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Annual Report 2010

For more than 60 years, the RAND Corporation has worked
side by side with government as a trusted adviser. Through
rigorous and objective research and the development
of sophisticated analytic tools, RAND researchers from
diverse disciplines and perspectives collaborate to create
strategies and solutions to keep our nation strong.

RAND ARROYO CENTER

Annual Report 2010

MESSAGE FROM THE DIRECTOR

For at least four years, the U.S. Army has been working to restore balance to a force consumed by the pressing demands of two overseas contingencies. Of perhaps greatest concern is the enduring effect on the all-volunteer force, as soldiers and their families adapt to the strains of multiple deployments, combat and its aftereffects, and a high operational tempo that continues even after returning home. Indeed, by June 2010, roughly 350,000 current Army service members had completed two or more deployments in support of operations in Iraq and Afghanistan, including more than 120,000 completing three or more. Army civilians, too, deploy as part of this expeditionary force. As the Army struggles to manage these personnel demands, it also confronts the immediate challenge of fielding trained and ready units for the wartime missions at hand. As it rotates those units home following deployments, they must be properly manned, trained, and equipped for the next cycle. And finally, there is the continuing need to adapt the force for new, as yet uncertain, demands over the horizon.

These four imperatives—sustaining Army soldiers, families, and civilians; preparing for success in the current conflict; resetting units effectively when they redeploy; and transforming for an uncertain future*—have been shaping the RAND Arroyo Center research agenda since they were first articulated by the Army Chief of Staff in 2007. Last year was no exception, and in this annual report the reader will find numerous examples of how we are contributing to improved policy and decisionmaking across these dimensions. Several of these I highlight below.

SUSTAINING SOLDIERS, FAMILIES, AND CIVILIANS

Arroyo research into the effects of a continuing high operational tempo on the force is informing the debate on Army

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* See, e.g., the Honorable John M. McHugh and General George W. Casey, Jr., *A Statement on the Posture of the United States Army 2010*, submitted to the committees and subcommittees of the United States Senate and House of Representatives, 2nd Session, 111th Congress, February 2010.

Jeff Isaacson is the Director of RAND Arroyo Center.

personnel policy. Our analysis of individual rotation rates showed how the pace of deployments is affecting morale, family satisfaction, and reenlistment intentions. It also examined options to mitigate negative effects, including variable enlistment length, new procedures for managing changes of station, and ways to improve predictability for personnel in the post-deployment phase.

Our research into the mental health aspects of operational tempo examined how the deployment cycle is affecting the psychological well-being of soldiers and their families. Here, among other things, Arroyo quantified the relationship between combat exposure and the risk of post-traumatic stress, recommending approaches for treatment that specifically account for those most at risk.

PREPARING FOR SUCCESS IN THE CURRENT CONFLICT

The experiences of Advise and Assist Brigades (AABs) in Iraq were analyzed to understand how individual, as well

as collective, training prepared AABs for success in their missions and what the Army can do to ensure effective security force assistance (SFA) going forward. The study found that straightforward modifications to the current training program could improve individual and unit-level preparations for SFA and, despite differences from Iraq, help to further mission success in Afghanistan. Implementation of the study findings is ongoing.

Managing inventories of organizational clothing and individual equipment (OCIE) is a key logistics function of an Army at war. Based on Arroyo analysis of how Central Issue Facilities could better balance OCIE demands against available inventories, the Army has significantly reduced the need for new procurements by implementing processes that enable frequent, data-based replenishments and increase lateral inventory transfers between facilities. The efficiency gained as a result of this study enabled the Army to reduce its OCIE budget by roughly $30 million annually.

RESETTING UNITS EFFECTIVELY

Operational tempo obviously affects maintenance requirements for Army materiel, especially vehicles. But how quickly vehicles wear out varies, based on age, maintenance history, how they are utilized, and where they've deployed. Arroyo logisticians examined how these factors affect fleet costs and readiness. Because all vehicles are to an extent unique, significant savings can be achieved by implementing vehicle reset strategies that are tailored to these factors. We are now working with the Army to put these findings in motion.

Manpower also resets, and a critical part of that process is identifying, diagnosing, and treating individuals who may exhibit violent behavior or other symptoms of mental illness. Here, RAND Arroyo Center assisted the Army in understanding how it could better respond to this challenge. Our quick-turn analysis in the aftermath of the Fort Hood shootings in late 2009 reviewed the scientific literature to cull opportunities to improve Army programs meant to address this issue, as well as the means by which the Army evaluates the efficacy of those programs.

TRANSFORMING FOR AN UNCERTAIN FUTURE

The 2008 Battle of Sadr City sheds light on numerous elements central to Army planning and programming for full-spectrum conflict. Our research into the lessons learned from that battle comprised extensive review of the contemporaneous written record and interviews with dozens of participants. Findings on the utility of ground maneuver, tanks, snipers, special operations forces, precision bombs, barriers, persistent surveillance, and decentralized decisionmaking (mission command) are influencing the ongoing debate about future requirements for urban operations and wide area security missions.

Finally, the design of tactical network architectures today will significantly affect large-scale maneuver in the Army tomorrow. Arroyo scientists, coupled with operations researchers, have analyzed such architectures with a specific emphasis on connectivity at lower levels within the tactical network. Results include a network analysis tool capable of quick-turn studies of test data to assess radio and waveform performance, as well as discrete recommendations on voice and data network segregation, subnets, and dynamic gateway functionality.

In the pages that follow, the reader will find more examples like these, along with detailed summaries of selected studies and the biographies of some of our key staff. Their diligence and dedication enable RAND Arroyo Center to build and sustain analytical capacity for the Army over the long term. They also facilitate our efforts to find objective answers to tough questions and provide the Army with practical solutions to its demanding problem sets. It is through these mechanisms and interactions that we continue to help the Army restore balance, as we engage with the Army leadership to prepare for challenges to come. ●

Jeff Isaacson
Director, RAND Arroyo Center

Contents

1. RAND Arroyo Center Overview

MISSION AND CONTRIBUTIONS

Founded in 1982, RAND Arroyo Center is the United States Army's sole federally funded research and development center (FFRDC) for studies and analysis.[1] As an FFRDC, Arroyo enables the Army to maintain a strategic relationship with an independent, nonprofit source of high-quality, objective analysis that can sustain deep expertise in domains of direct relevance to perennial Army concerns. Accordingly, RAND Arroyo Center's mission is to:

- Conduct objective analytic research on major policy concerns, with an emphasis on mid- to long-term policy issues.
- Help the Army improve effectiveness and efficiency.
- Provide short-term assistance on urgent problems.
- Be a catalyst for needed change.

In carrying out its mission, Arroyo investigates the full range of Army issues and aims to:

- Adapt to change and get out ahead of some of the changes in the world affecting the Army.

- Define innovative and different ways of operating.
- Maintain objectivity and balance in addressing controversial and sensitive subjects.
- Make unique contributions to the Army's key areas of interest.

RAND Arroyo Center provides Army leadership with research products and services in four major categories, as listed in Table 1.1: research projects, education and training, subject matter experts, and research documents.

This annual report provides information on five types of these products and services. Section 2 lists Arroyo studies conducted in fiscal year (FY) 2010, and Section 3 summarizes seven of those studies in detail. Section 4 describes training and education opportunities for mid-level Army officers and presents the 2009–10 cohort. Section 5 profiles some of the many researchers who made important contributions to RAND Arroyo Center studies in FY 2010. Section 6 lists selected research documents published in 2010.

Table 1.1—RAND Arroyo Center Research Products and Services

Research Projects	Education and Training
• DA-funded annual studies	• Army Fellows Program
• DA-funded quick-response and direct support studies	• Temporary assignments
• Sponsor-funded studies	• RAND PhD in policy analysis*
Subject Matter Experts	**Research Documents**
• Pentagon briefing series	• Monthly research highlights
• Annual logistics seminars	• Publications and summaries
• Tailored briefings and seminars	• Web site
• Embedded analysts	

DA = Department of the Army.
*The doctoral program is available through the Pardee RAND Graduate School, a separate unit of the RAND Corporation; in addition to coursework, Army officers enrolled as graduate students participate in on-the-job training working with RAND analysts on policy studies, including Arroyo studies.

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[1] Originally established at the Jet Propulsion Laboratory in Pasadena, California, the Arroyo Center was moved to RAND in 1984 at the request of the Chief of Staff of the Army.

OVERSIGHT AND MANAGEMENT

The Army's oversight and management of RAND Arroyo Center is stipulated by Army Regulation 5-21.[2] The regulation establishes a governing board of Army leaders known officially as the Arroyo Center Policy Committee (ACPC). The ACPC is co-chaired by the Vice Chief of Staff of the Army and the Assistant Secretary of the Army (Acquisition, Logistics and Technology); current members are listed on page 9. The Director for Program Analysis and Evaluation serves as Executive Agent for the Arroyo Center, charged with oversight of its daily operations.

The ACPC meets at least twice a year with Arroyo management to provide overall guidance, review the annual research plan, and approve individual projects. Additionally, each project is sponsored by at least one Army senior leader, either a general officer or a member of the Senior Executive Service. The sponsor has responsibility for helping to formulate the project, providing access to needed data and other information, monitoring its progress, reviewing its publications for accuracy, utilizing its findings, and implementing its recommendations.

At RAND, the Arroyo Center is managed within the Army Research Division, one of RAND's largest research units.

Arroyo organizes its work for the Army into five research programs:

- Strategy, Doctrine, and Resources Program
- Force Development and Technology Program
- Military Logistics Program
- Manpower and Training Program
- Military Health Program[3]

The list on page 10 identifies the current Arroyo management team. ●

Tim Bonds is the Deputy Director of RAND Arroyo Center.

Marcy Agmon is the Operations Director of RAND Arroyo Center.

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[2] http://www.armystudyguide.com/content/publications/army_regulations/ar-521.shtml.

[3] Research in this program is conducted through the Center for Military Health Policy Research, in collaboration with RAND Health, another unit of the RAND Corporation.

General Peter W. Chiarelli (Co-Chair)
Vice Chief of Staff, U.S. Army

Honorable Malcolm R. O'Neill (Co-Chair)
Assistant Secretary of the Army (Acquisition, Logistics and Technology) and Army Acquisition Executive

Honorable Thomas R. Lamont
Assistant Secretary of the Army (Manpower and Reserve Affairs)

Honorable Mary Sally Matiella
Assistant Secretary of the Army (Financial Management and Comptroller)

General Martin E. Dempsey
Commanding General, U.S. Army Training and Doctrine Command

General Ann E. Dunwoody
Commanding General, U.S. Army Materiel Command

General James D. Thurman
Commanding General, U.S. Army Forces Command

Mr. Michael Krieger
Acting Chief Information Officer/G-6, U.S. Army

Mr. Terrence C. Salt
Principal Deputy Assistant Secretary of the Army (Civil Works)/Deputy Assistant Secretary of the Army (Legislation)

Lieutenant General Daniel P. Bolger
Deputy Chief of Staff, G-3/5/7, U.S. Army

Lieutenant General Thomas P. Bostick
Deputy Chief of Staff, G-1, U.S. Army

Lieutenant General Benjamin C. Freakley
Commanding General, U.S. Army Accessions Command

Lieutenant General Robert P. Lennox
Deputy Chief of Staff, G-8, U.S. Army

Lieutenant General Rick Lynch
Assistant Chief of Staff for Installation Management/Commanding General, Installation Management Command, U.S. Army

Lieutenant General John F. Mulholland, Jr.
Commanding General, U.S. Army Special Operations Command

Lieutenant General Eric B. Schoomaker
Commanding General, U.S. Army Medical Command/The Surgeon General

Lieutenant General Mitchell H. Stevenson
Deputy Chief of Staff, G-4, U.S. Army

Lieutenant General Jack C. Stultz, Jr.
Chief, Army Reserve/Commanding General, U.S. Army Reserve Command

Lieutenant General Richard P. Zahner
Deputy Chief of Staff, G-2, U.S. Army

Executive Agent for RAND Arroyo Center
Major General Joseph E. Martz
Director, Program Analysis and Evaluation

Membership effective December 2010.

▶ **Jeff Isaacson**, Vice President and Director

▶ **Tim Bonds**, Deputy Director

▶ **Marcy Agmon**, Director of Operations

▶ **Rick Eden**, Communications and Research Quality Assurance

Strategy, Doctrine, and Resources Program

▶ **Laurinda L. Rohn**, Director

Force Development and Technology Program

▶ **Bruce Held**, Director

Manpower and Training Program

▶ **Bruce Orvis**, Director

Military Logistics Program

▶ **Kenneth J. Girardini**, Director

Military Health Program

▶ **Sue Hosek and Terri Tanielian**, Co-Directors

2. Fiscal Year 2010 Research Agenda

INTERACTIVE DEVELOPMENT OF THE AGENDA

As an FFRDC, RAND Arroyo Center operates under a multiyear contract of five years with one five-year option period. The Army may add other funds to this core contract for additional studies. In FY 2010 about half of the projects conducted by RAND Arroyo Center were "core" studies and the other half "add-on" studies; core studies are funded through a program element in the Army budget and add-on studies are funded individually by project sponsors. To help assure the usefulness and relevance of each study, the process by which it is formulated involves a high degree of interaction and coordination between the Army sponsors and the Arroyo research managers and project leaders.

As Figure 2.1 shows, the process for developing an annual research agenda for core studies starts in late April and concludes in September before the beginning of the fiscal year in which the studies will be initiated. Arroyo's Executive Agent sends a memorandum to the ACPC mem-

bers requesting research proposals. Shortly thereafter, Arroyo's director and program directors begin discussing research ideas with their respective sponsors. At the same time, prospective project leaders are discussing potential ideas with their colleagues and program directors.
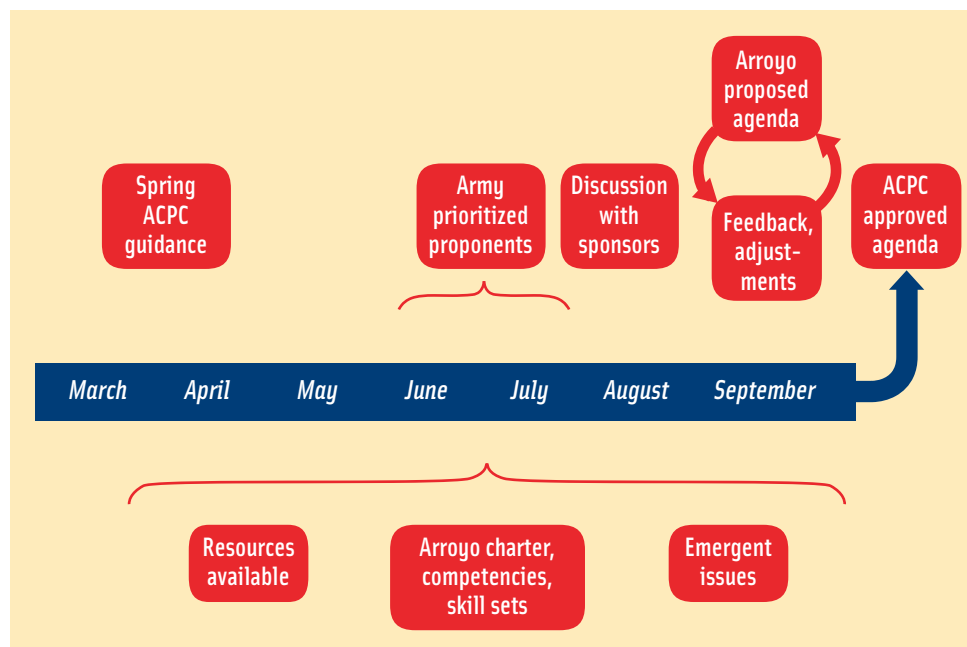
The number of proposals typically greatly exceeds the number of projects for which funds are available. Individually and as a group, the proposals are evaluated within the context of criticality to the Army; available funding; and Arroyo's mission, available expertise, and comparative advantage to conduct the research. A portion of core funding is reserved to address important issues that may emerge during the final stages of research planning. In its fall meeting, the ACPC approves the research agenda of core projects for the upcoming fiscal year.

