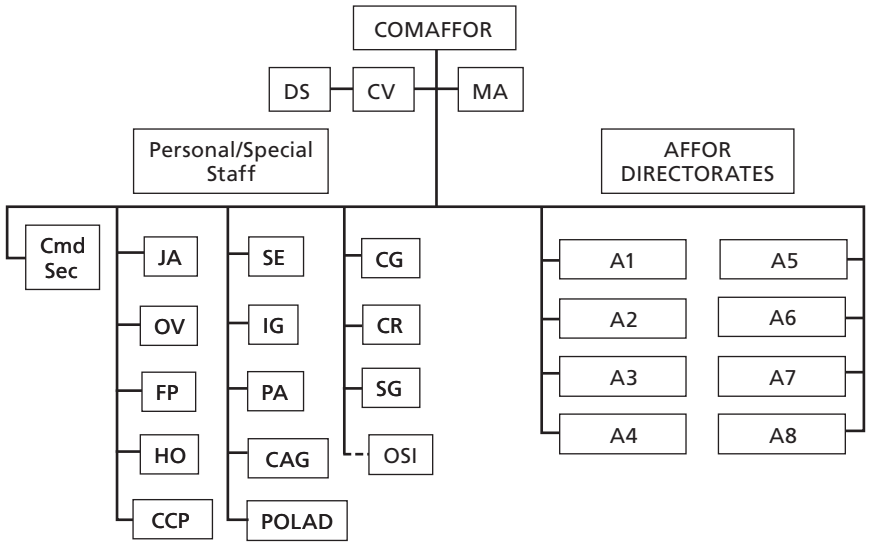
Current Operations

Today, Central Command (CENTCOM) is conducting Operations Enduring Freedom and Iraqi Freedom. 9AF is the Numbered Air Force (NAF) supporting these operations as CENTAF, the Air Force component. In FY04, CENTAF flew more than 31,000 combat sorties, used more than 500 million gallons of JP8 fuel, started 12 new operational plans, maintained 14 forward operating locations, and had more than 17,000 attached personnel ("WFHQ: A CENTAF Perspective," 2004, slides 2–4).

From the early 1990s until September 11, 9AF was considered a model NAF. Most of the administrative control (ADCON) duties had been transferred to ACC headquarters at Langley AFB, Va. The above-the-line ADCON staff was approximately 99 personnel. Some of the manpower (for example, Financial Managment, Commander Programs, and Public Affairs) was embedded in the host wings. The modified AFFOR staff consisted of an A1/4, A2, A3/5, and A6. The commander of the Air Operations Group was dual-hatted as the A3/5. This skeleton AFFOR staff was never given separate authorizations for an AFFOR staff ("WFHQ: A CENTAF Perspective," 2004, slide 9).

After September 11, the AFFOR staff was split out into A1 through A6, and later A7 and A8 were added. Today, the CENTAF AFFOR is much larger—approximately 1,000 people. Of those 1,000 people, approximately 100 personnel are deployed forward. The others remain in-garrison. Both the forward and in-garrison locations maintain an A1 through A8 AFFOR staff. When combined with the forward located AOC, CENTAF is already organized in the WFHQ construct.

Figure D.6
CENTAF AFFOR Staff Internal Construct



SOURCE: WFHQ: A CENTAF Perspective (2004), slide 10.
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In the Pacific Command (PACOM), yearly exercises are held to train staff in their warfighting roles and responsibilities. In December 2003, a PACOM exercise entitled Terminal Fury 2004 was conducted. During that exercise, 13AF in Guam was the assigned NAF supporting PACAF. However, PACAF also maintained a large AFFOR staff at Hickam AFB, Hawaii, located near the PAFAC AOC. The commander of PACAF at this time battle-rostered all his personnel so all personnel would know their wartime function. Personnel were classified at Theater AFFOR (required at PACAF), Deployed AFFFOR (required to support the NAF), POSC/crisis action team (CAT), standing joint task force requirements, and other Title X requirements. Table D.1 lists the number of personnel assigned to each organization.[6]

[6] These numbers do not include the personnel assigned to the NAF.

Table D.1
PACAF Battle Roster, December 2003

Position	Number
Theater AFFOR	229
Deployable AFFOR	5
POSC/CAT	52
SJTF	8
Other Title X	29
Total	323

SOURCE: PACAF/XPM, December 30, 2003.

The NAF, the Theater AFFOR, and the POSC/CAT are all three organized as an AFFOR Staff—each with an A1 through an A7. The NAF and the Deployable AFFOR support the COMAFFOR. The Theater AFFOR and the POSC/CAT would support the PACAF commander if different from the COMAFFOR.

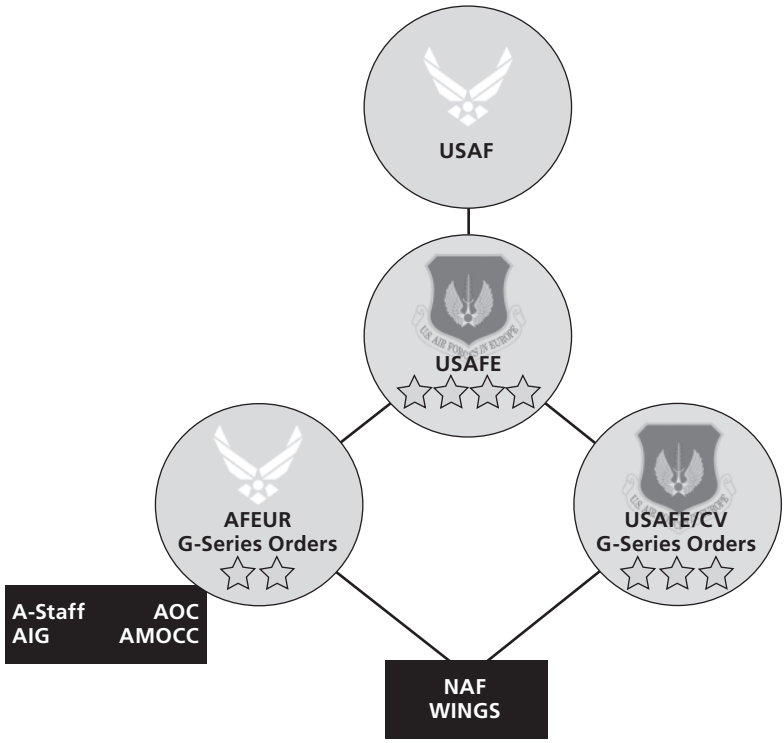
In the European Command (EUCOM), a transitional organization called the AFEUR was established in March 2004 as the command and control node for air and space operations in Europe. It will serve as the warfighting headquarters in Europe. Figure D.7 illustrates the transitional organizational construct (Isherwood, 2004, slide 11).

An Air Forces Europe exercise, directed and scheduled by EUCOM, was held January–March 2004. During this exercise, called Austere Challenge 2004, 16AF was the assigned NAF supporting the AFEUR. 16AF deployed to Ramstein AB, Germany, and was located near the AOC for Europe. However, the AFEUR also maintained an AFFOR staff at Ramstein called the Operational AFFOR. Table D.2 lists the number of personnel assigned to each function in the Operational AFFOR.[7]

Currently, the Air Force is moving ahead with the transition to WFHQ. Very quickly in the reorganization vetting process, it was realized that additional manpower was needed, especially during periods

[7] These numbers do not include the personnel assigned to the NAF.

Figure D.7
USAFE Interim Organizational Construct, March 2004



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of crisis operations. One goal was to end the need to "skip echelon" and have a fully functional staff for the commander. Another goal was to size the staff in a way that it could quickly ramp up for a crisis. If properly configured, this may be a good potential mission for ANG participation (see Chapter Four).

Table D.2
AFEUR Operational AFFOR Joint Manning Document, March 2004

Position	Staffing
CC	50
A1	5
A2	7
A3	13
A4	27
A5	4
A6	9
A7	12
A9	2
FM	2
HO	4
JA	6
PA	8
HC	4
SE	7
SF	3
SG	12
OSI	2
Totals	177

SOURCE: USAFE, March 19, 2004.

APPENDIX E

AFFOR Staff Roles and Responsibilities

In this appendix, we outline the roles and responsibilities of the Air Force forces (AFFOR) staff. Air Force Doctrine Document (AFDD)-2, *Organization and Employment for Air and Space Operations* (USAF, 2004a) lists the roles and responsibilities for the A1 through the A6. The AFFOR C2 Enabling Concept (USAF, 2005a) outlines the roles and responsibilities of the A7 through the A9.

The following material is from AFDD-2.

Manpower and Personnel (A1)

The Director of Manpower and Personnel is the principal staff assistant to the COMAFFOR on manpower and personnel management. The A1 is responsible for executing personnel policies, developing procedures as necessary, and supervising the administrative requirements for personnel. Because component commanders normally receive personnel support from their Service headquarters, the A1 role is primarily an U.S. Air Force component function. Key responsibilities of the A1 include:

- Ensure that subordinate U.S. Air Force units are kept informed of personnel actions that affect them.
- Monitor U.S. Air Force unit strengths by means of daily personnel status reports.
- Advise the commander and staff on matters concerning unit replacement plans and status of all components.
- Provide control and standardization of personnel procedures.

- Maintain records to support recommendations for unit and DoD awards and decorations.
- Oversee the administration of the headquarters for pay and finance; administration of augmentees; coordination of morale, welfare and recreation activities; and preparation of evaluation, efficiency, and fitness reports.
- Assist the COMAFFOR in determining the need for, and structure of, organizations.
- Assist the COMAFFOR in determining and documenting manpower requirements.
- Assist the COMAFFOR in identifying available manpower resources.
- Operate and maintain contingency manpower and resource management systems.

Intelligence (A2)

The Director of Intelligence is the principal staff assistant to the COMAFFOR for ensuring the availability of intelligence on enemy locations, activities, and capabilities, and probable enemy COAs. The A2 ensures adequate intelligence support to forces within the assigned area of operations. Key responsibilities of the A2 include:

- Serve as the principal advisor to the A3 and COMAFFOR on ISR requirements, capabilities, and limitations.
- Manage intelligence requirements. Prioritize based on mission needs.
- Validate subordinate unit requirements.
- Coordinate intelligence support from national, DoD, Service, and joint intelligence elements and coalition intelligence sources.
- Direct and coordinate intelligence and information collection and analysis to support COMAFFOR, air and space operations, and the JFC as directed.
- Exchange liaison officers as appropriate with JFC and lateral components intelligence staffs.
- Prescribe security and releasability requirements for intelligence information.