The process for an Army sponsor to add a study to the research agenda during the course of the year by using funds other than the core is also highly interactive. The Executive Agent approves add-on projects. This may be done at any point during the fiscal year so long as Arroyo's total level of effort for the year does not exceed a ceiling established by the Office of the Secretary of Defense.

The remainder of this section describes the FY 2010 research studies, beginning with quick-response studies and continuing with studies in Arroyo's five programs. The next two pages list the sponsors of FY 2010 RAND Arroyo Center studies. Some sponsored more than one study.

Figure 2.1—The Arroyo Center Works Closely with Army Leadership to Develop Core Studies

GEN Peter W. Chiarelli
Vice Chief of Staff
U.S. Army

GEN Carter F. Ham
Commanding General
U.S. Army Europe, and Seventh Army

LTG Robert E. Durbin
Special Assistant to the Chief of Staff Army for
Enterprise Management

LTG Benjamin C. Freakley
Commanding General
U.S. Army Accessions Command

LTG Frank Helmick
Commander
XVIII Airborne Corps and Fort Bragg

LTG Robert Lennox
Deputy Chief of Staff, G-8

LTG John F. Mulholland, Jr.
Commanding General
U.S. Army Special Operations Command

LTG Eric B. Schoomaker
Commanding General
U.S. Army Medical Command/The Surgeon General

LTG Mitchell H. Stevenson
Deputy Chief of Staff, G-4

LTG Michael A. Vane
Director
Army Capabilities Integration Center (ARCIC)
U.S. Army Training and Doctrine Command

MG Gina S. Farrisee
Acting Deputy Chief of Staff, G-1

MG Rhett A. Hernandez
Assistant Deputy Chief of Staff, G-3/5/7

MG Kevin Leonard
Deputy Chief of Staff, G-3/5/7
U.S. Army Materiel Command

BG Robert M. Brown
Deputy for Acquisition and Systems Management
Office of the Assistant Secretary of the Army

BG Francis G. Mahon
Director
Quadrennial Defense Review

BG Herbert R. McMaster, Jr.
Director, Concept Development and Learning
Army Capabilities Integration Center (ARCIC)
U.S. Army Training and Doctrine Command

BG Raymond P. Palumbo
Deputy Commanding General
U.S. Army Special Operations Command

BG Leslie A. Purser
Deputy Chief, Army Reserve for Human Capital
U.S. Army Reserve

BG Thomas C. Seamands
Chief
General Officer Management Office

BG Steven W. Smith
Chief Cyber Officer
Office of the Chief Information Officer, G-6

BG Robin P. Swan
Director
Strategy, Plans, and Policy
Office of the Deputy Chief of Staff, G-3/5/7

COL(P) William P. Scott
Director
LandWarNet
Office of the Deputy Chief of Staff, G-3/5/7

Dr. Craig E. College
Deputy Assistant Chief of Staff
Installation Management

Mr. Donald Tison
Assistant Deputy Chief of Staff for Programs, G-8

Mr. E. B. Vandiver III
Director, Center for Army Analysis

Mr. James C. Cooke
Director, Test and Evaluation Office
Office of the Deputy Under Secretary of the Army

Mr. Wimpy Pybus
Deputy Assistant Secretary of the Army for Integrated
Logistics Support
Office of the Secretary of the Army

Mr. Samuel B. Retherford
Deputy Assistant Secretary of the Army for Military
Personnel
Office of the Assistant Secretary of the Army (Manpower
and Reserve Affairs)

Mr. Mark Rocke
Deputy Assistant Secretary of the Army
Strategic Communication and Business Transformation
Office
Assistant Secretary of the Army, Acquisition, Logistics
and Technology

Ms. Janet Bean
Executive Director, Integrated Logistics Support Center
U.S. Army Tank-Automotive Command Life Cycle
Management Command

Mr. Laurence Burger
Director, Space and Missile Defense Battle Laboratory
U.S. Army Space and Missile Defense Command

Dr. Michael Drillings
Director for MANPRINT Directorate
Office of the Deputy Chief of Staff, G-1

Mr. James C. Dwyer
Deputy G-3 for Support Operations
U.S. Army Materiel Command

Mr. Edward Harrington
Deputy Assistant Secretary of the Army for Procurement

Ms. Kathleen Marin
Director, Installation Services

Dr. Fenner Milton
Director, Night Vision/Electronic Sensors Directorate
U.S. Army Materiel Command

Mr. Allan M. Resnick
Assistant Deputy Chief of Staff for Combat Development
U.S. Army Training and Doctrine Command

Mr. Robert E. Seger
Assistant Deputy Chief of Staff, G-3/5/7
Deputy G-3 for Training
U.S. Army Training and Doctrine Command

Mr. Rickey E. Smith
Director, Army Capabilities Integration Center
U.S. Army Training and Doctrine Command

Mr. John D. Sparks
Dean for U.S. Army College of the American Soldier
U.S. Army Training and Doctrine Command

Mr. Robert J. Turzak
Director of Program Development
Office of the Deputy Chief of Staff, G-4

Quick-Response Studies

RAND Arroyo Center reserves a portion of its research agenda for fast-turn studies on important issues that emerge during the course of the fiscal year. In FY 2010, Arroyo completed eight such quick-response studies for the Army. Each is described briefly below.

▶ **A Review of the Army's Means of Identifying and Responding to Potentially Violent Personnel**. Following the November 5, 2009, shootings at Fort Hood, this study assisted with a review of Army programs for identifying and responding to potentially threatening and violent personnel. It identified cultural factors that could affect the implementation of those programs. It also reviewed current theoretical work in the social sciences that could help evaluate and improve Army programs or systems designed to aid in the early identification of aberrant behavior. The study also helped evaluate the Army's ability to respond to a mass casualty situation at an Army installation and to care for victims and families in the aftermath. Sponsored by Commanding General, U.S. Army, Europe.

▶ **OIF and OEF: When Will Demand (or Supply) Go Down?** This study estimated when the demand for U.S. Army forces for OEF and OIF will decline or, alternatively, when U.S. willingness—as indicated by the attitudes of Congress, members of the administration, and the public—to supply forces will significantly decline. It assessed indicators of demand in Iraq and Afghanistan as well as the willingness of the United States to supply forces. Sponsored by the Assistant Deputy Chief of Staff for Programs, G-8.

▶ **Developing and Utilizing an Army Red-Teaming Capability**. This study assessed the Army's existing "red-teaming" capability. It examined theories of red-teaming and the approaches of the other services. It identified U.S. Army red-teaming needs, capabilities, and gaps and recommended an approach for developing and using an independent Army red-teaming capability. Sponsored by the Vice Chief of Staff, U.S. Army.

▶ **Defining Standards for Burdens Placed on Soldiers**. This study assessed how the Army could set "standards" that would limit and mitigate burdens (physical, mental, and emotional) placed on soldiers and their families due to the current high operational tempo of two wars. The standards can be used as a means to monitor the sustainability of the Army's all-volunteer force. The study defined a process to set initial limits for specific soldier burdens, monitor soldiers and families to identify causal relationships between deployments and stresses, and adjust standards as causal relationships become better understood. Sponsored by the Vice Chief of Staff, U.S. Army.

▶ **Increasing Soldier Performance Through Embedded Training and Rehearsal**. This study assessed the potential costs, technical feasibility, and benefits of advanced embedded training and rehearsal technologies for selected Army maneuver combat systems and platforms. The study first defined the requirements for embedded training and rehearsal capabilities. It assessed the current state of technology and its application to selected future Army soldier systems and platforms and determined how embedded training systems can be soldier centric. Sponsored by the Vice Chief of Staff, U.S. Army.

▶ **Test and Evaluation Needs for Future Force Unmanned Ground Vehicles**. As the Army continues the plan to introduce unmanned ground vehicles as an integral part of its future force, there is a concomitant need to adjust test and evaluation capabilities for these systems, especially so for the systems that will reduce human-in-the-loop interactions. This study began the process of assessing what the test and evaluation needs might be for unmanned ground vehicles, comparing and contrasting semi-autonomous systems and tele-operated systems, as well as manned systems. Sponsored by the Assistant Deputy Under Secretary of the Army (Test and Evaluation).

▶ **Historical Demand for the XVIII Airborne Corps Capabilities**. This study evaluated historical demand for the XVIII Airborne Corps and those units habitually assigned to or associated with it. The study gathered data on the historical uses of airborne forces, assessed priority security objectives and missions as articulated by the Secretary of Defense, and analyzed their implications for future demand. Sponsored by the Commander, XVIII Airborne Corps.

▶ **Improving Strategic Communications to Enhance the Army's Equipping Process**. This study made recommendations for better articulating the Army's modernization strategy to decisionmakers and resourcers. It evaluated the Army's current processes for developing and delivering its "Equip the Force" message. It then identified metrics for assessing the effectiveness of the message as well as ways to improve its development and delivery. Sponsored by the Assistant Secretary of the Army (Acquisition, Logistics and Technology). ●

Strategy, Doctrine, and Resources Program

Laurinda L. Rohn directs the Strategy, Doctrine, and Resources Program.

MISSION AND RESEARCH STREAMS

The Strategy, Doctrine, and Resources Program analyzes the implications of the dynamic security environment on future strategic concepts, Army roles and missions, force structure, capabilities, doctrine, and resourcing requirements. The program is directed by Dr. Lauri Rohn. Dr. Adam Grissom and Mr. Thomas Szayna serve as associate directors.

To accomplish its mission, the program sustains research streams in seven policy domains:

- Assessing the evolving operating environment
- Developing capabilities to face new challenges
- Developing partner capabilities
- Improving capabilities for stability operations
- Improving resource management
- Learning from past and present operations
- Supporting Army wargames and analysis

Maintaining expertise in these strategy, doctrine, and resource domains also allows Arroyo to provide timely short-term assistance on issues of importance to the Army.

The program's FY 2010 research agenda within each of these streams is described below.

FY 2010 STUDIES IN STRATEGY, DOCTRINE, AND RESOURCES

Assessing the Evolving Operating Environment

▶ **Unconventional Warfare on the Shared Battlefield**. This study identified the capabilities required to successfully plan and execute unconventional warfare (UW) operations involving military and nonmilitary elements of the U.S. government, including but not limited to the Central Intelligence Agency, other Department of Defense organizations, Department of State, and Department of Treasury, on the shared battlefield of the future. Sponsored by the U.S. Army Special Operations Command.

▶ **Assessing the Concept of Hybrid Warfare**. This study analyzed the hybrid warfare concept and suggested how the Army could take it into account when planning and preparing to address potential future threats. Sponsored by the U.S. Army Training and Doctrine Command.

▶ **Understanding the Army's Potential Contributions to U.S. Success in Afghanistan-Pakistan: An Exploratory Analysis of Strategy and Force Requirements**. This study conducted a strategic analysis of the Afghanistan-Pakistan (Af-Pak) situation that assessed possible future ground force requirements. It assessed the probable outcomes of the contest in Af-Pak under current conditions and possible outcomes under alternative strategies and resource commitments, and identified potential exogenous developments that could change the requirements for ground forces. The study illuminated the contributions the Army can make to a successful outcome in Af-Pak. Sponsored by the Deputy Chief of Staff, G-3/5/7.

Developing Capabilities to Face New Challenges

▶ **Developing Strategic Metrics for the Army Enterprise**. This study developed an analytic framework to define outcome-oriented metrics that senior leaders of the Army Enterprise can use to assess the effectiveness of selected Army strategies, investments, processes, and decisions. Sponsored by the Office of Business Transformation.

▶ **A Capabilities-Based Assessment of Socio-Cultural Requirements Across All Phases of Military Operations.**

Tom Szayna is an Associate Director of the Strategy, Doctrine, and Resources Program.

Adam Grissom is an Associate Director of the Strategy, Doctrine, and Resources Program.

This study conducted an assessment, within the capabilities-based assessment (CBA) framework, of the socio-cultural components that support military missions across all phases of military operations. Specifically, this study answered three research questions for each phase of military operations: (1) What socio-cultural capabilities must the commander possess to accomplish the mission? (2) Which of the identified capabilities are lacking (gaps)? and (3) How can the gaps be mitigated? Sponsored by the U.S. Army Training and Doctrine Command.

▶ **Enhancing the Contributions of Army National Guard Special Forces**. This study compared the attributes of Active Component Army Special Forces (AC SF) and National Guard Special Forces (NG SF) to inform USASOC's force planning deliberations. This project first assessed what, if any, differences exist between AC SF and NG SF capabilities, capacities, and authorities. It then identified any particular capability strengths or "niche" areas within the NG SF that make those forces comparably well suited to particular missions or operational contexts. The results pointed USASOC toward unique NG SF characteristics that might be further capitalized upon, as well as USASOC capability gaps or shortfalls that the NG SF may be uniquely suited to mitigate. Sponsored by the U.S. Army Special Operations Command.

▶ **Assessing the Size of Squads in the U.S. Army**. This study described how the U.S. Army squad size has evolved over time to what it is today, comparing U.S. Army squads with those of selected foreign armies, and assessing implications of current operations for the size of squads. Sponsored by the U.S. Army Training and Doctrine Command.

Improving Capabilities for Stability Operations

▶ **Specialized Versus Multipurpose Forces for Security Force Assistance and Stability Operations**. This study assessed the pros and cons of specialized versus multipurpose forces for conducting security force assistance (SFA) and stability operations (SO) missions. It examined the arguments for each type of force, using evidence-based approaches, and provided options to Army leadership on ways to meet SFA and SO mission requirements. Sponsored by the Deputy Chief of Staff, G-8.

▶ **Analysis of Advise and Assist Brigades in Iraq**. This study examined the preparations and experiences of the advise and assist brigades (AABs) deployed to Iraq. It assessed areas where the preparation has been appropriate and where changes in preparation could improve capabilities. The study provided recommendations to the Army regarding the training of future AABs and identified key lessons learned that are applicable to future security force assistance missions across all combatant commands. Sponsored by the Deputy Chief of Staff, G-3/5/7.

Improving Resource Management

▶ **Developing Army Options for a Changing Fiscal Environment**. This study developed a method to project the impact of Army capabilities investments on the Army's ability to meet the requirements of the emerging defense strategy, and the resource requirements associated with those investments. Sponsored by the U.S. Army Training and Doctrine Command.

▶ **Reassessing the Army's Force Mix: Providing Needed Forces While Reducing Costs**. This study identified and

assessed the costs, benefits, and risks, broadly defined, of various structural options for active and reserve component Army forces. It examined the historical and legal context in which the active Army, U.S. Army Reserve, and Army National Guard have existed and operated, and it developed and applied criteria to evaluate possible structural changes. Sponsored by the Deputy Chief of Staff, G-8.

▶ **Assessing the Army Generating Force**. This project developed analytical methods that allow the Army to assess the size, composition, and manning for the generating force. The study supported the VCSA-directed Capability Portfolio Review of the Army's workforce. Sponsored by the Deputy Chief of Staff, G-3/5/7.

Learning from Past and Present Operations

▶ **The Battle of Sadr City: Lessons for Future Operations**. This study assessed the 2008 battle of Sadr City, Iraq to capture insights about innovations in warfighting for future Army doctrine and capabilities for operations in urban and other complex terrain. Sponsored by the Deputy Chief of Staff, G-8.

▶ **An Army for Full Spectrum Operations: Lessons from Irregular Wars**. This study examined recent "irregular" conflicts (specifically, the Israeli experiences in the 2006 Second Lebanon War and in the 2009 operations in Gaza), assessed the contributions of conventional capabilities and forces to irregular warfare, and identified the implications for U.S. Army force mix and capabilities, and the forces that support, or operate with, ground forces. Sponsored by the Deputy Chief of Staff, G-8.

▶ **Improving the Army's Disaster Response: Lessons from the Earthquake in Haiti**. This study prepared an account of the planning and execution of Army operations in response to the January 2010 earthquake in Haiti. It identified areas where the Army should consider changes in its planning of, doctrine for, and execution of similar future operations. It developed lessons that can be applied to potential similar missions in the future in the United States and abroad. Sponsored by the Deputy Chief of Staff, G-8.

Supporting Army Wargames and Analysis

▶ **Analytic Support to Unified Quest 2010**. This study assisted the Army in its effort to use UQ10 as a tool to restore balance in the current force and ensure that the service remains prepared to serve as an integral element of U.S. land power. The study supported UQ10 by both providing analytic assistance to UQ10 seminars and wargames and conducting independent research on how decentralized operations can improve future Army performance. Sponsored by the U.S. Army Training and Doctrine Command.

▶ **JICM Command and Control (C2) Enhancements (Supporting Precision Munition Analyses)**. This study helped to enhance JICM (Joint Integrated Contingency Model) to improve CAA analyses of the effectiveness of precision munitions, by adding an explicit mathematical model of targetable divisional C2 assets, and their effects on divisional operations when damaged by precision munitions (and/or other strike mechanisms). Sponsored by the Center for Army Analysis. ●

Force Development and Technology Program

Bruce Held directs the Force Development and Technology Program.

MISSION AND RESEARCH STREAMS

The Force Development and Technology Program identifies and assesses ways in which technological advances and new operational concepts can improve the Army's effectiveness in current and future conflicts. The research agenda focuses on helping the Army determine how to maintain its technological edge against adaptable adversaries. This is accomplished by performing assessments of a technology's feasibility, performance, cost, and risk. The program is directed by Mr. Bruce Held. Dr. Christopher Pernin and Mr. John Matsumura serve as associate directors.

Most recently, the program has featured work on exploiting information technology for Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR); continued development of modeling and simulation tools for examining modern conflicts; seeking efficiencies in the materiel acquisition process; and examining emerging trends in warfighting such as IED use, cyber-operations, and the use of unmanned systems. In undertaking studies and analyses for this core competency, Arroyo seeks to pro-

vide unbiased, independent assessments of new weapon systems and operational concepts that emphasize jointness. It also analyzes new technologies to support future Army analytical needs and refines strategies for developing new technologies and acquiring new systems. At the same time, both Arroyo and other RAND research units develop and maintain analytical combat models and simulations that support this core competency.

To accomplish its mission, the program sustains research streams in six policy domains:

- Systems and technology analysis
- Networks and C4ISR
- Modeling and simulation
- Force and organizational development
- Acquisition policy
- Assessment of tactics, techniques and procedures

The program's FY 2010 research agenda within each of these streams is illustrated below.

FY 2010 STUDIES IN FORCE DEVELOPMENT AND TECHNOLOGY

Systems and Technology Analysis

▶ **Advanced Technology Sensors and Data Exploitation**. This study provides continuing technical support and analysis in the development of advanced technology sensors and data exploitation required for the future force. The study also provides independent, objective technical assistance to assess electronic sensor technologies and image processing algorithms, proposed sensor concepts, and competing sensor designs. Sponsored by the Night Vision and Electronic Sensors Directorate, U.S. Army Materiel Command.

Networks and C4ISR

▶ **Assessing the Impact of Network Hierarchies and Associated Technologies on Force Effectiveness**. This continuing study began with the initial, real-time linking of QualNet (a commercially developed network model) with RAND's Janus-based federation of models and simu-

John Matsumura is an Associate Director of the Force Development and Technology Program.

Chris Pernin is an Associate Director of the Force Development and Technology Program.

lations in an attempt to assist the Army in understanding the power and limitations of the network. It provided quantitative analysis using high-resolution, force-on-force simulation to assess the effects of various C3 (Communications, Command, and Control) hierarchies on force effectiveness. The study assessed both operational (force performance measures of effectiveness) and technical (information exchange rates, message latencies, and message loss rates) parameters associated with various C3 hierarchies. It also addressed the impact of new technology insertions on the network, focusing on unmanned systems. Sponsored by the Assistant Secretary of the Army (Acquisition, Logistics and Technology), U.S. Army Training and Doctrine Command (ARCIC), and Army Test and Evaluation Command.

▶ **Effective and Integrated Tactical Network Architectures for Maneuver Army Brigade Combat Teams**. This

study identified network architectural options for objective tactical network configurations for maneuver BCTs with a focus on capability set years FY 2011/2012 and FY 2013/2014. It also focused on ensuring effective connectivity at the company level and below. Sponsored by the U.S. Army Training and Doctrine Command (ARCIC) and the Deputy Chief of Staff, G-3/5/7.

Modeling and Simulation

▶ **Analytical Support to the Army G-8, Post-QDR Analysis**. This study provided analytical support to the Army G-8, in particular the Army Quadrennial Defense Review Office, by assessing QDR-related issues facing the Army. The study assessed the 2010 QDR report for current and future issues relevant to the Army and conducted analytic tasks determined by the G-8 that required the rapid application of analytic methods, including leveraging existing research and conducting new research, depending on the specific needs of the G-8 and the availability and quality of extant research and analysis. Sponsored by the Deputy Chief of Staff, G-8.

Force and Organizational Development

▶ **Army Equipping and Modernization Strategies**. This study determined how the Army can equip a rotational force at least cost while preserving capacity and capability across the active and reserve components. The study modeled the supply and demand for forces, developed options for executing the equipping strategy, and applied the model to three cases. Sponsored by the Deputy Chief of Staff, G-8.

▶ **Developing Army Capabilities for Cyber-Operations**. This study determined the changes to culture and acquisition policy and procedures needed throughout the Army to best enable Army cyberspace operations. The study also assessed what information needs to be gathered and shared to achieve sufficient cyber situational awareness. Sponsored by the U.S. Army Training and Doctrine Command (ARCIC) and the Chief Information Officer, G-6, U.S. Army.

Acquisition Policy

▶ **Analytical Support for the Secretary of the Army's Study of the Army Acquisition System**. This study provided analytical support as needed to a review commissioned by the Secretary of the Army to examine the

Army's acquisition system and make recommendations for improving it. Sponsored by the Deputy Assistant Secretary of the Army (Acquisition, Logistics and Technology).

▶ **Procuring Command and Control (C2) Systems**. This study explored how the Department of Defense acquisition system can more rapidly develop, procure, and field effective C2 systems within the framework of current policies and processes. As the research examined the issues that make C2 system acquisition difficult today, it developed recommendations for changes in the Army's and the Defense Department's policies and processes that would improve the timelines for developing, procuring, and fielding such systems. Sponsored by the U.S. Army Space and Missile Defense Command and the Assistant Secretary of the Army (Acquisition, Logistics and Technology). ●

Manpower and Training Program

Bruce Orvis directs the Manpower and Training Program.

MISSION AND RESEARCH STREAMS

Maintaining high-quality soldiers requires personnel policies that accomplish the key objective of the military personnel system: attracting and maintaining the right people, and then training and managing them in a way that maximizes their capabilities. In the area of this core competency, the Manpower and Training Program endeavors to understand and enhance the contribution of Army personnel, their qualities and skills, their preparation for varied missions, and their ability to coordinate actions to produce a coherent operating force. Arroyo quantitatively analyzes and tests alternative policies and resource mixes to improve effectiveness and efficiency and to develop useful approaches to key personnel issues. It develops and analyzes strategies for manning, training, and retaining quality soldiers, for structuring the future Army, and for recruiting and developing its leaders. Arroyo helps to design and understand mechanisms for providing medical and other soldier support. It assesses collective and individual training approaches for the active and reserve components, and it evaluates alternative

rotation, deployment, and assignment policies in support of the Army's missions. The program is directed by Dr. Bruce Orvis. Dr. Michael Hansen and Mr. Henry (Chip) Leonard serve as associate directors.

To accomplish its mission, the program sustains research streams in eight policy domains:

- Recruiting and personnel fill requirements
- Readiness
- Leader development
- Individual and collective training
- Distributed learning, development/application of training systems
- Retention
- Officer career fields, selection, assignment sequencing
- Soldier and family support

Within these streams, Arroyo provides expertise and analysis developed over many years of focused and sustained research at RAND, as well as short-term, quick-response support on critical issues.

The program's FY 2010 research agenda within each of the eight streams is given below.

FY 2010 STUDIES IN MANPOWER AND TRAINING

Recruiting and Personnel Fill Requirements

▶ **Develop a Holistic Strategy for Reduction and Stabilization of Recruiting Resources**. This research developed a conceptual paradigm for allocating resources; summarized the results and limitations of previous research; identified gaps in the literature; developed a resource allocation simulation model; and provided resourcing recommendations. It addressed the implications of alternative policy goals, such as maximizing high-quality contracts; maximizing total contracts; filling critical skills; meeting long-term manpower goals (retention, high quality "matches"); minimizing risk (distinction between "expected" outcome versus downside risk of failure); or enhancing diversity (demographic, regional). It also considered the influence of other factors, such as the external

environment (economy, propensity, competition from other services); recruiter behavior in response to choices made by USAREC; and budget level. Sponsored by the Deputy Chief of Staff, G-1.

▶ **Recruiting Force Composition**. This study assessed the allocation of recruiters (how many recruiters at what cost?); personnel selection (who are the most effective recruiters?); recruiter assignment (where should recruiters be placed?); and human resource policies (how should recruiters be motivated?). Its models of recruiter productivity link enlistments to market factors and recruiters' demographic characteristics. It also estimated the marginal cost of increasing contracts via recruiters, and used retention bonuses to provide guidance on opportunity costs. Sponsored by the U.S. Army Accessions Command.

▶ **Accession Flows Needed to Support ARFORGEN**. This study identified the fit of accession flows with ARFORGEN-driven fill needs. It looked at specific changes needed in flows to improve fit, as well as their second-order effects on the accession cohort (e.g., recruit demographics, FSTP (Future Soldier Training Program) lengths/costs, term lengths, incentive costs, man-months served, and other recruiting factors, as well as pre- and post-accession attrition rates and related costs). There were also major flexibility issues to be studied in the training-accession pipeline. Sponsored by the Deputy Chief of Staff, G-1, and the Commanding General, U.S. Army Accessions Command.

▶ **Academic and Economic Value of Military Service**. This study quantified the impact of military service on college enrollment, college completion, and earnings of military service members and veterans to determine whether military service leads to improvements in college performance and earnings. It also examined the extent to which these results vary with individual characteristics. Sponsored by the U.S. Army Accessions Command.

Readiness

▶ **Policy Options for Transforming the Reserve Components into an Operational Reserve**. This study identified the Army reserve components' steady-state requirements for manpower to support transformation to an operational reserve, including requirements for active duty/full time support, active duty for operational support (ADOS), and other full-time and temporary manpower solutions. It assessed the required mix of

Michael Hansen is an Associate Director of the Manpower and Training Program.
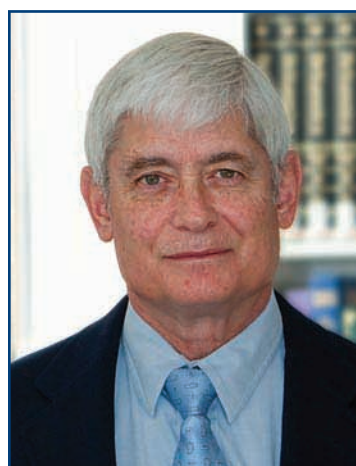
Chip Leonard is an Associate Director of the Manpower and Training Program.

permanent military, civilian personnel (Department of Army Civilians, or DACs, and Military Technicians, or MilTechs), and activated reservists in rotational assignments to support such transformation, and it determined how future demands for capabilities might differ from the current case. It also identified related policy, end strength, and resourcing changes that may be needed to support these requirements. Sponsored by the Deputy Assistant Secretary of the Army for Military Personnel.

▶ **Employer Partnership Initiative Analysis**. The objectives of this study were to examine the experience with the Employer Partnership Program (EPP) to date and to recommend approaches to strengthen the incentives for employers and reserve component service members to participate in the program. This study analyzed data collected from the EPP's job search website, conducted case studies of Army Reserve units located in four met-

ropolitan areas, and interviewed program stakeholders. Low usage of the EPP website suggests the need to invest additional resources in the program to increase outreach efforts and improve the job search experience. Collaboration with employer partners could be improved by providing visibility of applicants coming through the EPP website, allowing employers to reach out to website users, and providing information about the types of guard and reserve units located near the employer. Sponsored by the U.S. Army Reserve.

Leader Development

▶ **Senior Leader Development Needs: Identifying Critical Capabilities Possessed by O6 Leaders**. This study helped the Army's Senior Leader Development office identify the supply of senior leaders who possess competencies and capabilities that are critical to the current and future needs of the Army. It identified self-reported critical competencies and capabilities that are required for current hard-to-fill colonel assignments. It developed tools for searching databases containing competencies and capabilities and used a database of selected survey respondents to demonstrate how these tools could be applied to identify the supply of colonels possessing critical capabilities.[4] Sponsored by the Chief of Staff, Army.

Individual and Collective Training

▶ **Monitoring Skill Trends**. This study provided the Army with an analytical methodology to identify trends in proficiency on selected tasks and skills in all warfighting functions across the full spectrum of operations. It developed mechanisms for collecting data on trends, and methodologies for analyzing implications of performance on the selected tasks. The work to date offers updated trend comparisons with data from a 2007 project, showing as the earlier work did that the factors influencing these trends, and thus the directions of the trends, are multifaceted. Sponsored by the U.S. Army Training and Doctrine Command.

▶ **Establishing Army Multicomponent Noncommissioned Officer Academies**. This study examined the feasibility, benefits, limitations, and cost-effectiveness

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[4] This study also informs issues within the Officer Career Fields, Selection, and Assignment Sequencing research stream.

of creating multicomponent Noncommissioned Officer Academies (NCOAs) throughout the Army to conduct the Warrior Leader Course (WLC). It developed and assessed options for implementing a multicomponent organizational structure to align to WLC student loads. The study also assessed the implications of the WLC findings in terms of possible broader applications within the NCO Education System. Sponsored by the U.S. Army Training and Doctrine Command.

Distributed Learning, Development/Application of Training Systems

▶ See the quick-response study described above, "Increasing Soldier Performance through Embedded Training and Rehearsal," sponsored by the Vice Chief of Staff, U.S. Army.

Retention

▶ **Strategies to Improve Retention of Highest-Performing Officers**. This study evaluated different measures of potential and performance in order to identify the Army's highest-performing officers and the areas in which it has been least successful in retaining these officers. It identified areas in which the Army faces its greatest competition for these officers from other employers. The study recommended ways to strategically target officers in these communities and to develop effective tools that encourage high-performing officers to remain in service. Sponsored by the Deputy Chief of Staff, G-1.

Officer Career Fields, Selection, Assignment Sequencing

▶ See "Senior Leader Development Needs: Identifying Critical Capabilities Possessed by O6 Leaders," above.