Operations (A3)

The Director of Operations serves as the principal staff assistant to the COMAFFOR in the direction and control of U.S. Air Force forces. When OPCON of U.S. Air Force units is formally transferred to the COMAFFOR, the A3 ensures that they are capable of performing tasked missions. This includes monitoring unit deployments and beddown locations, combat readiness, mission rehearsals, force protection, and training activities. The A3 may be dual-hatted as the AOC director, and would then be responsible for campaign planning and execution as well. Key responsibilities of the A3 include:

- Organize the operational aspects of the headquarters staff.
  - Recommend AETF organization. Normally, responsible for setting up the appropriate C2 nodes (forward-deployed and reachback U.S. Air Force forces (AFFOR) locations, deployed wing and group operations centers, etc.).
  - Establish and manage daily staff battle rhythm, to include daily briefings and meetings.
  - Monitor deployed unit operational situation reports.
  - Oversee training and standardization/evaluation of AETF operational units.
  - Coordinate AEF unit availability and sourcing with the appropriate MAJCOM staff.
  - Establish guidance for and monitoring of OPSEC.
- Coordinate operational issues with the JFC and component staffs. Typical issues would include:
  - Establish liaison with appropriate supporting commands and agencies.
  - Provide information on the number and location of all friendly air and space assets.
  - Coordinate joint and coalition training with other components.
  - Establish force protection requirements, including civil defense.
  - Develop Commanders Critical Information Requirements.

  - Identify essential elements of information with A2.
- Develop and coordinate a plan that integrates information operations to accomplish the JFC's objectives.
- Advise the COMAFFOR on employment and management of air, space, and information resources for which the COMAFFOR has OPCON/TACON or has established supported/supporting relationships.

Logistics (A4)

The Director of Logistics is the principal staff assistant to the COMAFFOR for formulation of logistics plans and the coordination and supervision of force beddown, transportation, supply, maintenance, mortuary affairs, food and exchange services, civil engineering, explosive ordnance disposal, fire fighting, and related logistics activities.[1] In general, the A4 formulates and implements policies and guidance to ensure effective logistics support to all U.S. Air Force forces. Most of the challenges confronting this division will be U.S. Air Force component unique. Key responsibilities of the A4 include:

- Coordinate the overall logistics functions and requirements of the COMAFFOR and maintain liaison with logistics functions of other components and the JTF J-4.
- Advise commander concerning logistics matters that affect the accomplishment of COMAFFOR missions.
- Establish and operate a logistics readiness center or operations support center.
- Identify, coordinate, and monitor logistics requirements to ensure deployed forces are sustained from the onset of operations, including CONUS resupply and reachback, time definite delivery movements, theater distribution with JTF J-4 and other Services, and timely retrograde of personnel and reparable materiel.

[1] We would add fuel and munitions to the A-4 list of responsibilities, as they are two of the most important logistics functions. Although fuel is a joint responsibility, there are many functions such as, deployable fuel sets, hydrants, and pantographs that are Air Force-only fuel taskings.

- Formulate COMAFFOR logistics policies.
- Coordinate logistics requirements and support with the logistics team in the AOC.
- Coordinate all COMAFFOR food service, mortuary affairs, lodging, and field exchange requirements.
- Identify contractor personnel employed in the AOR to support U.S. Air Force forces, and monitor contractor support activities to ensure continuity of operations.
- Coordinate beddown of all JFACC forces when COMAFFOR is designated JFACC.
- Coordinate common item supply support that is a COMAFFOR responsibility.
- Monitor the ammunition and fuel support capability of all COMAFFOR forces.
- Identify and monitor transportation movement requirements.
- Arrange for and coordinate COMAFFOR host-nation support requirements with the JTF J-4.
- Coordinate agreements for inter-Service supply and support with components and JTF J-4.
- Exercise staff supervision or cognizance over applicable civil engineering, maintenance, recovery, and salvage operations.
- Monitor and coordinate theater aerial ports and theater distribution processes affecting U.S. Air Force operations.

Plans (A5)

The Director of Plans serves as the principal staff assistant to the COMAFFOR for all consolidated planning functions. The A5 conducts comprehensive force-level move ment and execution planning throughout the campaign. This involves preparation and subsequent refinement of the force flow, beddown, and redeployment in the TPFDD. The A5 normally leads the A-staff in crisis action planning and publishing the U.S. Air Force component OPORD to support the JFC's campaign. Key responsibilities of the A5 include:

- Perform collaborative planning with the JTF and the coalition and Service staffs.

- Initiate and oversee AFFOR support of JTF CAP activities.
- Facilitate component OPORD development.
- Determine unit beddown requirements for U.S. Air Force forces.
- Integrate U.S. Air Force execution planning efforts with JTF (J-5 and J-35), the JFACC's staff (if applicable), coalition, and Service staffs throughout the campaign.
  - Determine support requirements for additional forces or capabilities.
  - When necessary, prepare air allocation request and air support request messages.

Communications and Information (A6)

The Director of Communications and Information is the principal staff assistant to the COMAFFOR for communications, electronics, and automated information systems. This includes establishing the theater communications and automated systems architecture to support operational and command requirements. Key responsibilities of the A6 include:

- Coordinate the overall communications and information functions of the COMAFFOR and maintain liaison with communications and information functions of the other components, the JTF J-6, Joint Communications Control Center, Joint Communications Support Element (JCSE), and Defense Information Systems Agency (DISA) area communications operations center as required.
- Formulate COMAFFOR communications and information policies.
- Ensure frequency allocations and assignments meet technical parameters under host-nation agreements, coordinate these actions with the A3 and JTF J-6, deconflict frequencies, and provide communications-electronics operating instructions for assigned forces.
- Assign call signs.

- Plan, coordinate, and monitor communications security procedures and assets.
- Coordinate information protection requirements and procedures with the AOC IW team.
- Advise AOC on development of communications architecture inputs to the JAOP.
- Coordinate plans with JTF J-6.
- Ensure communications and information interface requirements are satisfied.
- Extend required communications and information connectivity to subordinate U.S. Air Force units (to include reachback units) and other components.
- Oversee the administration of the headquarters postal services.

From *Air Force Forces: Command and Control Enabling Concept* (Change 1), USAF, 2005a:

> **Installations and Mission Support (A7)**
>
> The A7, Director of Installations and mission support is the primary advisor to the COMAFFOR for installations, mission support, security, contingency engineering (CE, Services, Contracting and Security Forces), and cross-functional expeditionary combat support. The A7 provides focused oversight and operational level planning, policy and resources for managing garrison and contingency installations and mission support activities and serves as the coordinating authority for related issues with other U.S. government agencies. The A7 will also serve as the interface for other service Regional Wartime Construction Management (RWCM) support, contracting support and real estate activities for lease/use of host nation facilities and basing. The A7 may establish and lead, if required, a Mission Support Planning Group (MSPG) designed to help plan, execute, monitor and assess COAs and integrate all mission support activities in support of the COMAFFOR's long-term and short-range goals. Further details will be addressed in related Air Force Instructions, Doctrine, and standard operating procedures.

Programs and Financial Management (A8)

The A8 director provides the COMAFFOR comprehensive advice on all aspects of programming and financial management and coordinates with the JFC's staff on joint issues. The A8 acts as the Service component liaison with the UCC J8 on joint-related issues and with the MAJCOM A8 for Air Force specific capabilities. The A8 assists the COMAFFOR in administering AF appropriated (and non-appropriated funds as applicable) and serves as a strategic advisor in carrying out financial management responsibilities. The A8 advises the COMAFFOR on the implications of unique financial obligations incurred during contingencies, foreign disaster relief operations, interagency operations and other non-combat missions. The A8 will conduct program assessment and provide coordinated resource inputs to the supporting MAJCOM's POM processes.

Analyses, Assessments and Lessons Learned (A9)

The A9 Director provides integrated analysis and assessment of the air, space, and information operations campaign and execution for predictive battle space awareness across the AOC and AFFOR staff. The A9 assesses the success of the effects-based operations and makes recommendations to the COMAFFOR. The A9 also assists the A3 in mission rehearsal and conducts red teaming, and course of action analysis. The A9 is directly responsible to the COMAFFOR for supporting the OAT within the AOC Strategy Division team and for projects outside the Operational Assessment Team scope. The A9 serves as the focal point for reachback efforts to the AF analytic organizations. The A9 is also responsible for collecting, documenting, reporting, and disseminating critical information necessary to analyze, assess, and document the air and space campaign, contingency operations and to document lessons observed. The A9 distributes lessons observed and learned to inform and guide planning and execution. The A9 also facilitates after action reviews and develops a remediation plan.

APPENDIX F

Intermediate-Level Maintenance Support

This appendix provides background information about intermediate-level maintenance that may be useful in understanding the concepts presented in Chapter Five of this report. Because ILM is a core warfighting capability that supports the AEF, it may be a good potential candidate for mission assignment to the ANG using the mission assignment criteria outlined in this report. (See Chapter Five for application of the mission assignment methodology to ILM operations.)

Current Air Force Maintenance Practice

The Air Force generally provides for the maintenance of a weapon system by organizing maintenance tasks and functions into three distinct levels or echelons. In this context, maintenance includes the inspection, fueling, arming, and servicing of aircraft, as well as the repairing and overhauling of aircraft, aircraft components, and associated support equipment. On-equipment maintenance, as the name implies, consists of maintenance work that is accomplished on the aircraft itself; off-equipment maintenance refers to work accomplished on components that have been physically removed from the aircraft. The three levels of maintenance are organizational level, intermediate level, and depot level.

Organizational level (O-level) maintenance consists of on-equipment servicing and repair of an aircraft that is normally conducted on the flightline. An O-level repair action normally begins by identifying a failed aircraft component or line replaceable unit (LRU), an aircraft

subassembly that flightline maintenance personnel are authorized to remove. The LRU is removed and replaced with a serviceable spare component, and the aircraft is returned to mission capable status.

Intermediate-level maintenance (ILM) consists of repairing, in a shop or on a test bench, failed LRUs that have been removed from the aircraft. Each air base establishes ILM facilities, or back shops, that are authorized to repair LRUs through the removal and replacement of failed shop replaceable units (SRUs) or by other repair processes. The LRUs made serviceable through this process are then returned to the base's spare parts inventory. Each base is authorized a specific quantity of spare LRUs and SRUs to support this repair cycle activity.

The third level of maintenance is depot level. *Depot level maintenance* consists of the major overhaul of aircraft through Programmed Depot Maintenance (PDM), as well as the repair or overhaul of LRUs and SRUs. For any given aircraft or component, depot level maintenance is usually accomplished at one central location. This location is typically an Air Force Materiel Command Air Logistics Center (or depot), a contractor facility, or—in some cases—a Navy or Army logistics facility.