Soldier and Family Support

▶ **Individual Rotation Tempo and Its Effects on Quality of Life and Retention**. This ongoing research is assessing individual rotation tempo and its possible adverse second-order effects, such as effects on family separation, professional development, morale, and attrition/retention. It is evaluating potential changes in first-term length options, post-deployment assignment management, PCS timing, and dwell—and tradeoffs among them—that address these outcomes while meeting ARFORGEN requirements. Sponsored by the Deputy Chief of Staff, G-1, and the Commanding General, U.S. Army Accessions Command.

▶ **Installation Infrastructure and Services in Support of Army Force Generation (ARFORGEN).** This ongoing study is examining demands for soldier and family support and how they are changing in the face of lengthy, repeated deployments; availability and sufficiency of support services; and alternatives and resource requirements for improving installation services. The study is identifying problems and needs related to soldier and family well-being and quality of life in the active and reserve components; linking soldier and family problems and needs to programs and services; reviewing current metrics of installation requirements and services addressing soldier and family problems and needs; as required, proposing new data-collection efforts; and designing a longitudinal system for providing data on services, outputs, and outcomes. Sponsored by the Assistant Chief of Staff for Installation Management/Installation Management Command. ●

Military Logistics Program

Kenneth J. Girardini directs the Military Logistics Program.

MISSION AND RESEARCH STREAMS

The Military Logistics Program conducts analyses to help the Army improve support to operational forces, enhance the effectiveness and efficiency of its business processes, and optimize the industrial base and support infrastructure. At the strategic level, research on military logistics helps the Army to develop both a compelling vision of future support capabilities and an effective and efficient strategy for executing the vision. In accordance with the vision, Arroyo develops and evaluates alternatives in major logistics policy areas: (1) institutional Army and Joint operational support policies, processes, and structures; (2) industrial base policies and structures; and (3) fleet management planning. Arroyo also identifies and evaluates improvements to logistics processes that will enhance performance and deployability or will reduce costs and achieve efficiencies while maintaining or even improving effectiveness, and it provides analytic support to Army implementation efforts. The improvements include changes in financial management policies and processes that will increase the effectiveness, efficiency,

and responsiveness of the Army's logistics processes. In all these areas, Arroyo draws on extensive research capital to provide timely short-term analytical assistance to senior decisionmakers on urgent logistics issues. The program is directed by Dr. Kenneth J. Girardini. Dr. Rick Eden serves as the associate director.

To accomplish its mission, the program sustains research streams in four policy domains:

- Supply chain management
- Fleet management and modernization
- Logistics force development
- Infrastructure management

The program's FY 2010 research agenda within each of these streams is illustrated below.

FY 2010 STUDIES IN MILITARY LOGISTICS

Supply Chain Management

▶ **Achieving Time Definite Delivery**. This study assessed the current effectiveness of global distribution and identified areas for improvement. It evaluated global distribution performance trends; assessed major factors driving performance; identified and ranked the most critical performance issues; and provided recommendations for the way ahead. Sponsored by the Deputy Chief of Staff, G-4.

▶ **Expanding Authorized Stockage List (ASL) Expert Team Capabilities**. This study provided computer programs to expand the capabilities of the Army's expert ASL review (ExASL) team to develop ASL recommendations for custom situations and to develop theater/regional retention levels. Sponsored by the Deputy Chief of Staff, G-4.

▶ **Improving Central Issue Facility (CIF) Inventory Management**. This continuing study has improved the efficiency of Central Issue Facility (CIF) Organizational Clothing and Individual Equipment (OCIE) inventory management in support of the Active Army. It has piloted the use of inventory levels; developed business rules for redistributing inventory across CIFs; estimated the effects of implementing bar code scanners on CIF workloads; and

conducted a gap analysis between future CIF information systems and OCIE inventory management needs. Sponsored by the Deputy Chief of Staff, G-4.

▶ **Improving Inventory Management of Organizational Clothing and Individual Equipment (OCIE) at Sierra Army Depot**. This study developed an approach and business rules for setting centralized inventory levels for organizational clothing and individual equipment at Sierra Army Depot (SIAD) in support of U.S. Army Reserve (USAR) soldiers and Active Army soldier OCIE reset. Sponsored by the U.S. Army Materiel Command.

▶ **Improving War Reserve Secondary Item (WRSI) Processes**. This continuing study has assisted Army efforts to review and improve the overall WRSI management process to include requirements determination, resource allocation, execution, storage, and stock rotation. The study team worked with the Army to refine and institutionalize the new WRSI methodology developed and applied by Arroyo to guide the execution of FY 2008 WRSI funding. The study directly supported the reposturing of Army WRSI inventories to include specific recommendations for APS-5, the implementation of APS-4, and the finalization of the APS-3 update. Sponsored by the Deputy Chief of Staff, G-4.

▶ **Integrating Forward Distribution Depot (FDD) Missions**. This study integrated and improved the implementation of forward positioning, war reserve, and serviceable retention missions at FDDs for improved readiness for new contingencies and lower total cost. Sponsored by the Deputy Chief of Staff, G-4.

▶ **Options for Redistribution of Non-Army Managed Items (NAMI)**. This study examined how the Army could improve the cost-effectiveness of NAMI redistribution. It compared the costs and performance of the current system with redirecting serviceable returns to Strategic Distribution Platforms (SDPs) and developed and assessed a modified serviceable credit scheme. Sponsored by the Deputy Chief of Staff, G-4.

▶ **Understanding Army Materiel Command's (AMC's) Inventory Turn Rate**. This study gained an understanding of the drivers of AMC's inventory turn trend so as to determine whether inventory management is satisfactory or whether and how inventory turns could improve. It developed inventory turn metrics for AMC and determined the potential impact of specific process changes to AMC inventory turns. The study was conducted in

Rick Eden is the Associate Director of the Military Logistics Program.

collaboration with the Army Materiel Systems Analysis Activity (AMSAA). Sponsored by the U.S. Army Materiel Command and the Deputy Chief of Staff, G-4.

▶ **Army Procurement Transformation**. This study reviewed the reform initiatives implemented by the Army to ensure that they are having the intended effect: to transform the Army Contracting Enterprise into a more effective and efficient operation and organization. Specifically, is the Army's transformation of its procurement processes, practices, organizations, training, and personnel meeting its objectives? Those objectives include making Army contracting better able to respond robustly to persistent, worldwide contingencies and surges in demand. Army contracting should have greater accountability and transparency, while also supporting the greater Army Enterprise and its initiatives for strategic business transformation. Sponsored by the Assistant Secretary of the Army (Acquisition, Logistics and Technology).

Fleet Management and Modernization

▶ **Army Acquisition Objectives Under Army Force Generation (ARFORGEN)**. This study analyzed the components that comprise Army Acquisition Objectives (AAO) to determine whether they remain appropriate given the Army Force Generation (ARFORGEN) process and current practices such as reset and whether any new components should become part of AAOs. Additionally, the study examined how well equipment readiness goals align with training needs in an ARFORGEN-based Army supporting ongoing conflicts. Sponsored by the U.S. Army Materiel Command.

▶ **Improving Sustainment Considerations in Program Decisions**. This study analyzed how to better ensure that full and accurate sustainment cost estimates inform program decisions intended to minimize life-cycle costs. It assessed how well life-cycle sustainment costs are estimated in program planning; determined whether there are gaps in capabilities that hinder accurate life-cycle cost analysis; and assessed whether alternative metrics and incentives could lead to improved consideration of life-cycle sustainment issues for program planning. Sponsored by the Deputy Chief of Staff, G-4.

▶ **Life-Cycle Sustainment Data Gaps and Implications**. This study assessed the breadth and quality of sustainment data available on Army ground systems, identifying gaps and the implications of those gaps for life-cycle management. The study team identified the types and characteristics of data needed for life-cycle management analyses of ground systems; reviewed the sources of Army sustainment available; identified gaps in needed data; and identified the analytic implications of missing or subpar data quality and the monetary and/or nonmonetary costs associated with sustainment data limitations. Sponsored by the Deputy Chief of Staff, G-4.

▶ **Age, Operational Tempo (OPTEMPO), and Deployment Effects on Maintenance Costs and Readiness**. This study assessed the effects of age, OPTEMPO, and deployment on vehicles for vehicle renewal program decisionmaking, value analysis, and justification. Building an integrated fleet analysis dataset, the study team conducted statistical analyses to determine the effects of age, OPTEMPO, and deployment on maintenance costs (parts and labor) and readiness. Sponsored by the Deputy Chief of Staff, G-4.

▶ **Using Field Data to Improve Initial Issue Parts Support for New Equipment**. This study developed a recommendation for Army policy on initial issue parts packages, referred to as "push" packages, provided by program managers (PMs) to supplement the authorized stockage lists (ASL) of supporting supply support activities (SSAs) as part of new equipment fielding. Because new equipment fieldings typically occur in phases over time, the policy should address how to rapidly update push packages using empirical demand data from initial fieldings for improved early life-cycle readiness. Sponsored by the Deputy Chief of Staff, G-4, and the Assistant Secretary of the Army (Acquisition, Logistics and Technology).

Logistics Force Development

▶ **Examining Future Force Logistics Footprint Needs and Opportunities**. This study conducted a critical review, based on current operations and future concepts, to determine the feasibility of providing logistics support over wide areas and to smaller units, while also reducing the overall logistics footprint. It identified alternative solutions that would enable this capability and identify changes required to existing concepts, doctrine, and procedures to inform the development of the Army Functional Sustainment Concept 2016–2028. Sponsored by the U.S. Army Training and Doctrine Command.

▶ **Improving Army Utilization of Operational Contract Support**. This study assisted the Army in developing improvements in its utilization of Operational Contract Support in contingency operations to reduce cost, manage risk, and improve performance. Sponsored by the Assistant Secretary of the Army (Acquisition, Logistics and Technology).

Infrastructure Management

▶ **Installation Infrastructure and Services in Support of Army Force Generation (ARFORGEN), Phase 1**. This continuing study examined demands for individual and family support and how these are changing in the face of lengthy, repeated deployments, availability and sufficiency of support services, and alternatives and resource requirements for improving installation services. The study provided an improved understanding of the needs of soldiers and their families, focusing on individual and family readiness and services provided through installations to meet these needs, and collected information that the Army can use to improve the management and resourcing of services. This project was a joint effort with Arroyo's Manpower and Training Program. Sponsored by the Assistant Chief of Staff for Installation Management/ Installation Management Command.

▶ **External Trends for Army Installations 2025**. This study identified external trends that may affect the Army's ability to provide quality installation services and infrastructure and that the Army should consider in its strategic installation planning. Sponsored by the Deputy Assistant Chief of Staff for Installation Management. ●

MILITARY HEALTH PROGRAM

Sue Hosek co-directs the Military Health Program.

Terri Tanielian co-directs the Military Health Program.

MISSION AND RESEARCH STREAMS

The Military Health Program conducts analyses designed to ensure that the medical readiness and health benefit missions of the Army are carried out effectively and efficiently. These analyses include studies of policies and programs for enhancing health promotion and providing care on the battlefield, in garrison, and in Army medical facilities. Through this initiative, Arroyo has the capability to estimate the health-related effects of deployment on soldiers and their families and assess programs to alleviate these effects; examine the appropriateness, cost, and quality of health care and provide analytical support to efforts to improve the effectiveness and efficiency of health care; and evaluate the unique issues in managing medical personnel.

In collaboration with RAND Health, a separate division of the RAND Corporation, research in this program is conducted through the Center for Military Health Policy Research, which has experience in developing and evaluating alternative policies to reduce the costs of health care, achieve efficiencies, enhance quality of care, and improve the productivity of health providers, as well as

assessing the medical readiness of soldiers and programs. Additional capabilities include evaluating the implications of advances in medical technology, and contributing toward analyses of the requirements for medical personnel in the full spectrum of future demands, including combat support, nation building, humanitarian, and disaster response operations. The Center is co-directed by Ms. Sue Hosek and Ms. Terri Tanielian.

To accomplish its mission, the program sustains research streams in six policy domains:

- Health promotion and health care provision
- Deployment-related health issues
- Quality of health care
- Reducing costs and improving productivity
- Medical readiness
- Medical personnel

Maintaining expertise in these domains also allows Arroyo to provide timely short-term assistance on issues of importance to the Army.

The program's FY 2010 research agenda within these streams is illustrated below.

Deployment-Related Health Issues

▶ **Addressing the Psychological Health and Behavioral Effects of Army Force Generation (ARFORGEN) and Operational Tempo (OPTEMPO): Phase 2**. This study is helping the Army develop a broad understanding of the dynamic and cumulative effects of a full range of deployment cycle experiences (e.g., deployment, deployment length, number of deployments, combat exposure, dwell time, and operational tempo) on the psychological well-being of soldiers and family members. By examining the longitudinal relationships between personal vulnerabilities and strengths, exposure to combat and other deployment-related experiences, and psychological outcomes, this study is informing the development and implementation of Army efforts to mitigate stress and its negative consequences through changes in force management, support programs, and mental health treatment. Sponsored by the U.S. Army Surgeon General/U.S. Army Medical Command.

Quality of Health Care

▶ **ARFORGEN (Army Force Generation) and the Ability of Army Medical Treatment Facilities (MTFs) to Meet Beneficiary Health Care Needs: Phase 2**. This study is helping the Army develop a comprehensive and accurate description of the changes in health care utilization by soldiers and family members over the deployment cycle. The project will assess the effects of deployment and operational tempo on Army MTFs' ability to meet the health care needs of soldiers and families. The project is also assessing the integration of MTF services with TRICARE civilian providers and related installation programs. Sponsored by the U.S. Army Surgeon General.

Medical Readiness

▶ **Defining and Measuring Family Readiness**. This multiyear study is identifying the antecedents and consequences of family readiness by collecting longitudinal data from Army families across the deployment cycle. Sponsored by the U.S. Army Surgeon General.

Future Demands on Medical Personnel

▶ **The Future of the Army Medical Department's Professional Filler System (PROFIS)**. This study is developing a comprehensive and accurate description of the functionality of the Army Medical Department's PROFIS in the contemporary operating environment of persistent conflict and assessing the potential need for modifications or improvements to the PROFIS or the PROFIS Deployment System (PDS) systems. Sponsored by the Office of the Army Surgeon General/U.S. Army Medical Command. ●

3. Summaries of Selected FY 2010 Studies

This section of the Annual Report provides summaries of seven studies completed in FY 2010:

▶ **Standing Up a More Capable Joint Task Force Headquarters**

▶ **Reducing Costs, Increasing Capability: A New Equipping Strategy for Combat Support Hospitals**

▶ **Building Partner Country Capacity for Stability Operations**

▶ **Addressing Commanders' Needs for Information on "Soft" Factors**

▶ **Is There a Cheaper and Faster Way to Distribute Medical Supplies?**

▶ **Army Warfighters' Forums Can Be Innovative and Successful**

▶ **Developing U.S. Army Officers' Capabilities for Joint, Interagency, Intergovernmental, and Multinational Environments**

Standing Up a More Capable Joint Task Force Headquarters

KEY POINTS

- Demand for Joint Task Force headquarters (JTF HQs) is likely to remain high.
- The Army can provide the core of many JTF HQs, but other services and government agencies must contribute some key personnel.
- DoD processes to identify and assign key personnel to JTF HQs need to be improved.

When the Department of Defense (DoD) is called on to respond to domestic or international crises, it typically uses a joint task force (JTF) to quickly integrate forces and capabilities across the military services. The use of JTFs has increased over the past decade, and their range of missions has expanded. Recent well-known examples include building partner capacity in the Horn of Africa (CJTF-HOA), civil support for Hurricane Katrina (JTF-Katrina), and disaster relief in Haiti (JTF-Haiti).

There has been some concern among senior policymakers in DoD that the headquarters element of a JTF has some serious shortcomings. JTF headquarters (JTF HQ) are staffed by personnel from the tactical headquarters of the military services as well as by joint augmentees, who add depth in critical areas. Specific concerns about JTF headquarters include the length of time needed to establish them, the ability to staff them appropriately, and their ability to coordinate with the military services, U.S. government agencies, and forces from other countries. The U.S. Army asked RAND Arroyo Center to help improve the Army's ability to quickly establish a more capable JTF HQ.

JTF HQs Face Planning, Staffing, and Training Challenges

The Arroyo team analyzed the range of missions, deployment patterns, staffing processes, and training opportunities associated with past and ongoing joint force operations. The team concluded that JTF HQs had too little time before deployments to allow for long-lead planning, organizational activities, and training. The Arroyo study included an analysis of 45 JTFs operating from 2000 through 2005—data were available for 16 of these regarding the amount of time JTF HQs had to prepare for deployment. The team's analysis showed that about 70 percent of the JTF HQs had 5 weeks or less to prepare for deployment (see Figure 3.1).[5] Consequently, JTF HQs are compelled to develop operating concepts and plans on the fly, even for complex missions.

Figure 3.1—Time Between Warning Order and JTF Deployment
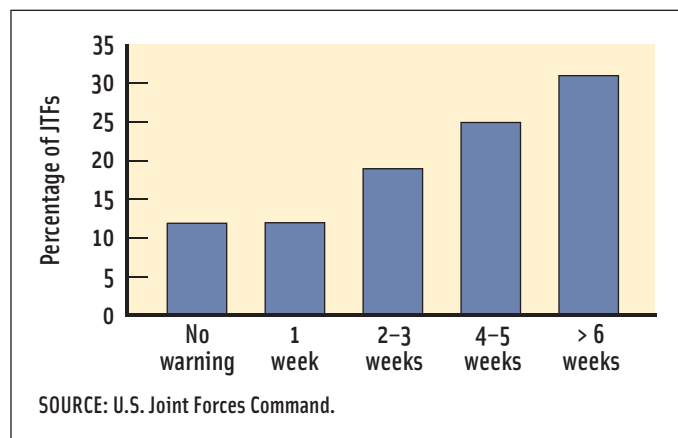
SOURCE: U.S. Joint Forces Command.

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[5] See also Armando X. Estrada, *Joint Task Force Requirements Determination: A Review of the Organization and Structure of Joint Task Forces*, Monterey, CA: Naval Postgraduate School, 2005.

Although they deploy quickly, JTF HQs can take up to six months to obtain all of the personnel they require to carry out planning, intelligence, logistics, communications, and other command and control functions. The process of tailoring and augmenting JTF HQs to obtain the number of personnel and the skills needed is lengthy: It includes designing the JTF headquarters, developing a joint manning document, and obtaining approval of the manning document from the combatant commander and Joint Staff. In addition, key personnel are in high demand, so JTF HQs are in competition with other service and joint headquarters for experienced staff and key specialists. As a result, JTF HQs often lack staff in important specialties when they begin operations, and their effectiveness is limited to some degree until they receive the specialties key to the assigned mission.

Tactical Headquarters of Army Corps and Divisions Can Serve as JTF HQs

The Army can improve the speed with which JTF HQs may be deployed and enhance their capability by providing permanent fully manned, equipped, and trained units to serve as the core of JTF HQs. These units would be formed within the Army's corps and division headquarters. The Arroyo team recommends that the Army assign its corps headquarters to serve as JTF HQs when missions are broad in scope or large in scale, such as recent counterinsurgency and stability operations in Iraq and Afghanistan. Division headquarters could serve as JTF HQs when the corps headquarters are already busy—and when missions are narrower in scope or smaller in scale.

Corps and division headquarters will still need significant augmentation to be fully functional in a joint role. Thus the Arroyo team recommends improving the process for assigning staff who are outside the parent unit headquarters. For example, to fill billets more quickly, Army headquarters and the major Army commands can help the combatant commanders develop mission-specific joint manning documents and interagency agreements.

JTF HQs Should Become More Integrated with Other Forces

Waiting until arrival in the theater is too late to begin coordinating all the elements that contribute to a joint operation. JTF HQs need to develop end-to-end concepts of operation for operational and tactical-level tasks in cooperation with the combatant commands, the other

services, and other government agencies, and they need to train with these organizations before deployments. JTF HQs also need to identify the capabilities they depend on in each of these organizations (e.g., air power) and develop habitual relationships with them to minimize risks. Preparing potential JTF HQs to exercise command and control will require an investment on the part of DoD and other government agencies as well as the Army.

Conclusion

None of the actions recommended in the Arroyo study will be easy to implement. They will require the Army, the other services, and other U.S. government agencies to commit troops, civilian specialists, training time, and other resources. But the reality is that the demand for JTFs will continue, and if history is any guide, the Army will face the lion's share of this demand. ●

Reducing Costs, Increasing Capability
A New Equipping Strategy for Combat Support Hospitals

KEY POINTS

- The Army's current strategy for equipping Combat Support Hospitals (CSHs) does not cost-effectively manage medical equipment maintenance and obsolescence.
- When not deployed, active component CSHs want more medical capability at home station but less equipment to maintain; nondeployed Army Reserve CSHs want even less equipment.
- A RAND Arroyo Center team used input from CSH commanders and others to design equipment sets for home stations that would substantially reduce maintenance and costs.
- The overall equipping strategy would provide commanders with local equipment sets that meet the training needs they described, reduce the total amount of equipment, require more sharing of equipment, and allow affordable, ongoing equipment modernization.

The U.S. Army uses CSHs—deployable hospitals housed in tents and expandable containers—to provide surgical and trauma care close to combat action. A CSH unit consists of a 248-bed hospital, approximately 500 personnel, and $26 million in medical equipment. The Army has 26 CSH units, which can be deployed once every three years (active component) or once every five years (Army Reserve). At the height of the "surge" in Iraq, four CSH units were deployed: three in Iraq and one in Afghanistan.

Doctrine dictates that CSHs deploy with their own equipment. In practice, these units instead have received new medical equipment when deploying or have taken owner-ship of existing, upgraded equipment that is already deployed. When not deployed, CSH medical personnel work at Army hospitals around the country and world. A partial set of a CSH unit's medical equipment is held at home stations for training or possible local emergency medical missions. The remainder is in long-term storage at the Sierra Army Depot in Northern California.

This equipping strategy has created maintenance and obsolescence challenges. For example, CSH medical equipment at home stations is generally older, unevenly maintained, and seldom or never used. Realizing that its equipping strategy is inefficient and ineffective, the Army asked RAND Arroyo Center to help develop a better one.

Equipment Needs at Home Stations

The Arroyo team conducted surveys, focus groups, interviews, and site visits to understand equipment requirements at home stations. Many active component commanders wanted fewer beds and wards to maintain, but some wanted more equipment at home station to better train for deployments and increase local medical capability. Other active commanders were concerned about their ability to maintain more local equipment and wanted different, more capable equipment at home station. Reserve CSH commanders wanted significantly less equipment at home station: their units had too little time to maintain it. They wanted to keep only enough equipment to support training individual and team skills. For unit-level training, the reserves already use Army training sites that own CSH equipment.

Options for Home Station Equipment Sets

To address the needs and concerns of CSH personnel, the research team developed three new designs for home sta-

tion equipment sets. Table 3.1 lays out those options and compares them to current home-station sets:

1. **Expanded Capability**: If the Army decides that CSHs at home station should have the capability for broader training and more medical capability, it should adopt an "expanded" capability set with more local medical equipment. An expanded design has fewer total beds than the current design, but doubles the surgical and trauma capability.

2. **Enhanced Capability**: If active component CSHs can train more broadly elsewhere, such as at a regional training site, then the Army should adopt an "enhanced" design, providing even fewer beds but still improving local medical capabilities.

3. **Lean Capability**: The "lean" design would provide a very limited set of equipment sufficient to allow CSH personnel to train for certain core hospital functions. The lean design sends nearly all medical equipment to storage.

Based on a risk analysis that considered maintenance, training, and local medical missions, Arroyo researchers recommended that the active component adopt the enhanced design and that the Army Reserve adopt a very lean equipment set at home station.

Equipment Sets at Training Sites and in Storage
The research team also made recommendations for CSH equipment at training sites and in storage. For training sites, the team recommends tailoring equipment sets for training exercises to the needs of specific CSHs.

For the equipment at the Sierra Army Depot (about two dozen 164-bed hospitals and two full 248-bed hospitals), the team recommends radically reducing the number of 164-bed sets, improving the condition and currency of the remaining sets, and shared ownership (i.e., CSH units would not retain a one-to-one correspondence between their home-station equipment set and sets in storage).

Reduced Costs and Better Equipment
The overall strategy proposed by Arroyo would substantially reduce the cost of equipping and maintaining the Army's CSHs. Fewer full hospital sets systemwide mean less medical equipment. A detailed cost analysis conducted by the Arroyo team estimated that the total cost of CSH medical equipment sets would decrease from approximately $1 billion to about $740 million. The associated reduction in maintenance and upgrade costs will make it easier for the Army to ensure that the remaining equipment is well maintained and state of the art.

Proposed Strategy Consistent with Broader Army Shift
Senior Army leaders are concerned that the Army cannot afford to fully equip all units all the time. The proposed equipping strategy represents a radical departure from the current strategy, but is consistent with Army leaders' increasing emphasis on performing more efficiently while still improving capabilities: "doing more with less." The proposed strategy is a means to both ends: improving training and deployed capabilities while reducing costs through more efficient operations. ●

Table 3.1—Options for Home Station Equipment Sets

Equipment	Set Total	CSH Home Station Sets			
		Current	Expanded	Enhanced	Lean
Operating tables	8	2	4 ↑	2	1 ↓
Trauma beds	8	4	8 ↑	4 ↓	1 ↓
Intensive care beds	48	24	24 ↓	12 ↓	2 ↓
Intermediate care beds	200	80	40 ↑	20 ↑	2 ↓
Full x-ray capability	2 x-ray	x-ray	2 x-ray ↑	x-ray	None ↓
Hard shelters	12	3	12 ↑	12 ↑	0 ↓
Pharmacy	Large and small	Small	Large and small ↑	Large ↑	0 ↓

Building Partner Country Capacity for Stability Operations

KEY POINTS

- Building partner capacity (BPC) and stability operations are receiving attention in official strategy and planning. However, an integrated strategy is lacking.
- BPC for stability operations activities tend to be more effective when they: are planned and resourced over a period of years; involve all relevant U.S. military and civilian agencies and allies; target multiple countries throughout a region; employ a variety of security cooperation tools; and consider indigenous partner requirements.
- Recommendations for the Army and DoD include: better integration of BPC and stability operations; improved visibility into related security cooperation activities; a concerted effort to learn from the experience of major U.S. allies; and rigorous methods for selecting and prioritizing partner countries—and assessing capacity-building efforts in those countries.

Counterterrorist operations, along with the wars in Afghanistan and Iraq, have highlighted the important roles for the United States in stability operations, i.e., maintaining security, providing humanitarian aid, beginning reconstruction, and bolstering local governments. The Department of Defense has emphasized that a sustainable counterterrorism strategy should ideally allow the United States to work "by, with, and through" its allies and partners and, when necessary, bolster the capacity of their governments and security forces to conduct stability operations.

The U.S. government thus needs to build its own interagency capacity for conducting stability operations while simultaneously helping build partner capacity (BPC) for stability operations across a wide range of nations. To support this objective, RAND Arroyo Center recently conducted an exploratory analysis of key strategic elements necessary to align U.S. government security cooperation efforts with the goal of BPC for stability operations in a security environment without major overseas contingencies.

BPC and Stability Operations Lack an Integrated Approach

An important objective of the study was to clarify the relationship between BPC and stability operations. In general, BPC and stability operations are receiving a good deal of attention in official strategy and planning documents. However, an integrated strategy is lacking.

Key U.S. government agencies have come to an agreement on the major goals for stability operations. Largely absent from existing documentation, however, is a means to help decisionmakers prioritize and implement goals in a variety of pre-conflict, conflict, and post-conflict circumstances. Further, DoD planning guidance establishes only a general connection between stability operations goals and BPC activities, not a clearly defined and well-integrated strategy. Key agencies have yet to reach consensus on their respective roles and missions. However, in certain combatant commands (COCOMs), such as U.S. Southern Command, a significant number of events, resources, and personnel are focused on BPC for stability operations.

RAND Arroyo Center conducted an exploratory analysis to help determine potential partners, assess the pros and cons of each, and choose ways to weight and assess selection factors. The analysis found that there are only a few well-rounded stability operations partners that are neither major allies nor advanced industrial states.

However, the number of potentially willing partners expands significantly if one values past participation in U.N. operations over involvement in U.S.-led operations.

A New Assessment Approach Is Needed to Inform Decisions About BPC for Stability Operations

Arroyo developed a six-step assessment approach to enable the Army and other DoD agencies to make more informed decisions about BPC for stability operations planning, programming, and budgeting (see Figure 3.2). This approach provides a systematic method to evaluate the performance and effectiveness of existing security cooperation programs and activities with respect to stability-related objectives and end states in particular countries.

Based on its analysis using this approach, Arroyo found that BPC for stability operations activities tend to be more effective when they are used in the following ways:

- Applied in coordination with other related activities to reinforce key concepts.
- Worked with, by, and through existing regional organizations and arrangements.
- Not "handed over" to an ally with little to no U.S. oversight.
- Sustained through careful planning and resource allocation.

Recommendations

RAND Arroyo Center's analysis resulted in a number of recommendations for the Army and DoD to consider in moving forward.

- **BPC and stability operations need to be more clearly defined and better integrated.** U.S. government agencies need to understand not only primary strategic objectives but also their respective roles and missions. Mechanisms for aligning Army, DoD, and national BPC

Figure 3.2—Six-Step Approach to Assess the Effectiveness of BPC for Stability Operations

1. Select desired end state and specific goals
2. Develop generic input, output, and outcome indicators and external factors
3. Identify focus countries, programs, program aims, and appropriate objectives
4. Identify appropriate indicators and external factors
5. Apply assessment framework
6. Determine overall program/activity contribution to the achievement of the desired end state

for stability operations strategy, planning, and resourcing should be constructed.

- **DoD and the Army should seek to understand the extent and effectiveness of the BPC for stability operations activities that they, their interagency partners, and major U.S. allies are currently conducting.** Coordination and cooperation should be promoted where possible.
- **The military, and particularly the Army, should improve its visibility into security cooperation activities relevant to BPC for stability operations.** The Army should assist the COCOMs in developing a holistic approach to BPC for stability operations that involves all relevant U.S. agencies and allies while also considering the indigenous requirements of partners.
- **In the future, the Army should increase the number and extent of its BPC for stability operations activities in certain regions, such as U.S. Africa Command.** The Army might also make a concerted effort to learn from the BPC for stability operations experience of its allies, in particular, the United Kingdom and France, in key areas such as trainer selection and training of trainers.
- **The Army and DoD should place greater focus on coalition and regional candidates that have a demonstrated willingness to participate in U.N. deployments.** The apparent scarcity of high-potential partner nations could justify a narrowing of U.S. government BPC for stability operations efforts or serve as an impetus for greatly increasing the amount of resources dedicated to those efforts. Arroyo recommends, more specifically, that the Army and DoD emphasize potential coalition partners that have shown willingness to participate in U.N. deployments. Because few countries are both fragile and receptive to U.S. help, the decision to attempt to build indigenous stability operations capacity may, in many cases, have to be based on the degree of a country's internal weakness and the salience of the U.S. strategic interest in that country.