As an example of this three-level process, most air bases have a Jet Engine Intermediate Maintenance (JEIM) facility, or engine shop. When a pilot reports an engine problem, O-level maintainers diagnosis the problem. They may be able to make a minor on-equipment repair that resolves the problem. If not, they will remove the engine and replace it with a serviceable spare engine. The unserviceable engine is sent to the JEIM facility (engine shop) where it is inspected and disassembled. Repair is normally accomplished by removal and replacement of a major subassembly (SRU) such as a fan or compressor section. The engine is then reassembled, inspected, tested, and returned to the base's spare engine pool. The failed SRU (in this example, the compressor) is usually returned to the depot to be overhauled or rebuilt.

During the design phase of each weapon system, logistics engineers conduct a Repair Level Analysis (RLA). In this analysis, the potential failure mode of each component of the weapon system is examined, and a cost/benefit determination is made as to whether the component failure should be authorized as an organizational, interme-

diate, or depot-level repair action. Thus, in principle, the allocation of total maintenance workload between organizational, intermediate, and depot level action is planned at the time the weapon system is designed, optimizing the support for the weapon system. Maintenance actions are assigned to repair levels to minimize the total system costs of maintenance manpower, maintenance equipment, component transportation, and spare component pools necessary to provide a desired level of weapon system availability.

In a typical three-level maintenance scheme, responsibility for and control of organizational and intermediate-level maintenance activities are usually assigned to the operating command, whereas depot level maintenance is the responsibility of the Air Force Materiel Command. For some weapon systems, including the F-16 and newer aircraft, the Air Force has adopted a two-level maintenance scheme, which reduces the amount of repair done at the intermediate level. However, two-level maintenance focuses mainly on avionics repair; a fairly large intermediate repair capability for nonavionics repair is still in place for most aircraft support, including the F-16.

ILM Deployment Concepts and Experience

Throughout the Cold War era, the Air Force developed maintenance concepts and detailed war mobilization plans to support deployed aircraft engaged in conventional combat operations. For many years the primary focus of this planning was for a major theater war in the defense of the NATO region, and the planning was thus focused on deploying aircraft from CONUS to operate from NATO airfields. The plans were elaborate and detailed, but the basic maintenance support concept was straightforward. The unit of deployment was typically a wing or a squadron. The wing would be tasked to deploy on relatively short notice to a preplanned operating location in the theater. The wing flying operation was intended to be self-sufficient for the first 30 days of combat operations. This meant that each squadron would deploy with its aircraft, its aircrews and operational personnel, and its organizational-level maintenance personnel and equipment. In addition, the

unit would deploy with a pool of war reserve materiel (WRM) engines and a War Readiness Spares Kit (WRSK). These spare engines and spare LRUs were calculated to be sufficient to satisfy the squadron's needs for the initial 30 days of planned combat sorties, so the flying unit could operate independently, that is, without additional intermediate or depot level maintenance support during that time period.

For support beyond day 30 of the conflict, the plans called for the base back-shop operations to deploy to the flying unit's forward location to provide ILM; that is, to do on-site component repair. Given the establishment of SRU pipelines between the deployed ILM activity and the depot facilities, this deployed ILM capability would have allowed the deployed flying units to operate for as long as might have been necessary. These plans even called for the follow-on deployment of relatively fixed facilities such as JEIM shops and engine test facilities. In actual practice, however, full ILM support was rarely if ever deployed as follow-on support of contingency operations.

The AEF rotation policy the Air Force has chosen to employ over the past decade has separated the deployment of the specific aircraft from the deployment of Expeditionary Combat Support, which includes maintenance organizations. The exception is the aircraft maintenance squadron (AMXS); the assigned O-level maintenance capability normally deploys with its assigned aircraft. The AEF rotation policy calls for the functional area managers at the MAJCOM to identify and assign ECS support to deploying aircraft while the AF/XO tasks the aircraft.

During the Cold War era, the unit of deployment was a wing, and a single wing was intended to be self-sustaining. Once all the aircraft were deployed, all associated support UTCs would be deployed to the same location. After Desert Storm and the end of the Cold War, the deployment concepts for the Air Force began to change. The unit of deployment was no longer a wing, nor even an entire operations squadron, but rather a flight of six to twelve aircraft. These aircraft and their specific flightline support would join other flights deploying from various locations to form an Air Expeditionary Force (AEF). The ECS or general support could be pooled from tasked units, or a completely separate unit could provide the support. This concept of assigning the

right mixes of different types of Mission Design Series (MDS) or air vehicles to accomplish a given set of objectives, while operationally efficient, has created some support issues. What once was considered a fully self-sustaining wing can now be split into many parts and pieces, and the deployment requirements may not be equal across all parts. As stated previously, the aircraft maintenance unit will normally deploy with its assigned Operations Squadron, but the associated MXS may deploy a portion of the required support or none at all.

Maintenance Manpower

Ninety-eight percent of Air Force maintenance manpower authorizations are for enlisted personnel who are technicians and supervisors. Maintenance authorizations are further stratified by skill level as shown in Table F.1. Across the Air Force and within the active component, 5-level is the most common skill level. However, as presented in the table, the active component has a higher proportion of 3-level apprentices than the overall total force and a lower proportion of 7-level technicians.

Newly enlisted Air Force personnel attend a maintenance technical school and are awarded a 3-level certification upon completion. A

Table F.1
Maintenance Manpower Authorizations by Skill Level

Skill Level	Title	Typical Rank	Percent of Total Maintenance (All)	Percent of Total Active Component Only
3	Apprentice	E-3	11	19
5	Journeyman	E-5	53	59
7	Craftsman	E-7	35	21
9	Superintendent	E-9	1	1

SOURCE: CMDB file.

3-level airman has very limited skills and experience and must be closely supervised. The maintenance technician achieves advanced skill levels through an established system of on the job training (OJT) and career development courses. It generally takes five to six years to complete enough training to certify as a 7-level, or expert technician. Given a four-year enlistment cycle and a first-term reenlistment rate on the order of 50 percent, growing experienced aircraft maintenance technicians is a continual challenge for the active duty Air Force. Although the total number of maintenance technicians on active duty equals or exceeds the authorized quantity, a disproportionately high number of them could be 3-levels. The active duty units tend to be chronically short of 7-level and 9-level technicians.

In contrast, the ANG has traditionally acquired new guardsmen as they leave active duty, typically as 5-levels. Because of the career longevity of a guardsman, over 95 percent of all full-time ANG aircraft maintenance technicians are 7-level or 9-level certified. Many have more than 20 years of experience in aircraft maintenance.

The ANG currently meets its maintenance requirements with a mix of full- and part-time personnel. Table F.2 presents the average number of authorized positions at an ANG base per aircraft by MDS for all maintenance and the subset of authorizations for ILM only. Each of these is broken down by the average staffing for full-time ANG technicians and part-time drill positions. The proportion of total authorized positions filled by full-time technicians varies from 28 to 37 percent for total maintenance, and from 30 to 43 percent for ILM.

Table F.3 shows how ILM maintenance manpower authorizations are distributed across the various shops and specialties for fighter aircraft. Authorizations vary by shop across the bases because of differing numbers of assigned aircraft and differing MDS. In addition, the F-16 aircraft have differing roles and equipment. For example, F-16s at Hill are equipped with the Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) system, whereas the F-16s at Shaw are configured for the suppression of enemy air defenses (SEAD) mission.

Table F.2
ANG Maintenance Authorizations per Aircraft by MDS

	F-15	F-16	A-10	C-130	KC-135
Total maintenance authorizations	27.2	28.5	24.5	34.9	32.5
Full-time	10.2	8.0	7.2	11.6	11.1
Part-time	17.0	20.5	17.2	23.3	21.4
Percent of authorized positions filled by full-time ANG	37%	28%	30%	33%	34%
ILM maintenance authorizations	13.1	13.4	14.5	23.2	18.3
Full-time	5.6	4.4	4.4	7.3	6.6
Part-time	7.5	9.0	10.1	15.9	11.7
Percent of authorized positions filled by full-time ANG	43%	33%	30%	32%	36%

Table F.3
ILM Maintenance Manpower Authorizations for Active Duty F-15 and F-16 Wings

Base	Cannon	Shaw	Hill	Eglin	Langley	Seymour-Johnson
MDS	F-16	F-16	F-16	F15C	F-15/ F-22	F-15E
PAA	**60**	**72**	**66**	**48**	**66**	**87**
Accessory maintenance	133	155	181	122	119	152
AGE	69	107	72	83	97	101
Armament systems	42	81	55	47	64	59
Avionics	73	97	123	87	57	144
Fabrication	99	138	136	175	188	142
Maintenance	74	122	89	111	102	151
Munitions	216	206	243	106	159	208
Propulsion	73	176	96	127	96	123
TMDE	0	37	0	0	27	29

Under the AEF concept, large portions of ILM capabilities infrequently deploy forward. Items needing repair are either evacuated to home station or to CIRF operations. For these reasons and others, ILM may be a mission area that could benefit from partial assignment to the ANG (see Chapter Five for mission assignment options).

APPENDIX G

DoD BRAC Commission Actions, September 2005

Because we focused on staff functions in the COMAFFOR mission (Chapter Four), we evaluated only those installations with expeditionary combat support (ECS) functions that were affected by BRAC. According to the DoD Base Closure and Realignment Commission Action briefing (DoD, 2005d), the following installations will be closed.

- Kulis Air Guard Station, Alaska
- Gen Mitchell Air Reserve Station, Wisconsin
- Onizuka Air Force Station, California
- Air Force Research Laboratory, Mesa, Ariz. (Joint Cross-Service Group [JCSG])
- Buckley Annex, Colo. (JCSG)
- Brooks City Base, Tex. (JCSG)

The following installations will lose aircraft, but other ECS functions will remain at the installation.

- Cannon AFB, N.M.
- Mansfield-Lahm Municipal Airport Air Guard Station, Ohio
- Otis Air National Guard Base, Mass.
- Pittsburgh Air Reserve Station, Pa.
- W. K. Kellogg Air Guard Station, Mich.

APPENDIX H

Future Total Force Initiatives

The Future Total Force concept was developed by the Air Force to leverage capabilities in each component of the Air Force—the active component and the reserve component. Ten initiatives are currently being implemented. A brief description of each initiative is provided below (Roelofs, 2005).

Richmond-Langley Integration (Virgina)

The 1st Fighter Wing (Langley) and the 192nd Fighter Wing (VA-ANG) will work together in the transition to the F-22 Raptor.

Major Milestones

- CONOPS and training memorandum of understanding (MOU) signed by the Virginia Adjutant General, Director ANG Future Total Force (NGB/CF) and the Commander, Air Combat Command (COMACC), and released for distribution, April 7, 2005.
- First 192nd FW pilot in training, May 5; two maintainers start F/A-22 training May 30–June 15.
- VA-ANG/ACC integration office established at Langley to work on issues.

Current Status

- Working with the Integration office to determine VA-ANG personnel security investigation requirements. The current estimate is 200 reinvest/upgrades needed.
- ACC/ANG restructure meeting was held at Langley April 18–22. It included a Langley facility survey conducted for 192 FW beddown; XPXB final report pending.