Conclusion

Building partner capacity for stability operations is an ongoing process. Ideally, the results of these analytical processes will have a significant impact on the set of BPC for stability operations activities and partners, aligning relevant and effective activities with appropriate partners. ●

Addressing Commanders' Needs for Information on "Soft" Factors

KEY POINTS

- Commanders' most critical information need in counterinsurgency operations is to understand the attitudes, beliefs, and mood of the local civilian populations.
- Commanders who believed their influence operations had been successful had a clear picture of the key influence variables, available resources, and the desired end state.
- Developing good measures of effectiveness to assess the effectiveness of influence operations remains a challenge.
- To address commanders' needs for information, the Army should collect and analyze geospatial, network oriented, and individual- and group-focused information.

A recent RAND Arroyo Center study sought to characterize commanders' requirements for information on "soft" factors, and to develop practical ways for commanders to integrate influence activities into combined arms planning and assessment. The research entailed structured conversations with commanders and their staffs, a review of senior commanders' and other writings, an analysis of task lists, and an assessment of relevant data from the 1st Information Operations Command and the National Training Center.

There is growing recognition within the Army and Joint world that recent U.S. military operations in Iraq and Afghanistan—including information operations and influence operations—have turned in large measure on an understanding of "soft" factors. However, along with this recognition have come many questions, including: How do commanders view their requirements for "cultural preparation of the environment"? How can these sorts of factors be considered more systematically in planning and conducting operations?

The research summarized here is published in Eric V. Larson, Richard E. Darilek, Dalia Dassa Kaye, Forrest E. Morgan, Brian Nichiporuk, Diana Dunham-Scott, Cathryn Quantic Thurston, and Kristin J. Leuschner, *Understanding Commanders' Information Needs for Influence Operations*, Santa Monica, CA: RAND Corporation, MG-656-A, 2009. Related research includes Eric V. Larson, Richard E. Darilek, Daniel Gibran, Brian Nichiporuk, Amy Richardson, Lowell H. Schwartz, and Cathryn Quantic Thurston, *Foundations of Effective Influence Operations: A Framework for Enhancing Army Capabilities*, Santa Monica, CA: RAND Corporation, MG-654-A, 2009, and Eric V. Larson, Derek Eaton, Brian Nichiporuk, and Thomas S. Szayna, *Assessing Irregular Warfare: A Framework for Intelligence Analysis*, Santa Monica, CA: RAND Corporation, MG-668-A, 2008.
http://www.rand.org/pubs/monographs/MG656.html
http://www.rand.org/pubs/monographs/MG654.html
http://www.rand.org/pubs/monographs/MG668.html

Commanders' Information Needs for Influence Operations

Arroyo's review provided a number of insights into commanders' information requirements for influence operations. In this study, the term "influence operations" is used to refer to any operations, including information operations, that involve communications and interactions to inform and influence target audiences in concert with other activities.

- **Commanders' most critical information need is to understand the attitudes, beliefs, and mood of the local civilian populations.** Understanding the popular mood requires continuous monitoring of key indicators, perhaps more so in Muslim societies that are innately suspicious of the West and the United States.
- **Success in influence operations depends on commanders' understanding of the battle space and of how to employ influence operations to achieve the desired end state.** In addition, commanders who insist that their subordinates develop a coordinated program of influence operations activities and who follow up to ensure that they take place appear far more likely to succeed in integrating influence operations with other combined arms operations.

- **Many sources of information can be drawn upon to accurately assess the local information environment.** The most appropriate sources will vary according to the mission, the local context of the operation, and even the individual commander. It is important, in any case, to establish a clear information sourcing strategy early on.
- **Commanders who believed their influence operations had been successful had a clear picture of the key influence variables, available resources, and the desired end state.** In contrast, commanders who tried to monitor too many variables, who shifted resources back and forth in response to daily crises, or who changed themes and messages randomly appear to have enjoyed less success.
- **There is currently a lack of good measures of effectiveness (MOEs) to assess how a unit's influence efforts are being received by the local population.** However, three key indicators are being used across units and echelons in Iraq and Afghanistan with some success: the tenor of sermons in mosques, the "on the street" behavior of locals (e.g., obscene gestures toward U.S. troops, amount of anti-American graffiti), and trends in the number of intelligence tips from the local population.

A Framework for Thinking About Commanders' Information Requirements

Commanders' needs for information generally flow from an interaction of factors within three principal arenas: commanders' guidance regarding the overall mission, the resources available to the commander, and the operating environment. In terms of commanders' guidance, influence operations planning should flow from the top down while also ensuring that units in the field have the authority and flexibility they need to be responsive to quickly developing opportunities and challenges. A commander must also understand the full range of available resources, including those under his immediate command, as well as those available from other sources.

Understanding the operating environment, especially the information domain, is more complex. Arroyo developed a framework for thinking about commanders' information requirements in COIN and stability operations, and for guiding data-collection efforts related to the information domain. The framework uses three complementary "lenses" to characterize and diagnose features of the operating environment's information domain.

- **Geospatial**. The geospatial lens captures a number of critically important features of the information domain. These features range from mostly static features of the terrain (such as urbanization, land use, and transportation networks) to more dynamic features of the environment (such as the changing attitudes, beliefs, and behaviors of a given population in a specific region, and the ever-changing mix of new messages and information competing for attention at any given time).
- **Network-oriented**. A second lens involves overlapping or interlocking networks. This lens provides a view of key features of the broader political society, including key leaders, their critical relationships (both formal and informal), and their sources of authority, power, and influence.
- **Political or military stakeholder groups and their leaders**. Another lens involves identifying which groups or individuals need to be targeted, and whether targeting them means informing, influencing, cultivating, or incapacitating them. Each group or faction should be characterized in terms of its group identity and general worldview, as well as its specific aims, grievances, motivations, intentions, morale, basic strategies, leadership, and organizational structure.

Remaining Challenges

The research team identified several emerging challenges that need to be addressed:

- Integrated planning, execution, assessment, and information flows between echelons.
- Coordination and integration of influence operations across adjacent areas of operation.
- Ensuring continuity in information and influence operations across rotations.
- Overcoming doctrinal stovepipes that tend to treat influence operations and its related and supporting capabilities as discrete, somewhat isolated disciplines.

Addressing these challenges, if coupled with educational and training programs that teach soldiers how to integrate influence efforts with other activities, could give the next generation of Army commanders the tools they need to plan and execute more effective influence operations. ●

Is There a Cheaper and Faster Way to Distribute Medical Supplies?

KEY POINTS

- Medical supplies are stocked and distributed separately from other supplies that soldiers need, such as fuel, ammunition, and spare parts.
- Consolidating distribution of medical supplies in either Germany or Qatar could either lower costs, improve performance, or both.
- Shipping supplies from either the United States or Kuwait offers no advantages.

For nearly a decade, the U.S. Army has been supporting combat operations in Afghanistan and Iraq. Keeping soldiers supplied in such far-flung locations takes an enormous amount of supplies, none of which is more critical than medical supplies used daily to save soldiers' lives. However, medical supplies are distributed through their own distribution system and not mixed with other things soldiers need such as rations, fuel, ammunition, and so forth. The Army is under pressure to reduce costs wherever it can, and it asked RAND Arroyo Center to find out whether consolidating medical supply distribution could be more efficient and thus less expensive.

How Medical Supplies Are Distributed Now

Currently, two locations distribute medical supplies to units in Iraq and Afghanistan: one in Qatar and one in Germany (see Figure 3.3). Qatar fills about 60 percent of the demand, stocking only the fastest-moving items. It operates seven days a week, using contract and military personnel. Germany both replaces stocks distributed by Qatar and fills the requests for items not stocked in Qatar.

The research summarized here is published in William Welser IV, Keenan D. Yoho, Marc Robbins, Eric Peltz, Ben D. Van Roo, Adam C. Resnick, and Ronald E. Harper, *Assessment of the USCENTCOM Medical Distribution Structure*, Santa Monica, CA: RAND Corporation, MG-929-A, 2010.
http://www.rand.org/pubs/monographs/MG929.html

The location in Germany operates five days a week and uses local civilians.

Material other than medical supplies is distributed from a depot located in Kuwait, from distribution centers located in the United States (usually from Defense Depot Susquehanna Pennsylvania), and, for some items such as food, directly from vendors. Given that both systems distribute supplies to the same places, the question arises whether it would be more efficient to merge the two systems.

Options Considered and Criteria Applied

To ascertain whether consolidation would lead to efficiencies, Arroyo researchers evaluated five options:
- Status quo.
- Deliver directly from the United States.
- Stock medical supplies in Kuwait.
- Put more of the items now stocked only in Germany at Qatar.
- Consolidate all medical stocks at the Germany depot.

To assess the options, Arroyo researchers used two criteria: performance and cost. To qualify as a viable alternative to the status quo, an option first had to deliver medical supplies at least as fast as the current system and ideally even faster. To assess performance, researchers evaluated the time required for each segment of the supply process (e.g., time from when an order is sent until it is received; time from order receipt until a release order is cut; time from when an order is cut until the materiel is retrieved from the warehouse; and so forth). The second criterion was whether a given option cost less than the status quo. The cost analysis included transportation costs, any new construction required to implement an option, the effect of a shift in demand toward Afghanistan and away from Iraq, any increase in labor costs, and any costs associated with establishing increased stocks.

Results

Table 3.2 shows the results of the analysis. Compared with the status quo, two options were assessed as having better performance, lower cost, or both. Two options were assessed as having worse performance or higher costs than the status quo.

- **Ship from the United States**. Direct vendor delivery of a spare part is the closest analog to the medical model that relies on prime vendor support. Beginning at a vendor's location, the part is shipped to a consolidation and packing point and then on to a departure airfield. Supporting Iraq or Afghanistan from the United States leads to worse performance. Total time from when a vendor receives a materiel request until it arrives at the customer's airport is 28 days, compared with 10 days for medical supplies. Because the processing time for shipments from the United States is so much longer, this option received no further consideration.
- **Shift stocks to Kuwait**. The analysis shows that there is no case for moving Qatar's stocks to Kuwait. None of the data examined indicates that Kuwait would offer equal or better performance. The cost analysis concludes that

Table 3.2—Performance and Cost of Options

Option	Performance	Cost
Status quo	–	–
Increase stocks at Qatar	Better performance	Potentially higher cost
Stock medical supplies in Kuwait	Worse performance	Likely similar cost, but potential for higher costs
Ship from the United States	Overall worse performance	
Consolidate in Germany	Better performance	More cost-efficient

with the drawdown of forces in Iraq and the increase in Afghanistan, a potential cost advantage for conducting medical distribution operations from Kuwait disappears and with it any cost rationale for altering the current operations.

- **Increase stocks at Qatar**. Consolidating operations in Qatar would result in about a 20 percent improvement in performance, perhaps more. However, stocks would have to be increased significantly, some construction would be required to accommodate the increase, and some additional people would be needed to handle it. Overall, costs would increase slightly.
- **Consolidate in Germany**. Consolidation of medical supplies in Germany would yield the same performance increase as in Qatar. Consolidation in Germany would also yield a relatively modest cost reduction of between $1 million and $3 million annually, depending on the level of operations in Iraq and Afghanistan. There is some potential for further cost reduction by renegotiating contracts with the commercial air carrier to distribute material from only one airfield. This analysis assumes that Germany extends its operation from five days to seven, which would incur an increased cost. Whether military or local nationals would provide the additional labor remains to be determined. Overall, this was the preferred option. ●

Figure 3.3—Distribution Centers in Germany, Kuwait, and Qatar

Army Warfighters' Forums Can Be Innovative and Successful

KEY POINTS

- Stryker Brigades have little time between when they are organized to train and before they deploy to combat.
- Users were very satisfied with Stryker forum products and services.
- Participation in forum training activities improved tactical knowledge.
- Units that had theater-based feedback increased their tactical proficiency.

The U.S. Army fielded Stryker Brigades to fill the void between heavy forces that were quite capable but took a long time to deploy and light infantry forces that could deploy quickly but lacked punch and staying power. Stryker Brigades provide armored mobility and can deploy faster than the heavy mechanized units.

The first Stryker Brigade began its conversion in 2000. By 2003, Stryker units were preparing to deploy to Iraq. The comparatively short time between creation and commitment meant that the units had little time to refine their doctrine and warfighting tactics, techniques, and procedures. To help overcome this shortfall, the Army created the Stryker Brigade Combat Team (SBCT) Warfighters' Forum, a networked and collaborative means of sharing information that leverages modern computer-based technologies to facilitate the exchange of information. This forum, which has its own staff,[6] includes a website (StrykerNet) with an information repository, Internet-based interactive leader and staff symposiums, and direct response to queries, all of which enable units, including those in a combat theater, to share lessons learned, pose questions, identify problems, and report solutions.

The Army is developing additional warfighter forums and asked RAND Arroyo Center to assess how well the SBCT Warfighters' Forum works.

To make that assessment, Arroyo researchers posed three questions:

- How satisfied were those who used the forum?
- Did individuals' tactical knowledge increase?
- Did units' proficiency increase with theater-based feedback during a combat training center event?

How Satisfied Were Users?

Arroyo researchers gauged user satisfaction by surveying SBCT leaders about various StrykerNet elements, surveying approximately 3,000 soldiers in two SBCTs to estimate how many individuals in the SBCT community of practice used various forum products or services, and by having forum leaders and staff complete a communications log. The log recorded elements of email and face-to-face and phone conversations.

Analysis of the three data-collection efforts indicates that the majority of SBCT leaders sampled were satisfied with the StrykerNet website and would recommend it. Approximately one-third of senior leaders and staff reported that they visited StrykerNet, and one-half of those visiting the site reported using it for training or individual development purposes. Analysis of staff communication logs strongly suggests that customers were satisfied with the direct support they received. Repeat customers were common. The log analysis also suggests that the Warfighters' Forum staff reduced the burden on Stryker units by dealing with requests that would otherwise have gone to units.

Did Individual Tactical Knowledge Increase?

The method used to gauge an increase in tactical knowledge was evaluation of the Hundredth House tool, which com-

[6] The staff numbers approximately seven retired military personnel and an active-duty leader.

bines a computer-based reenactment of an insurgent ambush of American forces in Iraq, recorded interviews with the unit members who took part in the ambush event, and a battalion commander–led discussion among trainees that occurred after they viewed the reenactment and interviews.[7] The study involved a before-and-after test given to about 130 soldiers from two battalions that were preparing to deploy to Iraq. The training tool improved the tactical knowledge of most participants. Meaningful gains occurred among three of the four groups analyzed: Officers, NCOs with recent Operation Iraqi Freedom experience, and other enlisted soldiers all scored significantly higher on measures of tactics after completing the training. NCOs who had participated in Operation Enduring Freedom or Operation Iraqi Freedom before 2006 showed little gain. The reason for the comparatively small gain in this group is unclear, but two possible explanations are that NCOs who had deployed to Afghanistan or pre-2006 Iraq felt confident in their abilities and therefore failed to pay attention and absorb the knowledge/training, or that the NCOs consciously decided that their experience was a better model to follow/adopt than the techniques conveyed during the Hundredth House training.

Did Unit Proficiency Increase with Theater-Based Feedback During a Combat Training Center Event?

To assess improvement in unit proficiency, Arroyo researchers developed an Iraq Common Events Approaches (ICEA) handbook consistent with SBCT Warfighters' Forum techniques and approaches. The handbook reflected the experiences of SBCT soldiers who had recently returned from a 15-month deployment to Iraq. It included information about ten common events that combat units faced, e.g., coming upon a suspected improvised explosive device (IED). Collective responses from deployed soldiers were distilled and, if they occurred frequently enough, were included in the handbook. For example, for a suspected IED, common actions included secure and cordon off the area, place vehicles in an overwatch position, and set up roadblocks.

To assess the effect of the handbook, Arroyo researchers measured and compared the performance of units at

a combat training center that had received the handbook before the training event and one that had not. Observer-controllers, who accompany units during training and are experienced in the duties of those whom they are observing, collected evaluation data.

Units that had the ICEA handbook did significantly better on tactical tasks during combat training center rotations than platoons that did not receive the handbook. Researchers found the positive effect of the handbook at both the Joint Readiness Training Center and the National Training Center, regardless of how many training rotations the observer-controller had seen and across the ten tactical scenarios. Figure 3.4 shows the positive effect and that it extended across the entire training period. Generally, all units improved during the training period, but those that had the handbook did better.

Recommendations for the Army

In light of the positive effects of the SBCT Warfighters' Forum, Arroyo researchers recommend that the Army take the following steps:

- Ensure that Warfighters' Forums continue to provide dynamic information to their communities.
- Monitor views within the community of practice about what Warfighters' Forums offer to identify potential improvements.
- Incorporate feedback reports into prepackaged training aids and tools.
- Consider broader adoption of the method used to produce the ICEA handbook. ●

Figure 3.4—Differences Attributable to the Handbook During a Training Rotation

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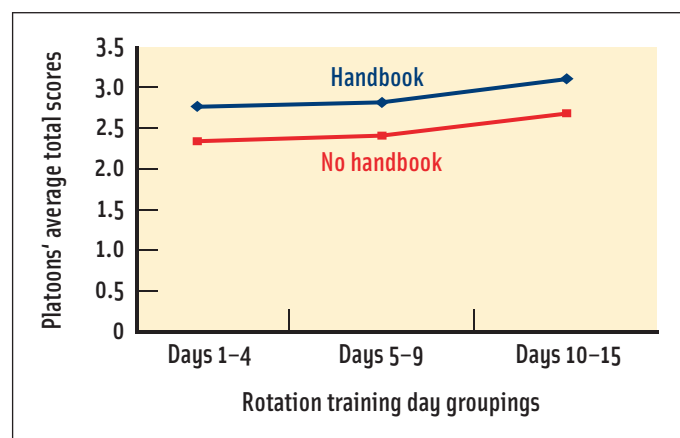
[7] The Hundredth House tool was developed by Joint Base Lewis-McChord, Battle Command Training Center, Leader Development Section and is available through the Stryker Warfighters' Forum. The name derives from soldiers' descriptions of the ambush site as looking like a hundred other houses they had been to.

Developing U.S. Army Officers' Capabilities for Joint, Interagency, Intergovernmental, and Multinational Environments

KEY POINTS

- Basic military, branch, and functional area expertise provides an essential foundation for success in joint, interagency, intergovernmental, and multinational (JIIM) settings; however, success in each of the JIIM domains also requires a wider and different set of knowledge, skills, and abilities to build on the foundation.
- In the current operating environment, Army officers have a significantly increased opportunity to gain experience in one or more JIIM domains.
- The Army can develop and maintain an adequate inventory of JIIM-qualified officers, although deliberate and effective management will be necessary to produce this inventory.

Army officers must increasingly function in joint, interagency, intergovernmental, and multinational (JIIM) environments, and must do so at lower echelons. In Iraq and Afghanistan, for example, brigade commanders command sizable elements from other services, respond to multinational commands, and integrate brigade combat team operations with the activities of other U.S. government agencies, of other national governments, and of nongovernmental organizations (NGOs).

The Army is responsible for developing the specific officer management policies to provide enough officers with the right capabilities to meet this demand. The U.S. Army Human Resources Command's Officer Personnel Management System (OPMS) Task Force asked RAND Arroyo Center to identify and describe the knowledge, skills, and abilities that Army officers need to function effectively in JIIM contexts and to identify opportunities to develop these

capabilities. Arroyo was also asked to develop a framework that will enable the Army to better track and manage the inventory of officers who possess the required capabilities.

Identifying JIIM Knowledge, Skills, and Abilities

The research team began by interviewing officers who had succeeded in a JIIM environment, along with officials from other services, agencies, and nations, in order to identify the knowledge, skills, and abilities that matter. **Respondents a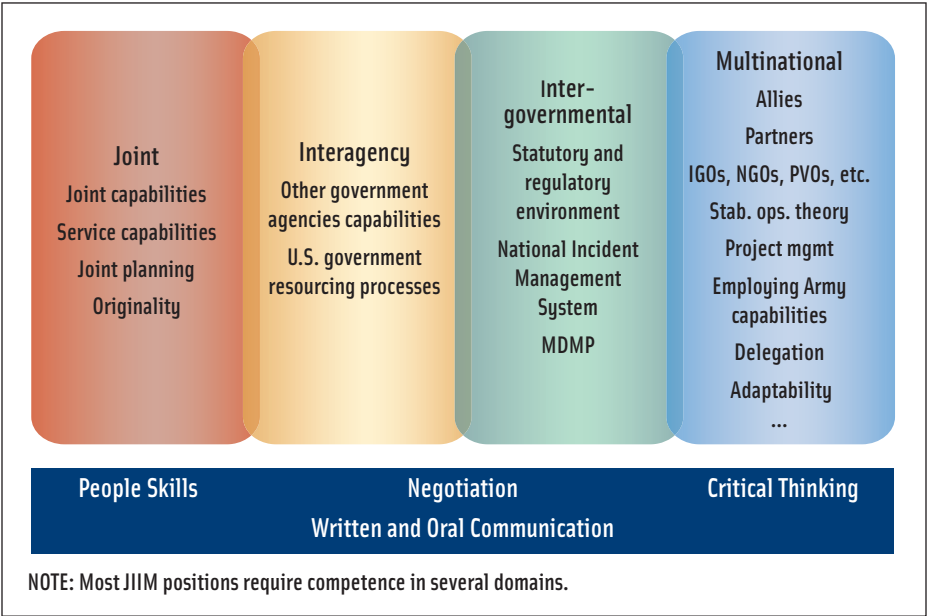ffirmed that basic military, branch, and functional area expertise are essential to success in JIIM settings**. Interpersonal and other integration skills tend to be of primary importance in JIIM environments, in which success usually requires voluntary collaboration between independent organizations that are frequently pursuing different agendas. Army officers indicated that skills and abilities acquired in the course of coordinating combined arms operations were effective in collaborating with individuals and organizations outside the Army. Officials from other services and agencies emphasized that what they needed from Army officers was help in understanding Army capabilities and assistance in leveraging those capabilities to accomplish common ends.

The JIIM domains are qualitatively distinct, if overlapping (see Figure 3.5). Simply put, success in each of the JIIM domains requires a different set of knowledge, skills, and abilities; expertise in one JIIM domain does not completely translate to expertise in another. To the extent that expertise is required, developing it requires experience in the relevant domain, not just a short preparatory course.

Service at strategic, operational, tactical, and institutional echelons requires distinctly different knowledge, skills, and abilities. That is, jobs at these different echelons differ in kind, not just in degree. The differences

Figure 3.5—JIIM Domains Overlap but Are Distinct from One Another

Joint	Interagency	Inter-governmental	Multinational
Joint capabilities	Other government agencies capabilities	Statutory and regulatory environment	Allies
Service capabilities			Partners
Joint planning	U.S. government resourcing processes	National Incident Management System	IGOs, NGOs, PVOs, etc.
Originality			Stab. ops. theory
		MDMP	Project mgmt
			Employing Army capabilities
			Delegation
			Adaptability
			...

People Skills — **Negotiation** — **Critical Thinking**
Written and Oral Communication

NOTE: Most JIIM positions require competence in several domains.

between echelons are at least as significant as those between JIIM domains.

Developmental Opportunities

Arroyo next surveyed assignment officers about the extent to which the positions they managed developed JIIM-relevant knowledge, skills, and abilities.

Broadening experiences contribute significantly to competence in the JIIM domains. According to respondents, the single most important preparation for JIIM environments was the opportunity to experience or learn "something different," i.e., assignments in which officers could not simply rely on their own accumulated experience and knowledge to succeed. For some, that "different" experience was service in the Balkans; for others, it was a tour on a higher-level staff.

In the current operating environment, Army officers have a significantly increased opportunity to gain experience in one or more JIIM domains. Naturally, in today's security environment, most of this experience accrued in the joint and multinational domains. Service in Army positions, such as battalion or brigade commander, executive officer, or operations officer, provided significant experience in integrating joint and multinational capabilities. Key officers on division and higher echelon staffs also accumulated significant interagency experience. Development required deployment and experience in an operational theater, how-

ever. In a garrison setting, those same positions provided little opportunity for developing JIIM-relevant knowledge, skills, and abilities.

A Framework for Tracking and Managing Officers with Relevant JIIM Knowledge, Skills, and Abilities

Arroyo developed a framework to help the Army better track and manage the inventory of officers who possess the required capabilities. The study team assessed the Army's ability to meet requirements for JIIM personnel using two models. In one, a *managing-skills* approach, the objective is to ensure that as many officers as possible acquire at least some JIIM experience. In the other, a *managing-competencies* approach, the object is to develop the maximum number of experts in the JIIM domains.

It should be possible to develop and maintain enough officers with the required knowledge, skills, and abilities in the JIIM domains. The Army could meet likely requirements using either model. If the Army adopted a managing-skills approach, over two-thirds of lieutenant colonels would have had some sort of JIIM experience by the time they either retired or became colonels. All colonels would have accumulated a JIIM assignment sometime in their careers. With a managing-competencies approach, the Army could produce substantially fewer experts, but with deeper experience; however, it is likely that the resulting inventory would still satisfy demand. Either approach requires deliberate, effective management.

Conclusion

The Army can develop and maintain an adequate inventory of JIIM-qualified officers without significantly disrupting existing career development patterns. While the strategic environment requires a larger inventory of such officers, current operations provide officers with more opportunities to develop the necessary knowledge, skills, and abilities—although the Army will have to manage its officers deliberately in order to produce the best possible mix of JIIM expertise in its inventory of officers. ●

4. Training and Education of Army Officers

Among the research products and services that RAND Arroyo Center provides to the Army is the training and education of Army officers as analysts. This educational function reflects RAND's goal, stated in its 1948 Articles of Incorporation, to "further and promote scientific, educational, and charitable purposes, all for the public welfare and security of the United States of America." RAND's institutional commitment to education and training gives Army officers the unique opportunity not only to work side by side with RAND analysts but also to engage with officers from other military services who are also at RAND participating in visiting analyst programs.

ARMY FELLOWS PROGRAM

Each year the Army selects a number of majors and lieutenant colonels to work at Arroyo as visiting analysts in the Army Fellows Program. This program affords officers the opportunity to increase their analytical capabilities through participation on Arroyo studies addressing critical policy issues facing the Army. In turn, their participation enhances Arroyo staff's understanding of current Army policies and practices. The one-year fellowship is followed by a three-year utilization assignment on a senior-level Army or Joint staff.

The Army Fellows cohort of 2010–2011 included (left to right) LTC Kenneth Burkman, MAJ(P) Aatif Sheikh, LTC Michael York, LTC Kimberlie Biever, LTC Michael Kolb, and LTC Glenn Burks. Not pictured is LTC David Bolduc.

To date, 168 officers have participated in the program. Seven officers participated in the program in the 2010–2011 cohort.

2010–2011 ARMY FELLOWS

Lieutenant Colonel Mike Kolb is an Adjutant General Corps officer who most recently served as the Chief of Plans and Operations for the 1st Human Resources Sustainment Center (21st Theater Sustainment Command) in Kaiserslautern, Germany. He has served in a multitude of positions in the Active and Reserve Army, including Secretary of the General Staff for the 21st Theater Sustainment Command, Brigade S1 for the 16th Sustainment Brigade, Chief of Deployment and Redeployment Operations for Coalition Forces Land Component Command C1, Commander of the 115th Mobile Public Affairs Detachment, Strength Manager of the 116th Cavalry Brigade Combat Team, and Missile Assembly and Transport Platoon Leader for the 4/12 Field Artillery Battalion. LTC Kolb is currently a PhD candidate in Organizational Leadership at the University of Oklahoma and is conducting dissertation research in the area of human/robot interaction. He holds an MS in Business Administration from Boston University and a BS in Business Administration (Entrepreneur Program) from the University of Southern California. As an Army Fellow, LTC Kolb contributed to studies on optimization of production and diversity of Army ROTC, manpower support for future Army force requirements, ARFORGEN equipment management, assessment of advanced technologies and concepts to support current and future forces, and staff organization to support current and future forces.

Lieutenant Colonel David Bolduc is a Combat Engineer and Force Management Officer who recently finished an assignment as a Programs Action Officer in the HQDA G3/5/7 Force Management at the Pentagon. As an Active Guard Reserve Officer, some of his assignments include Force Management Officer for 8th U.S. Army Korea, Overseas Deployment Training Officer for United States Forces Korea (USFK), Force Integration officer for the 96th Regional Readiness Command in Salt Lake City, Utah, and Acquisitions Program Management Officer at the Tank and Automotive Command (TACOM) in Warren, Michigan. LTC Bolduc holds an MS in Logistics Management from the University of Central Texas, and a BLA in Landscape Architecture from the University of Oregon. As an Army Fellow, LTC Bolduc contributed to studies on Chinese acquisition strategies, OSD responses to congressional inquiries from the 2010 National Defense Authorization Act regarding Army modularity, Army deployment cycle support, and Unified Quest (UQ) 2010.

Lieutenant Colonel Michael York is a Space Operations Officer who most recently served as a Joint Operations Center Team Chief for U.S. Africa Command. Previous assignments included serving in the 82nd Airborne Division, USSTRATCOM, and USSPACECOM. LTC York held various prior positions as an Air Defense Artillery officer and served as a Battery Commander. LTC York holds an MS in Space Operations from the Naval Postgraduate School and a BS in Business Administration from North Carolina A&T State University. As an Army fellow, LTC York contributed to studies on developing capabilities for Army cyber-operations, unmanned aerial systems support to small units, assessing staff structure to support Army Mission Command, assessing new energy technologies for Army installations, and addressing Army requirements in the Cyber/Electromagnetic Contest.

Lieutenant Colonel Glenn Burks's career field designation is military police, and he is also qualified as a Public Affairs Officer. He most recently served as the Deputy Chief Public Affairs at U.S. Forces-Iraq (Advising and Training). Previous assignments include serving as the Secretary General Staff at the 75th Battle Command Training Division and Battalion S3 with the 96th Military Police. LTC Burks is a doctoral candidate at Texas Southern University, where he studies Environmental Policy and Planning. He holds an MA in Sociology from Texas Woman's University and a BA from Western Michigan University. As an Army Fellow, LTC Burks contributed to studies on Army power and energy, strategic communications, and U.S. strategies in Afghanistan.

Lieutenant Colonel Kenneth W. Burkman is an Operations Research Systems Analyst who most recently served in the Capabilities Integration, Prioritization and Analysis Directorate, HQDA G-3/5/7. His previous assignments include serving as a Team Leader of Army Test and Evaluation Command's Forward Operational Assessment Team XII in Baghdad, Iraq; as an Associate Fellow at the

Chief of Naval Operations Strategic Studies Group in Newport, Rhode Island; and as an Assistant Professor of German at the U.S. Military Academy. As a junior officer, LTC Burkman served in mechanized and combat heavy engineer units. He holds an MS in Operations Research from the Naval Postgraduate School, an MA in German from the University of Illinois, an MS in Engineering Management from the University of Missouri-Rolla, and a BS in French and German from the U.S. Military Academy. As an Army Fellow, LTC Burkman contributed to studies on improving processes to determine War Reserve Secondary Item stocks and on improving processes for the Tire Assembly Repair Program. He also contributed toward understanding the impact of budget, repair cycle, and procurement processes on inventory turn rate at Army Materiel Command depots.