Community Basing (Vermont)

Active duty personnel will be stationed with Vermont Air National Guard personnel in Vermont.

Major Milestones (2005)

- 20th Maintenance Operations Squadron (MOS) established December 1 and assigned to 20th FW at Shaw AFB, S.C.
  - Detachment commander and superintendent identified for 158th FW
  - Active duty offset manning positions identified, unit manning document (UMD) developed
  - Initial ACC site survey completed February 18—no showstoppers
  - CONOPS approved by Vermont National Guard Adjutant General, the ANG Director, and COMACC; published May 8.

Current Status

- Headquarters, Air Force (HAF) housing waiver approved; transportation waiver near approval
- Eight of ten 3-levels for PCS identified by name; no early arrivals.

Hill Integration (UTAH) 388FW/419FW

Air Force Reserve personnel from the 419th Fighter Wing will be integrated into the active duty 388th Fighter Wing at Hill AFB, Utah.

Major Milestones

- Phase 1: Administrative control alignment, 4th Qtr. FY05
- Phase 2: Functional integration with four squadrons of jets—and four squadrons of pilots, 4th Qtr. FY06
- Phase 2A: AFRC F-16 Block 30s depart, 1st Qtr. FY07 to 4th Qtr. FY07
- Phase 3: Functional integration with three squadrons of jets and four squadrons of pilots, 1st Qtr. FY08.

Current Status

- ACC/XP CONOPS top line coordination complete; comments in review
- Draft MOU in coordination between wings.

Predator Missions (Texas/Arizona/New York)

The Texas, Arizona, and New York Air National Guards will conduct Predator unmanned aerial vehicle missions employing reachback from their home states.

Major Milestones

- NY-ANG Predator Unit announced 18 Mar, IOC FY08—Vice Chief of Staff of the Air Force directed replacement for the Distributed Common Ground System (DCGS)
- Initial operating capacity for Texas and Arizona by June 2006 (flying one shared orbit)
- High-fidelity mission simulator delivery by June 2007 or earlier.

Current Status

- NV-ANG and AFRC hiring for FTU augmentation and Air Warfare Center integration
- ACC/SC and AFCA working on communications architecture redesign
- Air Force Special Operations Center (AFSOC), ACC, AF met April 19 to integrate AFSOC needs into Predator plan
- Predator operator meeting to establish 17U AFSC, undergraduate remotely piloted aircraft training.

C-17 Guard Associate (Hawaii)

The 15th Air Wing (AW) and Hawaii Air National Guard's 154th AW will form a guard associate relationship flying the C-17 from Hickam AFB, Hawaii.

Major Milestones

- Corrosion Control Hangar (CCH) funding strategy: 3rd Qtr. FY05
- MOA signed— PACAF and AMC; and PACAF and NGB.

Current Status

- CCH requirements not executable within existing C-17 military construction
- Draft DOC and MOAs in development and coordination
- Hickam's first and second C-17 aircraft under construction at Long Beach, Calif.
- Support equipment, technical orders, and new personnel arriving.

C-17 Reserve Associate (Alaska)

The 3rd Wing and 915 AG will form a reserve associate relationship flying the C-17 from Elmendorf AFB, Alaska.

Major Milestones

- Third site activation task force (SATAF): Conducted September 2004
- Memorandum of agreement signed: PACAF & AMC and PACAF & AFRC
- Program Integration Office: planned to open, 4th Qtr. FY05.
- Aircraft arrival: 4th Qtr. FY07.

Current Status

- AFRC group headquarters funded at $3.1 million in AFRC's FY06 Budget Estimate Submission (BES)
- Draft plan in development and coordination
- Elmendorf's C-17 aircraft all coming from other units.

C-130 Active Associate (Colorado and Wyoming)

Colorado and Wyoming will form an active associate relationship flying C-130s.

Major Milestones

- Organizational Change Request (OCR), Program Change Request (PCR) approved by HAF 4th Qtr. FY 2005.
- Site surveys, SATAFs, programing plans, MOA, CONOPS complete, 1st Qtr. FY06
- Assumption of command, PCS inbounds, start flying training, 3rd Qtr. FY06
- Final training, deployment processing, deploy September 1, 2006.

Current Status

- PCR in draft
- FTF acceleration Integrated Product Team (IPT) continues to develop requirements, timeline.

C-130 FTU (Little Rock AFB, Arkansas)

The 314th AW and 189th AW will form an associate FTU for C-130s at Little Rock AFB, Arkansas.

Major Milestones

- 314th AW manpower authorizations identified for transfer, 1st Qtr. FY06
- 314th AW personnel PCS, 2nd Qtr. FY06
- 189th AW full-time manpower in place, 2nd Qtr. FY06.

Current Status

- PCR in draft
- FTF acceleration; IPT continue to develop requirements, timeline.

C-40 Integration (Scott AFB, Illinois)

An integrated relationship will be developed at Scott AFB, Ill., for flying C-40s.

Major Milestones

- Beneficial Occupancy Date (BOD) of August 2006 for contractor logistics support (CLS) support; six months prior to first aircraft arrival
- Aircrew and maintainers hired and trained by aircraft arrival, beginning in FY07

Current Status

- Three C-40Cs on contract for delivery to Air Force on February 15, May 31, and November 30, 2007
- Draft CONOPS in three-digit coordination.

C-5 FTU (Lackland AFB, Texas)

The 433rd AW and 37th training wing (TRW) will form an associate FTU for C-5s at Lackland AFB, Tex.

Major Milestones

- SATAF II June 2004; base operating support (BOS) meeting, April 2005; SATAF II, September 2005
- Begin converting drill positions to Air Reserve Technicians (ARTs) 1st Qtr. FY06
- 433rd AW ramp-up, formal school instructors trained 4th Qtr. FY06
- Ramp-up training begins, 1st Qtr. FY07.

Current Status

- Continue to work on BOS issues between 433rd AW and 37th TRW (host unit)
- Continue to work funding issues for AFRC manpower addition, simulator transfer, and simulator contract change.

APPENDIX I

Response to Hurricane Katrina

This appendix presents a general timeline of the U.S. government preparation and response to Hurricane Katrina, which made landfall August 29, 2005. To provide context, we first present a brief review of the current organizational structure and procedures involved in a federal government response to a disaster. The primary focus of this appendix is on the Air National Guard's emergency preparation and response to Katrina. However, we also discuss the response to Hurricane Rita, following in the weeks after Katrina. Finally, we discuss disaster preparation and response and lessons learned. This appendix is by no means intended to be all-inclusive. It is, however, intended to be representative of the Air Force, Air National Guard, and federal response to Hurricane Katrina.

Procedures For Federal Government Disaster Response

According to the National Response Plan and the DoD Joint Doctrine on Homeland Security, in order for DoD resources to be accessible, all local, state, and other federal resources must already be inundated. Figure I.1 contains the procedures for obtaining DoD civil support. The leading federal agency in the case of Hurricane Katrina, the Federal Emergency Management Agency (FEMA), must put in a request for DoD assistance to the Office of the Secretary of Defense (OSD) (Department of Homeland Security, 2004, p. 42; DoD, 2005c,

p. IV-1).[1] The DoD Executive Secretary then assesses and processes the Request for Assistance (RFA). The Assistant Secretary of Defense/Homeland Defense (ASD/HD) generally reviews the requests while the Joint Director of Military Support (JDOMS) processes the orders. The Secretary of Defense (SECDEF) approves requests from civilian agencies, but retains control of DoD assets. After the request is approved, the JDOMS provides orders to the appropriate command. The ASD/HD then coordinates with the Department of Homeland Security (DHS) and oversees the disaster area.

DoD's Northern Command (NORTHCOM) is responsible for civil support missions within most of the United States. There is a permanent Joint Interagency Coordination Group in NORTHCOM with officers from all DoD services and DHS. NORTHCOM generally responds to these missions with a joint task force and is subsequently allocated the forces necessary from the military services. A Defense Coordinating Officer (DCO) is selected and sent to the disaster area. The DCO becomes the point of contact for DoD asset requests by other government agencies in the area. The DCO does not have operational control over the Army Corps of Engineers or the National Guard deployed in state active duty (Title 32) standing. The governors of each state maintain control of the National Guard unless the Guard is activated in Title 10 status. When the National Guard is in Title 32 status, it is authorized to perform law enforcement functions. Only when activated under Title 10 is the Guard subject to the limitations of Posse Comitatus.[2]

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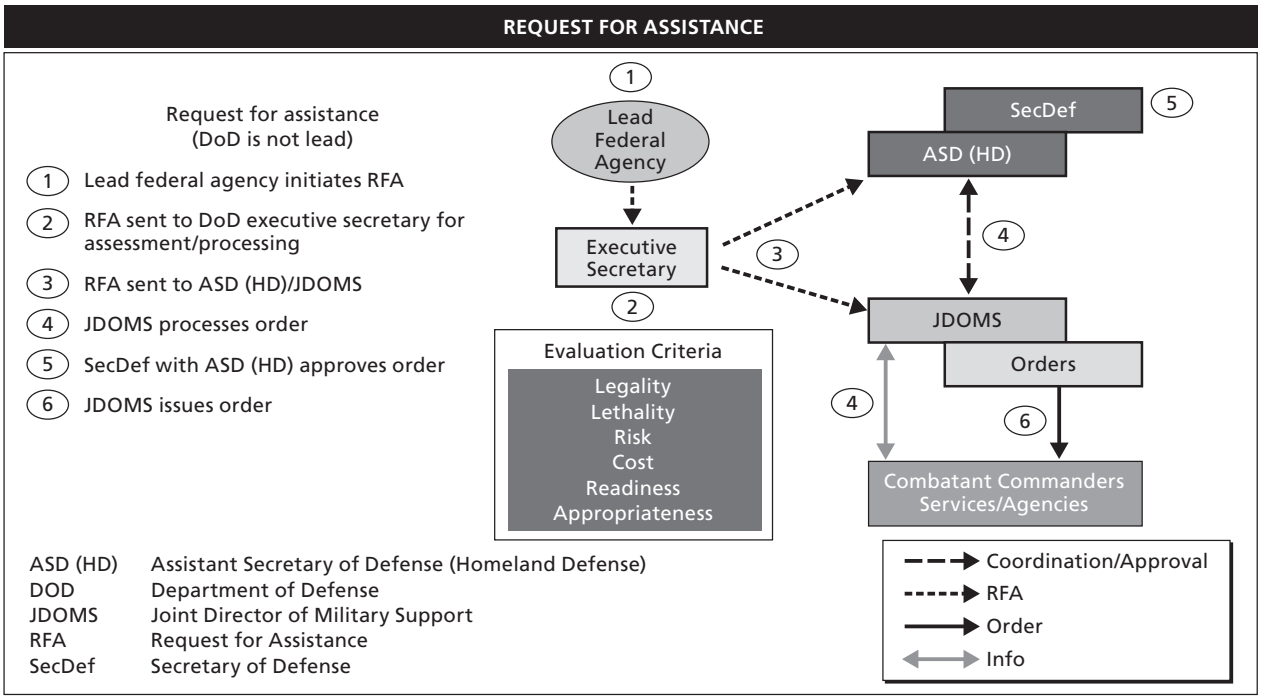
[1] Unless otherwise noted, Bowman, Kapp, and Belasco (2005) is the source for the remainder of the section describing the U.S. government disaster-response procedures and organization.

[2] The Posse Comitatus Act was passed in 1878 with the intention of eliminating the U.S. Army from civilian law enforcement and restoring it to the traditional role of defending the U.S. borders. It does not apply to the Coast Guard or the National Guard in state active duty (Title 32) status. Over the history of this legislation, numerous exceptions have been written in to allow for things such as the use of the military in an anti-drug law enforcement capacity. However, the basic principle of deterring unauthorized deployment of the military for traditional civilian law enforcement activities still exists.

Figure I.1
Request for Department of Defense Assistance

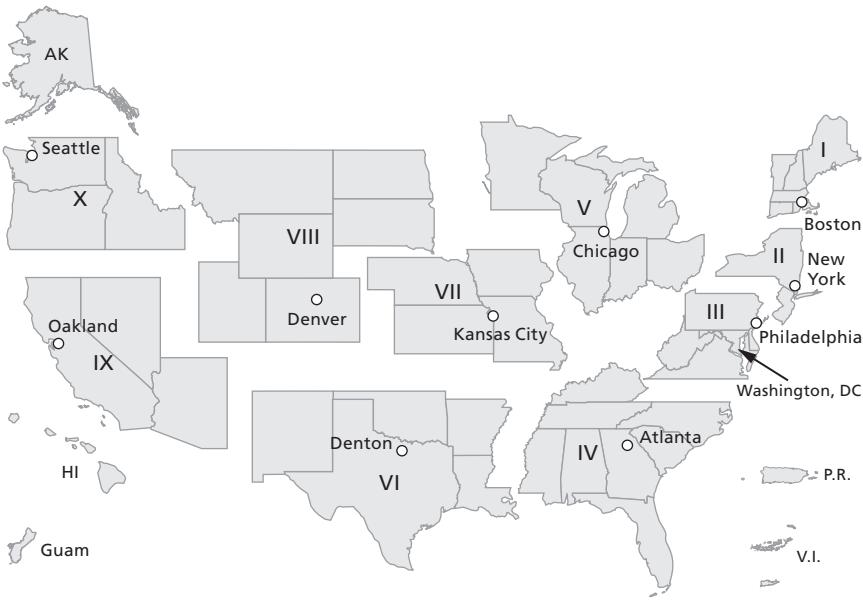


SOURCE: DoD (2005c).

RAND *MG539-I.1*

The National Guard and other nongovernmental agencies, such as the Red Cross, are the traditional first and second responders in the aftermath of a disaster. However, the lead federal agency for emergency response has historically varied depending on the disaster and the administration. FEMA revamped and redefined its missions and goals during President Clinton's administration. Under Director James Lee Witt, FEMA focused principally on emergency management rather than on national preparedness (Daniels and Clark-Daniels, 2000). FEMA's current organization includes 10 regional offices, illustrated in Figure I.2. Since Director Witt's term, FEMA has undergone further reorganization. In March 2003, the agency became part of the Department of Homeland Security.

Figure I.2
FEMA Regional Offices



SOURCE: http://www.fema.gov/regions/ (as of 11/18/2005).
RAND *MG539-I.2*

Disaster Preparation and Response to Katrina: A Chronology

This chronology is not intended to be comprehensive, but rather representative of the preparation and response to Hurricane Katrina.

Federal, State, and Local Preparation Measures for Hurricane Katrina

A severe weather execution order was signed by the SECDEF two weeks prior to Hurricane Katrina.[3] This order gave NORTHCOM some ability to develop a plan and respond to the disaster ("How the Pentagon Caught Katrina, 2005). DoD was able to deploy assets before receiving requests from DHS or FEMA. NORTHCOM proceeded with the order and first responded to Hurricane Katrina on August 24, five days prior to the August 29 landfall.

On August 24, NORTHCOM distributed the first warning orders to the Regional and State Emergency Preparedness Office, and the Army National Guard in the states that were in the path of the storm. On August 26, the National Hurricane Center declared New Orleans in the direct path of Hurricane Katrina. This triggered the Louisiana State Emergency Operations Center (EOC) in Baton Rouge to notify Louisiana Governor Kathleen Banco. Governor Banco declared a state of emergency, effectively putting the National Guard on full alert and allowing the President to employ military resources under the Stafford Act (Elea, 2005). The Guard was sent to different locations in Louisiana, including the Superdome, as determined by the Emergency Operations Plan. Medical assistance, security, and last-minute shelter were also provided. The Guard prepositioned high-water vehicles, engineering equipment, air assets, and other security resources (Landrenau, 2005). In addition, government officials from different parts of Louisiana met with parish leaders. The following day, August 27, the governor of Mississippi also declared a state of emergency, while President

[3] Unless otherwise noted, the sources for the remainder of the chronology section are Bowman, Kapp, and Belasco (2005) and Whitelaw (2005).

Bush declared a federal state of emergency[4] for the state of Louisiana on August 30. NORTHCOM responded by sending the initial components of Joint Task Force–Katrina. The Louisiana National Guard stood up a Joint Operations Center at Jackson Barracks in coordination with other states and parishes. It also planned an evacuation of the base before the storm and developed an evacuation plan for the state based on colored zones of vulnerability. It brought in generators, cots, and other equipment to shelters. Also at the state level, the Louisiana Wildlife and Fisheries donated 100 boats for rescue operations.

On August 28, New Orleans Mayor Nagin called for mandatory evacuation. The Louisiana National Guard began setting up shelters for those who could not leave the city and had special medical needs. The Superdome in New Orleans was designated as one of the shelters; 10,000 people gathered there before the storm, while 400 National Guard were sent in for security. The Director of Military Support to Civilian Operations for the Louisiana National Guard asked for reinforcements. Upon this request, more National Guard troops were activated. The National Guard also began to plan for evacuation and search and rescue missions that would be needed in the aftermath of Katrina. According to a FEMA exercise that was run in 2004 for a projected hurricane in Louisiana, the parishes were responsible for administering supplies for the first 48–60 hours after the storm. This was the time that FEMA would need to become operational. FEMA placed supplies in Houston in preparation for the hurricane and gave the parish leaders final verification that FEMA would need 48–60 hours to distribute the prepositioned supplies.

While FEMA prepared supplies out of the storm's path, military elements were also being moved to military bases to assist in the preparation and evacuation effort. Air Combat Command (ACC) deployed the 83rd Communications Squadron satellite communications teams to Keesler AFB, Miss., to provide communication for relief agencies (ACC News Service, 2005). Keesler AFB is the Federal Coordinating

[4] A state emergency is a prerequisite for sending military into an emergency. The federal emergency is the final step before the president can send military assets and federally activate the National Guard.

Center for the National Disaster Medical System, the medical arm of FEMA. It manages and maintains memorandums of agreement with 23 civilian medical facilities throughout the Mississippi Gulf Coast.[5] In addition to the response at Keesler AFB, Maxwell AFB, Ala., was absorbing evacuees from the Gulf Coast Region. A reception center was set up at Maxwell AFB to register the evacuees (Desjarlais, 2005).

Short-Term Military Response to Hurricane Katrina

On August 29, Hurricane Katrina made landfall as a strong category IV storm with winds up to 150 mph. On the same day, President Bush declared a federal emergency. NORTHCOM established Maxwell AFB as a federal operational staging area for movement of supplies and personnel (Miles, 2005a). NORTHCOM also provided and coordinated active duty forces while Joint Task Force–Katrina (JTF-Katrina) was being set up (Miles, 2005a). As of September 4, JTF-Katrina had aeromedically evacuated more than 2,955 patients, moved 15,165 people, and delivered 4,613 tons of cargo ("Airmen Saving Lives," 2005).

In order to facilitate the creation of JTF-Katrina, the following procedures were followed.[6] FEMA submitted a request to NORTHCOM. NORTHCOM put in a request for forces, and processed and coordinated with 1st Air Force to identify unique resources and numbers of people needed. 1st AF established the 1st Aerospace Expeditionary Task Force (AETF)–Katrina Operation to provide command and control of resources supporting air operations for Katrina. Maj Gen Scott Mayes, 1st AF and 1st AETF commander, was also the joint forces air component commander (JFACC) for JTF-Katrina. He was responsible for coordination with local, state, and federal agencies in the relief operations for Katrina. The 1st AETF provided airlift, aeromedical evacuation, medical support, surveillance, civil engineering,

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[5] See Keesler AFB home page, online at http://www.keesler.af.mil/81MDG/medical.asp?menu=Info.mnu.

[6] "Air Force provides broad-based hurricane relief effort" (2005) is relevant for all information in this section concerning the formation of Joint Task Force–Katrina unless otherwise noted.

among other FEMA requests ("1st AF Provides Command, Control," 2005).

1st Air Force then worked with the Air Expeditionary Force (AEF) Center on Air Force Space Command (AFSPC) deployments. The deployments were made from AFSPC headquarters to Tyndall AFB to coordinate space integration activities and develop joint air and space operations plans for JTF-Katrina (Thibault, 2005a). JTF-Katrina became "official" one day after the hurricane, with Army Lieutenant General Russel Honore acting as the DCO and task force commander. JTF-Katrina set up at Camp Shelby, Mississippi, on August 31. 1st AF established Air Expeditionary Groups (AEGs) at New Orleans airport; Keesler AFB, Jackson, Mississippi; and Maxwell AFB, Ala. The AEGs were formed to support forward deployed Air Force in the Gulf Coast ("Air Force Organization Provides," 2005).

On September 2, more than 193 people were deployed for JTF-Katrina. Air Combat Command sent senior leaders Major General Mike Decuir, director of air and space operations to coordinate air-power requests and Brig Gen Russell Kilpatrick, Command Surgeon, to coordinate all requests for Air Force medical support ("Air Combat Command Provides," 2005). Much of the relief effort depended on the navigation and timing of AFSPC's satellite system (GPS) (Thibault, 2005a). The Global Broadcast Service (GBS) also provided a communication system for NORTHCOM, JTF-Katrina, and Combined Air and Space Operations Center at Tyndall. The Spectral Operations Resource Center Team was used to provide high-resolution imagery to assess the damage to the Gulf Coast. Vandenberg AFB's Joint Space Operations Center supported the joint air and space effort. It deployed six helicopters and crews, with maintenance and support, to Mississippi with JTF-Katrina (Thibault, 2005a). The 620th Air Expeditionary Squadron (AFSPCs from Malmstron AFB, Vandenberg AFB, Minot AFB, Peterson AFB, F.E. Warren AFB) delivered food, water, and baby supplies beginning on September 5, 2005 (Parie, 2005).

On September 1, AFMC stood up a crisis action team (CAT) for Operation "Katrina Relief Operations" led by Lt Gen Gabreski with support from the eight bases associated with the command. From

September 1 to September 5, the CAT maintained operations 24 hours per day; then it went to 12-hour shifts. One hundred fifty people were deployed in the command (as of September 7) including those from civil engineering, security, contracting, public affairs, medics, and chaplains. Transportation equipment was sent to the Gulf Coast. Security forces went to work directly with local police officers (evacuees from Keesler were escorted to homes in Biloxi). Medics supported displaced people in recovery centers (Lackland AFB). An OC-135B from Offutt AFB, Neb., flew aerial imagery mission for FEMA beginning on September 1. Wright Patterson AFB processed and disseminated the imagery that served to assess damage, help in search and rescue, and find communication lines (Kathleen Lopez, 2005).

The first U-2 dragonlady flight was flown September 1 from Beale AFB in support of FEMA operations ("U-2 in Support of Hurricane Katrina," 2005). The 9th Reconnaissance Wing flew U-2 missions over the Gulf for two weeks in support of FEMA. The 480th Intelligence Group and the 27th Intelligence Support Squadron at Langley AFB supported the 9th wing in the collection, processing, and dissemination of intelligence from the U-2 missions (Cloutier, 2005).

ACC sent combat communications groups to six sites in Mississippi and Louisiana. Sixty airmen from 5th Combat Communications Group, Robins AFB, set up three satellite communication packages in Mississippi. More than 100 airmen from the 3rd Combat Communications Group, Tinker AFB, arrived in Louisiana to set up three satellite packages. ANG's 236th Combat Communications Squadron (CCS) and the 259th and 248th Air Traffic Control Squadrons also responded (ACC News Service, 2005). The 552nd Air Control Wing and 960th Airborne Air Control Squadron from Tinker AFB coordinated military and civilian aircraft and search and rescue aircraft. The 552nd Air Control Wing began on September 3 and was expected to stay longer than the scheduled month for daily air surveillance on the Gulf Coast (Fowler, 2005).

The Operations and Sustainment Systems Group (OSSG) was activated for Hurricane Katrina relief operations from the first hours

that Katrina made landfall.[7] Keesler requested an upgrade to unclassified circuits on Labor Day weekend and the OSSG doubled it. The group also increased classified circuit requirements for Robins AFB in support of E-8C JointSTARS missions in the region. Two OSSG communications experts were sent to Tyndall in support of JTF-Katrina. Experts were sent to Keesler with a contingency contracting IT kit (25 laptop computers, tape backup unit, software applications and databases). Database administrators were remotely supporting the network at Keesler. The logistics division was supporting the cargo movement in the region.[8]

At Eglin AFB, the 33rd fighter wing (FW) (60th Fighter Squadron and 33rd Operations Support Squadron) picked up the Louisiana ANG 159th FW's Operation Noble Eagle (ONE) missions 36 hours after returning from Katrina evacuation duty. Some of the unit had never flown a ONE mission and had to be trained in a few hours. They provided combat air patrol when President Bush visited New Orleans (September 2), Mississippi (September 5) and the Gulf Coast (September 11–12). The 33rd was undertaking the 24-hour coverage of the ONE missions for an unspecified time (Tomiyama, 2005).

Within the first few days after Hurricane Katrina, the rescue missions became a joint effort. Air Force helicopter (HH-60G Pave Hawk) rescue missions included around 400 airmen, with 12 days of round-the-clock operations. Four thousand two hundred lives were saved; 1,043 lives were saved with Air Force Reserve helicopters. AFRC 304th Rescue Squadron, Ore., and 306th Rescue Squadron from Davis-Monthan AFB, Ariz., are samples of the pararescuemen crews on the flights. "Typically, pararescuemen and their crews came from the same unit;

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[7] The Operations and Sustainment Systems Group provides technical and customer service support and acquisition and program management oversight of over 160 Combat Support Information Technology (IT) systems. OSSG also manages the Air Force standard desktop environment and serves as the Air Force lead for software program management under the auspices of the DoD Enterprise Software Initiative (http://www.fcw.com/vendorsolutions/ossw/ossg.asp, as of September 19, 2006).

[8] All information on the OSSG in the section, unless otherwise noted, is from"Systems Group Adds Technology to Katrina Relief Support" (2005).

however, the rescue effort for Hurricane Katrina blended active duty and guardsmen with the reserve on each flight" (Huntington, 2005b).

Detailed Air Responses

New Orleans Airport and Louisiana Operations. AMC sent the 818th Contingency Response Group (CRG), McGuire AFB, to New Orleans Airport on August 31. The fire department and local airport workers were there "carrying litters and marshalling helicopters," according to Lt Col David Wise of the 819th Global Support Squadron (Gulick, 2005). The 818th CRG helped provide airfield operations. The leadership of the CRG was responsible for interacting with DoD, FEMA, Department of Transportation, U.S. Border Patrol, and U.S. Forest Service officials in overseeing the flow of things associated with airlift. This included providing support and recommendations for the evacuation and relief aid distribution. AMC sent 80 men from the 375th Medical Group (MDG), Scott AFB; the 89th MDG, Andrews AFB; and the 6th MDG, MacDill AFB, to New Orleans on September 1, as part of the Air Force medical rapid-response force. A mental health response team and dental team from Scott AFB also deployed to New Orleans (Diamond, 2005b). The Expeditionary Medical Support System worked at New Orleans Airport while helicopters from all branches of the military landed every 10–15 seconds for rescue missions. Air Force Surgeon General Lt. Gen (Dr.) George Peach Taylor Jr. said, "the active duty, Reserve, and Guard were flawless in their collective response . . . " (Pomeroy, 2005). The 452nd Aeromedical Evacuation Squadron arrived at New Orleans Airport in two 50th Airlift Squadron C-130s from Little Rock AFB to do aeromedical evacuations. The airmen were part of Joint Task Force–Katrina, whose mission was to evacuate patients to New Orleans Airport and Ellington Field ("Airmen Saving Lives," 2005). AMC also sent a C-5 from the 60th Air Mobility Wing, Travis AFB, and a C-17 from the 305th Air Mobility Wing, McGuire AFB, which "transported tanker airlift control elements and CSRs to Gulfport and New Orleans, respectively" ("Hurricane Katrina Relief Effort," 2005).

After the first few days of search and rescue operations at New Orleans Airport, the 4th Air AEG, including about 70 airmen from

Seymour Johnson AFB, Shaw AFB, Holloman AFB, Scott AFB, and Tyndall AFB, arrived on September 3 (Collier, 2005). Command and control for the 4th AEG also arrived at the New Orleans Airport September 3. There were 35 security force patrolmen and 20 service specialists in the 4th AEG. The team included five airmen who helped set up the initial communications and "checklists" for Katrina efforts. The 4th AEG medical groups (such as the 375th Medical Group, Scott AFB) helped people locate those who were medically evacuated in the first week after Hurricane Katrina (Broshear, 2005).

On September 4, the 49th Materiel Maintenance Group (MMG), Holloman AFB, New Nexico, arrived to set up a 550-person Basic Expeditionary Airfield Resources (BEAR) Base at the New Orleans Airport. Temporary operations were run from a warehouse until September 9, when the tent city was ready (Johnson, 2005). "We got the initial site set up in record time with help from the Shaw guys," Senior Master Sgt. David Berridge, team chief for 49th MMG said. "We compliment civil engineer forces with guidance to ensure the [BEAR] assets stay working and get set up correctly. We have also provided training to other deployed units in order to erect all the shelters being put up." The site supported the 4th Air Expeditionary Group, Army Personnel, and the plan was to put another base at the Naval Air Station in New Orleans. The 49th also supported the 82nd Airborne division by building two more 550-set camps for those patrolling flooded areas in New Orleans. Priority improved management effort—base engineer emergency force (PrimeBEEF) civil engineer units from McGuire AFB began the process for the two other BEAR base sets before the 49th arrived. Four other BEAR base sets were sent to Barksdale AFB, La., and Eglin AFB, Fla. ("Holloman Unit Assists," 2005).

As of September 14, there were around 530 men at "Camp Gumbo." Master Sgt. April Skonieczny, command post superintendent from Shaw AFB explained, "We are disseminating information and helping to coordinate to get airmen downtown to do what they need to do." Also, in support of the 4th AEG, on September 1, the 2nd Logistics Readiness Squadron from Barksdale AFB arrived at the Joint Reserve Base in New Orleans with two R-11 jet fuel trucks and a C-300 12,000-gallon ground product truck to help refuel helicopters.

The mission was already filled by the Army and Navy, so the team went around New Orleans and refueled anyone who needed help (to the superdome, generators, stranded vehicles, city hall, fuel containers, and to Army High Extended Mobility Tactical Trucks [HEMTT].) The operations were run out of Belle Chasse, La. Support was also given to an ANG team that was refueling helicopters at a baseball field. The ANG had two R-11 trucks and more than 400 flights a day. One R-11 was used for downtown New Orleans refueling and one was used to support ANG at the baseball field (Johnson, 2005).

The 33rd Combat Communications Squadron from Tinker AFB, Okla., arrived at New Orleans airport on September 5 to provide communications capability for the tent city. It provided classified and unclassified voice, data services, Internet, DSN, land-mobile radio service, and communications between the command post and the aircraft. The communications were intended for the hospital and the offices and maintenance tents. The squadron convoyed in 30 military vehicles and brought two satellite dishes with them (Todd C. Lopez, 2005a).

Keesler AFB and Mississippi Operations. On the same day that Hurricane Katrina made landfall, an Engineering Installation Squadron at Keesler AFB repaired the instrument landing systems so that C-17 and C-130 flights could commence in the relief efforts (ACC News Service, 2005). Keesler was one of the critical staging grounds for aeromedical evacuations, search and rescue, and movement of relief workers and supplies. Red Horse Squadron worked to return power, air conditioning, and water in the dining halls at Keesler AFB in less than six days (Todd C. Lopez, 2005b). Keesler Air Force Base's 81st Medical Group was the first to send medical response teams to local communities in the area one day after Hurricane Katrina made landfall. As of September 13, the teams were operating 24-hour temporary care facilities with triage, urgent care, treatment areas, and a pharmacy. FEMA maintained its headquarters at Keesler and was "directing medical operations in the region" (Arana-Barradas, 2005a). On August 30, AMC responded by sending a four-person assessment team from the 615th Contingency Response Wing (CRW) at Travis AFB to Lafayette, La., to establish air mobility operations. Then on August 31, 621st CRW, McGuire AFB, N.J., sent a 29-person team to

New Orleans Airport and 42 airmen from the 615th CRW to Gulfport, Miss., to support airlift operations. The Contingency Response Groups then deployed to Keesler AFB (Diamond, 2005a). The 620th Air Expeditionary Squadron (8 helicopters and 83 pilots, maintainers, and support personnel from Peterson AFB, Colo.) was deployed by AFSPC on September 2. The helicopters were assigned to 20th AF. The relief operations were conducted from Columbus AFB, Miss.; as of September 7, 41 sorties had been flown, two evacuations had been made, and 22,800 pounds of supplies (water, food, medical) had been delivered to the Gulf Coast (Thibault, 2005b). Evacuations were conducted from Air Force Retirement Home, Gulfport, with a bus ride and an overnight stay in a fitness center with medical personnel. The 908th Air Force Reserve Airlift Wing then transported the patients to Andrew AFB in a C-130 on September 2 (Desjarlais, 2005). AMC also deployed an Air Guard CRG to Gulfport, Miss., to help move supplies, emergency responders, and evacuees (Diamond, 2005b).

Also on August 30, the 347th Expeditionary Rescue Group (ERG) deployed 450 airmen to Jackson, Miss., to support Katrina rescue operations. The communications team from the 347th ERG set up internet connections and radio systems and phones on both classified and unclassified systems within hours of its approval. As of September 12, approximately 5,000 feet of wire had been put down around the base for phone, radio and internet (Bazar, 2005). Five helicopters from the 920th Rescue Wing, Patrick AFB, Fla., and the 347th Rescue Wing, Moody AFB, Ga., flew search and rescue in Mississippi (Miles, 2005a). Air Force Special Operations Command asked Lt Col Kurt Wilson, 347th Maintenance Group Commander, Moody AFB, to control the maintenance operations in Jackson, Miss. "We basically had five (separate maintenance) systems," Colonel Wilson said. "The first thing I recognized that needed to be done was to bring everyone together as a unit." The 920th Rescue Wing at Patrick AFB was the first to arrive at the Mississippi ANG 172nd Airlift Wing's base on Aug 30. The wing started sending helicopters into New Orleans immediately for search and rescue. The 920th flew to Jackson to transport FEMA assessment teams to the disaster areas. Other units arrived shortly after. Some of these included the 943rd Maintenance Squadron

from Davis-Monthan AFB, Arizona Air Force Reserve; 106th Rescue Wing (RQW), NY-ANG; and the 347th Aircraft Maintenance Squadron, Moody AFB. "It was very much like a contingency," he [Capt. Craig Giles, 347th AMS] said, "While that's what we've been trained to do, I never thought I'd (have to) do it in Mississippi" ("Hurricane Katrina Relief Effort," 2005). Most of the ANG 172nd Wing was activated and accommodated the visiting reserve and active units. "We've got Guard, Reserve, and active duty all working together just as one . . . swapping (aircraft) parts, helping each other out," said Airman 1st Class Ed Bellus of 347th AMXS, Moody AFB (Huntington, 2005a). The helicopter search and rescue working with the 920th Rescue Wing (RQW), staged out of Jackson, included a 26-helicopter, 40-person team of reservists and active duty personnel from Valdosta, Ga.; Cocoa Beach, Fla., Ft. Walton Beach, Fla.; Las Vegas, Nev.; Tucson, Ariz.; Portland, Ore.; and New York City (Thompson, 2005).

Other Contingencies and Operations. The following is a sample of Air Operations by the Air Force and the Air National Guard immediately following Hurricane Katrina. NORTHCOM tasked the 908th Reserve Command Unit, including the 908th Airlift Wing, the 357th Airlift Squadron, and the 908th Aeromedical Evacuation Squadron, to support the Katrina relief airlift missions. Security Forces and the Aerial Port Squadron made up some of the 60 airmen who were deployed. The 25th Aerial Port Squadron encountered generators with configurations too large to transport by aircraft, and so they improvised by putting the generators on trucks and driving them to Keesler AFB. A truck and ten disaster relief responders were flown from Wyoming to Mississippi. Gulfport military retirement home was evacuated on C-130s to Maryland. Ten chaplains from Georgia were transported to the Gulf States. Medical evacuation flights were staged (Alvarez, 2005a). The 563rd Rescue Group, Davis-Monthan AFB, Ariz., deployed four helicopters with crews; and Minot AFB, N.D., deployed another helicopter and two crews for search and rescue and movement of supplies and people in the Gulf Coast ("Air Combat Command Provides," 2005). Nellis AFB had sent 97 medical, security, and pararescue, three HH-60 Pavehawk helicopters as of September 8 ("Nellis Supports," 2005). The Air Force deployed the 54th Helicopter Flight with five helicopters and

approximately 55 people from F.E. Warren AFB, Wyo.; Malmstrom AFB, Mont.; and Vandenberg AFB, Calif., to stage search and rescue and other air missions in support of Joint Task Force-Katrina ("Air Force Helicopter Flight," 2005). Maxwell AFB and Barksdale AFB, La., served as "federal operational staging areas" to move supplies and personnel to the Gulf Coast areas. England AFB, La., was an intermediate staging area for National Guard from other states supporting Katrina relief efforts (Miles, 2005b).

The 910th Airlift Wing (Reserve Unit) conducted aerial spray missions, beginning September 12, to control mosquito and fly populations in the Gulf Coast (Gregoire, 2005). The unit left Youngstown Air Reserve Station on September 8 to operate in Alabama, Mississippi, and Louisiana with 2 C-130s and 50 reservists. It operated out of Duke Field ("C-130s to Spray," 2005).

At Lackland AFB, the 433rd Aeromedical Evacuation Squadron (AES)–AFRC responded 48 hours after Katrina's landfall. The 146th Airlift Wing from Channel Islands, Calif., was also present. The airmen transported patients from New Orleans Airport on C-130s and took orders from the medics on the ground for fluids, medications, etc. (Knabe, 2005). By September 3, Lackland was established as a staging ground for evacuees to be routed on to area hospitals. The evacuees were triaged in New Orleans, brought to Lackland to be processed and transported to a hospital nearby (as of September 3, more than 811 patients had been flown to Lackland) (Fazzini, 2005). Eglin AFB airmen set up a tent city (250 patients, 200 medical personnel, 1000 evacuees) in Ft. Walton Beach (Miles, 200b).

As of September 2, Little Rock AFB had established a reception center for Air Force evacuees and was offering support services. Tyndall AFB had also set up services for evacuees ("Little Rock, Tyndall, Guard Bureau Helping," 2005). DHS and DoD worked to establish ten mobile federal medical shelters (250 patients each) in the Gulf Coast with two facilities at Naval Air Station, Meridian, Miss., two at ANG station, Meridian, Miss., two at Eglin AFB, and one at Fort Polk, La. (Miles, 2005b). The runway at Kirtland AFB, N.M., was used to move equipment and evacuees; Eglin AFB, Fla., and Robins

AFB, Ga., served as shelters for evacuees and FEMA rescue personnel (Kathleen Lopez, 2005).

The 50th Operations Group at Schriever AFB provided space system support before and after Katrina. The 22nd and 23rd Space Operations Squadron (SOPS) planned and ran network missions and the 21st SOPS provided communications capability so that the satellite images could be viewed at the administrations operations center before Katrina made landfall. The story was tracked by the AFRC 6th SOPS 23 August. The National Oceanic and Atmospheric Administration (NOAA) and the 6th SOPS provided 112 supports, 189 hours of forecast data, and 84 supports. After the hurricane, the 3rd SOPS provided communications (telephone, video, imagery) from three Defense Satellite Communications System satellites. The 4th SOPS, operating the Milstar satellite system, also provided communications between military and relief agencies and NORTHCOM, U.S. Joint Forces Command, and other important players in Katrina operations. The 53rd Air Force Reserve Weather Squadron at Keesler AFB used GPS to track the storm in WC-130s (Bierman, 2005). Later, GPS was used by search and rescue teams and as coordination for the massive influx of supplies (Parsons, 2005).

Air National Guard Response to Hurricanes Katrina and Rita

Hurricane Katrina

According to the National Guard Bureau, the Guard provided 74 percent of Joint Task Force Katrina operations (Haskell, 2005). The Katrina response was the "largest and most comprehensive National Guard response to a natural disaster" since 32,000 guard personnel were called to the 1989 California earthquake in San Francisco (Haskell, 2005). As of September 4, the Air National Guard had flown 785 sorties, flying in 12,854 troops, evacuating more than 11,000 victims, and providing 39,013 tons of supplies and equipment. The National Guard remained under the state's control. However, a memorandum was signed by Acting Secretary of Defense England on September 7

to retroactively activate the Guard in Title 32 status from August 29 (Bowman, Kapp, and Belasco, 2005). Joint Task Forces between the states' National Guards were formed. Although there were certainly lessons to be learned, there were also many reports of a strong joint effort between the active and reserve Air Force and the Air Guard during operations. The 347th RW and ERG commander from Moody Base was quoted as saying, "We have a tremendous joint effort [among] Guard, Reserve, and active duty airmen" (at Evers Field Air National Guard base, Miss). There were 450 airmen with 24-hour operations from Evers Field, Jackson, Miss., supporting search and rescue for Katrina. More than 2,700 people were rescued in less than a week. Twenty-three HH-60G Pave Hawk helicopter crews rotated eight-day and four-night missions, with each helicopter staying airborne at least eight hours straight. The 41st Helicopter Maintenance Unit was also present ("Airmen Saving Lives," 2005).

Some of the task forces and operations put together by the National Guard in the Gulf Coast Region were as follows: Joint Task Force Alabama was the command and control for all Alabama National Guard units in Mississippi except for two (controlled by Mississippi officials) (Alvarez, 2005b). The Air and Army Guard members provided communications, medical, signal and engineering capability. The 280th Combat Communications Squadron (CCS) (Alabama Air Guard) set up a satellite-based Internet café and provided tactical communications for Joint Task Force Alabama, including defense switched network phones, and local computer network with email, internet, phones, and a secure computer network (Alvarez, 2005b). Joint Task Force Arkansas opened 59 readiness centers to help register Katrina evacuees. Roughly 300 personnel from JTF-Arkansas were transported by the Arkansas Air National Guard to New Orleans Naval Air Station ("Arkansas National Guard," 2005).

About 100 Air National Guard from the 147th Fighter Wing, Lackland AFB, supported operations in New Orleans with security patrols and door-to-door recovery operations for 19 days ("From Katrina to Rita," 2005). Personnel from the Texas National Guard were some of the first on the scene in New Orleans after Katrina. More than 250 members of the 149th FW evacuated 35,000 people from the Super-

dome, while triage and evacuation operations were carried out at the Convention Center (Ripps, 2005). Task-Force LAV (Light Armored Vehicles) was run by National Guard soldiers and airmen using LAVs from Michigan, Nebraska, Oregon, and Tennessee. LAVs are generally used by the states for counterdrug programs. The task forces were located with the 20th Special Forces Unit and worked together on keeping the LAVs operational. The missions were conducted from dawn to dusk in New Orleans. The vehicles are able to operate in water and go where boats could not. As of September 6, the teams had evacuated more than 150 people. LAVs also supported SWAT teams in New Orleans in a security function (Hackley, 2005).

Air Guard units transported Army Guard, and other civilian and military relief workers, as was done in the case of the Portland ANG. More than 2,000 Oregon Army National Guard (ARNG) personnel were transported in the KC-135 belonging to the Illinois ANG 126th, with the support of the 939th Air Refueling Wing, operating out of an Oregon ANG base (Zarzyczny, 2005). The 139th AW conducted other transport operations. On September 1, airmen from the the 139th AW conducted an aeromedical evacuation from New Orleans Children's Hospital to Kansas City Airport on a C-130; they also transported the Colorado Guard Communication element from Buckley ANG Station to Gulfport ("139th Airlift Wing Completes," 2005). As of September 8, 2005, the New York National Guard's 105th Airlift Wing had flown 12 missions and and delivered approximately 1.5 million pounds of cargo and 400 passengers for Katrina relief missions. The 109th Aerial Port Squadron helped load a C-5 Galaxy (belonging to the 105th Airlift Wing) on September 5 with cargo for Gulfport ("More Relief on the Way," 2005). The 122nd Air Support Squadron of the ANG 159th Fighter Wing operated from Camp Beauregard, La., to monitor satellite radio linked to tactical air control Airmen in New Orleans. Those airmen were forward deployed on the ground in New Orleans in five locations and passed on real-time information to the command and control centers set up at each location (Nelson, 2005). The 236th Combat Communications Squadron, Hammond, La., provided satellite communication after Katrina. The 259th Air Traffic Control Squadron, Alexandria, La., and 248th Air Traffic Con-

trol Center, Meridian, Miss., deployed to New Orleans and Gulfport airports to provide mobile air traffic control towers ("Communication Units Deploy," 2005). Georgia's Air National Guard's 283rd CCS sent new technology for its first operational test, the IC4U (mobile communications terminal), to support operations in the Houston Astrodome after Hurricane Katrina. The Air National Guard RC-26 reconnaissance aircraft was part of the overall operation with the 9th reconnaissance wing's U2 mission over the Gulf Coast in support of Katrina ISR operations. As of September 13, 2005, more than 400 files of both imagery and images had been produced by ANG (Cloutier, 2005). The 147th Fighter Wing flew the RC-26 missions in New Orleans and other Gulf Coast areas to provide FEMA and Army Corps of Engineers with surveillance imagery ("RC-26 Assists," 2005). In addition, the Air National Guard C-130 Scathe Views was one of the aircraft providing downlinks for ten Remotely Operated Video Enhanced Receiver (ROVER) platforms used in search and rescue missions for Katrina (Hall, 2005).

Hurricane Rita

The relief operations for Rita were able to use land routes in the affected areas rather than the heavy reliance on air operations after Hurricane Katrina. Although there was a slower tempo for air operations during Rita, there was a fast turnover between Katrina and Rita operations. The following is a sampling of some of the Air National Guard response to Rita. Many of the units that were activated for Katrina transitioned into Rita operations almost without a pause.

As of September 25, the AF had flown 82 evacuation, search and rescue missions, and aerial damage assessments. Thirteen HH-60 Pave Hawk helicopters from the 920th RQW at Patrick AFB and the 347th RQW at Moody AFB had completed 14 search and rescue missions as of September 24. The Civil Air Patrol flew 42 aerial damage assessment flights for Hurricane Rita with 12 aircraft and 20 aircrews in Dallas Mission Base, Addison, Tex., and Stinson Field, San Antonio. The 621st Contingency Response Wing, McGuire AFB, conducted evacuations of vulnerable populations (2,000 elderly and newborns) for Rita. The 805 Air National Guard and reservists and 22 active duty

personnel evacuated 1,240 vulnerable citizens on C-5, C-17, and C-141 planes to eight locations, the largest being Lackland AFB. An ANG C-130 evacuated 48 intensive care unit nurses and 19 children from Houston Children's Medical Center to Arkansas Children's Medical Center and returned 60 patients to Key West from Charlotte, N.C. ("Air Force Evacuates," 2005).

Task Force Compassion at Ellington's abandoned base exchange was set up to provide a center for medical evacuees from Hurricane Rita. The Task Force included the 147th Medical Group from Lackland AFB, the 136th Medical Group from Naval Air Station–Joint Reserve Base, Fort Worth, and Army National Guard Support Medical Battalion in San Antonio (Roberts, 2005). The 149th FW was called back to Lackland (from Katrina operations) to be part of Task Force–Seguin, which was part of the larger Task Force–Texas (1,750 Army guardsmen and ANG airmen) to respond to Hurricane Rita (Ripps, 2005). Another report on Joint Task Force–Seguin stated that it was made up of 300 Army and Air Guard who participated in distribution of food and water (19,214 meals, 30,000 bags of ice, and 35,000 cases of water from September 28 to October 3). The guardsmen moved into the rural areas, such as Devers, Tex., in support of FEMA. They also participated in distribution of supplies and cleanup ("Texas National Guard Relief," 2005). The 147th Fighter Wing ran refueling missions in Beaumont, Tex. In one case, personnel had to fashion a special nozzle for the Texas Army National Guard when the latter arrived with 5,000-gallon fuel trucks having the wrong fueling nozzle for the buses that needed refueling. Two hundred sixty buses used in medical and civilian transport in Beaumont and Houston were refueled (more than 25,000 gallons) by the Texas Guard (Hammand, 2005). Service units from the 147th FW were deployed to serve hot meals to all the airmen deployed to Ellington field who were supporting Rita and Katrina operations (Schmidt, 2005b). As the 147th FW cleaned up Ellington field ramps on September 24 after Hurricane Rita had passed, Coast Guard search and rescue helicopters were already landing at the base for refueling.

Other Air National Guard Units also responded to the relief and rescue efforts for Hurricanes Rita with airlift, aeromedical evacuation,

and satellite and communication support. After Hurricane Rita, the 136th Airlift Wing set up tactical airlift control element and an aerial port supporting C-5 Galaxys, C-130s, and Army Ch-47 Chinooks (Arana-Barradas, 2005c). Thirty-seven tons of cargo were processed during September 24–26, mostly for the unit. The Chinooks loaded food and water for FEMA in Hawthorne, Tex. The wing found that the pace of work was less intense because the operations in Texas depended less on air delivery than did the New Orleans operations. Trucks were being used more to deliver supplies (Schmidt, 2005a). In preparation for Hurricane Rita, five Army and Air Guardsmen were sent with the IC4U to support 250 Texas guardsmen coordinating with local agencies on food and water distribution ("Cutting-Edge Communications," 2005).

Additional missions flown by AMC in the evacuation prior to Rita included C-17 Globemasters IIIs from 97th Air Mobility Wing at Altus AFB, Okla.; 62nd and 446th wings at McChord AFB, Wash.; C-141 Starlifter from the 445th Wing at Wright-Patterson AFB, Ohio; C-130s from Little Rock AFB, Ark.; and C-5 Galaxys from Lackland AFB, Tex. The RAVEN teams of security forces consisted of two to six team members each, who provided security on the evacuation flights for Rita. The evacuation for Rita, according to Col Franklin, was "a total-force effort, using active duty, guard, and reserve airmen and aircraft, as well as assistance from Navy aircraft" (Diamond, 2005c; Arana-Barradas, 2005b).

Lessons Learned From Hurricane Response

"The total force of the Air Force—the active duty, Guard, and Reserve—have responded aggressively and effectively to the challenge of the Hurricane Katrina [aftermath]," said acting Secretary of the Air Force Pete Geren. The Air Force provided aerial photography and imagery and was involved in search and rescue and the medical needs of victims, and in getting Keesler AFB operational again to see to the needs of those affected in the region as well as affected military personnel on the base (Gettle, 2005a).

According to an AF Link article, several lessons learned from Hurricane Katrina were rectified in preparation for and response to Hurricane Rita. Contingency Response Groups are designed to establish airfield operations under stress. When Katrina damaged Keesler AFB, CRGs were not readily available to make the airfields operational fast enough. In response, the Air Force prepositioned CRGs in preparation for Hurricane Rita to support the airfield operations and logistics and tobconduct evacuation missions at McGuire and Travis Air Force Bases. In addition to the absence of CRGs, there was a failure in the self-sustainment for first responders. There were deficits in food, water, among other things, for the teams being deployed. Because there was such a critical need for food and water upon the team's arrival, they distributed all their three-day supply of food to the evacuees (Gettle, 2005b).

Communications was another issue identified in lessons learned from Katrina. The Air Force activated more communications personnel and types of communications for Hurricane Rita. Voice and data communications, secure and unsecured transmissions for more than 900 users, satellite communications, and instrument landing systems and radar were available for Rita. Six BEAR packages were ready for use in Hurricane Rita at Holloman AFB, N.M. (Gettle, 2005b).

Joint Task Force Rita was formed at Fort Sam Houston several days before Rita was to make landfall to facilitate better coordination with FEMA. The 433rd Airlift Wing at Lackland AFB, Tex., set up a command and control center for aeromedical evacuations after Rita. The unit used two C-5 Galaxies and C-130s for aeromedical evacuations in Beaumont and Port Arthur, Tex. More than 6,800 people were evacuated with the assistance of the 433rd Airlift Wing. Lackland worked with the San Antonio Fire Department emergency medical services to move the evacuees from the base to hospitals and medical centers. This wing was critical in evacuating 12,700 people in New Orleans after Katrina.

Although NORTHCOM had a clear plan, the Guard was not well integrated or informed for Hurricane Katrina. The National Guard and NORTHCOM rescue operations were not well coordinated, according to Paul McHale, Deputy Defense Secretary for Homeland Defense. As

a result, there were overlapping search and rescue helicopter missions in the immediate aftermath of Katrina (Zubeck, 2005). The National Guard did not have contingency plans equal to those of NORTHCOM. The Guard performed well—not because of planning but as a result of the ingenuity of field commanders. There was shaky communication and cooperation between the active component and the Guard (*U.S. News & World Report,* 2005). In addition, the Guard experienced a shortage of equipment, particularly high-tech radios and satellite communications gear, during Katrina operations (Moniz, 2005).

According to testimony before a House Homeland Security subcommittee, the National Incident Management System (NIMS) in Louisiana was not used for Katrina. It took two weeks until there was a formal command structure in the operations center and it is still not clear who the incident commander was (Sullivan, 2005).

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