Lieutenant Colonel Kimberlie A. Biever is an Adult and Acute Care Nurse Practitioner and Clinical Nurse Specialist who most recently served as the lead Clinical Nurse Specialist in the Critical Care Department at Walter Reed Army Medical Center. She deployed in 2009 as the Joint Theater Trauma System Program Manager for Oper-ation Enduring Freedom and Operation Iraqi Freedom. Previous assignments include Chief Nurse and Executive Officer, Kaiserslautern, Germany; Head Nurse and Staff Officer, Fort Belvoir, Virginia; and Clinical Staff Nurse, Washington, D.C. LTC Biever holds an MS as an Adult Nurse Practitioner and an MS as an Acute Care Nurse Practitioner/Clinical Nurse Specialist, both from the University of Maryland, Baltimore, and a BS in Nursing from University of Southern Mississippi. As an Army Fellow, LTC Biever contributed to studies on the AMEDD PROFIS system, Air Force surgical skills currency, capabilities-based planning tools for emergency preparedness planning, access to care as related to ARFORGEN, and reserve component medical readiness.

Major(P) Aatif M. Sheikh most recently served as the Chief of the Pharmacy Division at General Leonard Wood Army Community Hospital at Fort Leonard Wood, Missouri. Previous assignments include Support Operations Officer for the 16th Medical Logistics Battalion; Chief of Pharmacy, Kimbrough Ambulatory Care Center; Chief of Pharmacy Informatics, Walter Reed Army Medical Center (WRAMC); Chief of Ancillary Services, Soto Cano Airbase, Honduras; and Chief of the Outpatient Pharmacy, WRAMC. MAJ Sheikh holds a PharmD from the School of Pharmacy, University of Maryland, Baltimore, and an MBA and an MHA from Baylor University. During his time at WRAMC, he also completed a Pharmacy Practice Residency. As an Army Fellow, MAJ Sheikh has contributed to studies on ARFORGEN effects on MTF access and utilization, PROFIS effects on the MTF, Afghanistan National Security Forces, and enhancing pharmacist utilization in AMEDD. ●

On October 12, 2010, Army Fellow Kimberlie A. Biever was promoted to the rank of lieutenant colonel. Col Warren Dorlac, director of the Center for Sustainment of Trauma and Readiness Skills, Cincinnati, and trauma consultant to the Air Force Surgeon General, presided over the ceremony and conducted the reaffirmation of the oath of office. Army Fellow LTC Michael Kolb read the promotion orders. MAJ(P) Aatif Sheikh assisted in the ceremony.

Lisa Colabella is a senior operations researcher who works in RAND Arroyo Center's Military Logistics Program. The projects she led in FY 2010 included a study examining the effects of age and usage on the mission-critical failure rates and operating costs of Army vehicles, and an assessment of the quality of equipment sustainment data in Standard Army Management Information Systems. In addition, she contributed to a study of total Army equipment requirements and equipment-on-hand levels, and she helped develop a new methodology for determining war reserve sustainment stock requirements. A recent RAND publication is *Improving Recapitalization Planning: Toward a Fleet Management Model for the High-Mobility Multipurpose Wheeled Vehicle* (http://www.rand.org/pubs/technical_reports/TR464.html).

Prior to joining RAND in 2000, Dr. Colabella was an assistant professor in the University of Southern California's Department of Management and Organization. She received her doctorate in Industrial Engineering from Stanford University, an MS in Operations Research from Stanford University, and a BS in Systems Engineering from the University of Virginia. She is an ad hoc reviewer for *Administrative Science Quarterly, Journal of Management Studies*, and *Academy of Management Journal*.

Carol Fan is an operations researcher who works in RAND Arroyo Center's Military Logistics Program. In FY 2010 Dr. Fan co-led two studies with Dr. Elvira Loredo on improving the inventory efficiency of Organizational Clothing and Individual Equipment (OCIE). One project focused on OCIE at Central Issue Facilities (CIFs), the other on OCIE in support of U.S. Army Reserve Soldiers and Reset of Soldiers returning from deployments. Dr. Fan also co-authored the recent Arroyo publication *A Funding Allocation Methodology for War Reserve Secondary Items* (http://www.rand.org/pubs/technical_reports/TR793.html). This work was nominated for a Barchi Prize at the Military Operations Research Society Symposium.

Prior to joining RAND in 2001, Dr. Fan was an assistant professor of mathematics at Loyola Marymount University in Los Angeles, California. She received her doctorate and MS degrees in Mathematics from University of Michigan, and her BA in Mathematics from Pomona College. She is currently the president of Math/Science Interchange, a nonprofit organization dedicated to increasing the number of young women pursuing careers in math and science.

Dan Gonzales is a senior scientist who works in RAND Arroyo Center's Force Development and Technology Program. In FY 2010 Dr. Gonzales led a study on future Army Infantry Brigade Combat Team (IBCT) tactical communications networks. The objective of this project was to determine the best IBCT networks configurations for data communications that are based on the Joint Tactical Radio System and selected legacy radios. Dr. Gonzales assisted Dr. Joel Predd, who co-led another RAND Arroyo Center project sponsored by the Vice Chief of Staff of the Army that examined ways that red teams can help the Army better deal with the top-level issues it faces today. Dr. Gonzales identified several near-term acquisition issues that concern high-priority Army communications programs that could be amenable to red team analyses.

Prior to joining RAND in 2001, Dr. Gonzales was a member of the research staff at the Institute for Defense Analyses. He received his doctorate in Theoretical Physics from the Massachusetts Institute of Technology and BS in Physics from Stanford University. Dr. Gonzales is a member of the American Institute for Aeronautics and Astronautics (AIAA) Information and Command and Control Systems Technical Committee and is a member of IEEE.

Bryan W. Hallmark is a behavioral scientist who works in several RAND Arroyo Center programs. In FY 2010 Dr. Hallmark co-led a study with Henry A. Leonard examining trends in full-spectrum skill proficiency within brigade combat teams. He also led a study investigating how advanced embedded training technologies could benefit tactical units' preparations for deployments. He was a contributor to a project examining the Army Reserve's Employer Partnership Program and to another that examined the historical evolution of infantry squad size and function. Dr. Hallmark co-authored the recent RAND publication *Assessing the Assignment Policy for Army Women* (http://www.rand.org/pubs/monographs/MG590-1.html).

Prior to joining RAND in 1992, Dr. Hallmark was a Principal Investigator for the National Research Center for the Gifted and Talented at the University of Connecticut. He received a doctorate in Social Psychology and an MA in Psychology from the University of Connecticut, and a BA in Psychology from California State University at Fullerton.

Katherine Harris is a senior researcher affiliated with RAND's Center for Military Health Policy Research. In FY 2010 Dr. Harris led one of five Arroyo Center projects exploring the collateral effects of rapid, rotational deployments on soldiers, force management practices, and installation support services. This project explored the cumulative and dynamic effects of deployment cycle experiences on the psychological well-being of soldiers.

Prior to joining RAND in 1998, Dr. Harris worked as an Assistant Professor in the Department of Health Systems Management in the Tulane University School of Public Health. Between 2001 and 2005, she was a Senior Analyst for the U.S. Substance Abuse and Mental Health Services Administration in Rockville, Maryland. She has 'an MS in Economics from the University of Michigan and a doctorate in Health Services Research from the University of Minnesota School of Public Health.

Dave Johnson is a senior political scientist who works in RAND Arroyo Center's Strategy, Doctrine, and Resources Program. In FY 2010 Dr. Johnson led two Arroyo studies. The first examined the capabilities the Army might require in future conflicts, with a particular focus on irregular and hybrid warfare; the second analyzed the 2008 Battle of Sadr City. Some of his recent Arroyo publications are *Military Capabilities for Hybrid War: Insights from the Israel Defense Forces in Lebanon and Gaza* (http://www.rand.org/pubs/occasional_papers/OP285.html) and *Observations on Recent Trends in Armored Forces* (http://www.rand.org/pubs/occasional_papers/OP287.html). His work has been included on the professional reading lists of U.S. Army and Air Force Chiefs of Staff.

Prior to joining RAND in 1998, Dr. Johnson was a vice president at Science Applications International Corporation (SAIC). He joined SAIC after a 24-year Army career, where he served in a variety of command and staff assignments in the United States, Korea, Germany, Hawaii, and Belgium. He retired as a colonel in 1997. He received his doctorate and MA degrees in History from Duke University. He also has master's degrees from the U.S. Command and General Staff College and the Industrial College of the Armed Forces and a BA in History from Trinity University.

M. Wade Markel is a senior political scientist working in RAND Arroyo Center's Strategy, Doctrine, and Resources and Manpower and Training Programs. In FY 2010 he led a study on improving the Army's ability to develop capabilities investment options in a constrained fiscal environment. With Dr. Ralph Masi, he co-led studies on improving the Army's management of active duty for operational support (ADOS) manpower and assessing the manpower implications of employing the reserve components as an operational force. He also contributed to analysis of the 2008 Battle of Sadr City's implications for Army force development. A recent publication is *Developing U.S. Army Officers' Capabilities for Joint, Interagency, Intergovernmental, and Multinational Environments* (http://www.rand.org/pubs/monographs/MG990.html).

Dr. Markel joined RAND in 2007 after 20 years with the U.S. Army as an infantry officer and strategist; he retired at the rank of lieutenant colonel. He received a doctorate in History from Harvard University and a BS from the U.S. Military Academy at West Point.

Ellen M. Pint is an economist who works in RAND Arroyo Center's Manpower and Training and Military Logistics Programs. In FY 2010 she co-led a study with Dr. Amy Richardson on the Army Reserve's Employer Partnership Program, examining opportunities to improve the program's civilian job search website for reservists and to strengthen relationships with employer partners. She also contributed to projects examining installation programs and services supporting soldiers and families through the ARFORGEN cycle; the effects of provider deployments on medical care for soldiers and family members; and the effects of equipment age, usage, and reset on vehicle maintenance costs. Dr. Pint co-authored the recent Arroyo publication *Developing Headquarters Guidance for Army Installation Sustainability Plans in 2007* (http://www.rand.org/pubs/monographs/MG837.html).

Prior to joining RAND in 1991, Dr. Pint was a British Telecom Prize Research Fellow in Economics at Nuffield College, Oxford University. She received a doctorate in Business (Economic Analysis and Policy) from the Graduate School of Business, Stanford University, an MS in Philosophy, Politics, and Economics from Oxford University, and a BA in Economics and French from Washington University in St. Louis, Missouri. From 2007 to 2010 she served on the Board of Directors of the Western Economic Association International and helps organize several sessions on defense economics each year at the association's annual conference.

Isaac Porche is a senior engineer who works in RAND Arroyo Center's Force Development and Technology Program. In FY 2010 Dr. Porche led a study on Army Cyber Operations and co-led a study on Army Electromagnetic Spectrum Operations with Dr. David Ortiz. A recent publication is *The Impact of Network Performance on Warfighter Effectiveness* (http://www.rand.org/pubs/technical_reports/TR329.html).

Prior to joining RAND in 1998, Dr. Porche was a project engineer with General Motors Electric Vehicles. He received his doctorate from the University of Michigan in Electrical Engineering, his MS in Electrical Engineering from the University of California, Berkeley, and his BS in Electrical Engineering from Southern University. He is a judge for the Automotive News PACE Award, an annual award given to innovative suppliers in the automotive industry.

Amy Richardson is a policy researcher who works in RAND Arroyo Center's Manpower and Training Program. In FY 2010 Dr. Richardson led a two-year Arroyo study to examine the academic and behavioral health challenges that children face when their parents deploy and the barriers to their receiving support services. She also co-led a study that recommended approaches to strengthen the Employer Partnership Program. She authored a chapter in the recent Arroyo monograph, *Foundations of Effective Influence Operations: A Framework for Enhancing Army Capabilities* (http://www.rand.org/pubs/monographs/MG654.html). She co-authored research on the children of deployed soldiers that was published in 2010 in *The Journal of Adolescent Health* (http://www.jahonline.org/article/S1054-139X(09)00598-9/abstract).

Prior to joining RAND in 2004, Dr. Richardson worked on land use and local governance issues for the Heinz Endowments. As part of the Allegheny County Council for Economic Development, she advised on strategies and priorities for economic development in the region. She received her doctorate in Public and International Affairs from Princeton University, and her BA in History from Yale University. She has also served as board president for Summerbridge Pittsburgh, an academic enrichment summer program.

Marc Robbins is a senior management scientist who works in RAND Arroyo Center's Military Logistics Program. In FY 2010 Dr. Robbins led two projects on supply chain management issues. The first focused on challenges in global distribution to Army forces around the world, with special focus on the continental United States. The second examined the impact of the "shadow distribution" system whereby the Army (and other services) recycles materiel bought in excess of needs, and developed alternatives to streamline and increase the efficiency of the system. Dr. Robbins also participated in a study of acquisition and support for non-Program of Record systems—that is, systems acquired during wartime outside of the standard process. He co-authored the recent Arroyo publication *Assessment of the USCENTCOM Medical Distribution Structure* (http://www.rand.org/pubs/monographs/MG929.html).

Prior to joining RAND in 1985, Dr. Robbins taught political science at the University of California, Irvine. He received his doctorate in Politics and Near Eastern Studies at Princeton University and a BA in International Affairs from the University of Virginia. He was made a member of the Ancient Order of St. Christopher offered by the U.S. Army Transportation Corps in recognition of significant contributions to the Transportation Corps.

Susan Straus is a behavioral scientist who works in RAND Arroyo Center's Manpower and Training Program. In FY 2010 Dr. Straus led an Arroyo study developing and testing tools and metrics to evaluate the effectiveness of Army distributed learning and assessing how Army information systems can be used to support ongoing evaluation. She also worked on a project assessing the potential costs, technical feasibility, and benefits of using advanced embedded training technologies for future Army forces' training. Dr. Straus is the lead author on a recent Arroyo publication, *Improving the Army's Assessment of Interactive Multimedia Instruction Courseware* (http://www.rand.org/pubs/monographs/MG865.html).

Prior to joining RAND in 2001, Dr. Straus was an assistant professor of organizational behavior at Carnegie Mellon University in Pittsburgh. She received her doctorate and MA degrees in Industrial/Organizational Psychology from the University of Illinois and her BA in Psychology from the University of Michigan. She also has an appointment as an adjunct associate professor in the Human-Computer Interaction Institute, School of Computer Science at Carnegie Mellon University.

6. Selected 2010 Publications

To fulfill its mission, RAND Arroyo Center places the results of its research in the public domain whenever such publication is consistent with classification and distribution restrictions. Army Regulation 5-21 enumerates three reasons for this open publication policy: "The Army encourages broad distribution of Arroyo Center results to achieve maximum benefit, to permit widespread peer review, and to increase awareness of issues identified by the Army leadership as important."

Arroyo publishes only research that has been peer reviewed to assure that it meets RAND's standards for high-quality, objective research (http://www.rand.org/standards.html). Arroyo uses the same model of peer review that is standard for scientific journals, requiring each research document to be reviewed by at least two experts and revised in response to their recommendations before publication. Additionally, Arroyo research documents are approved for publication by the sponsoring Army office and cleared for public release by the Army Office of Public Affairs.

In addition to its Annual Report, RAND Arroyo Center produces research publications in five RAND series:

- **Monographs**: publications that include both research findings and policy recommendations for senior Army leadership.
- **Technical Reports**: publications targeted at analysts and other readers with strong technical expertise.
- **Documented Briefings**: publications that document briefings presented widely to the senior Army leadership.
- **Occasional Papers**: publications that present an informed perspective on policy issues important to the Army.
- **Conference Proceedings**: publications that document Arroyo-hosted conferences.

RAND Arroyo Center research publications that are unclassified and without distribution restrictions are available for free downloading at http://www.rand.org/ard.html. A selection of Arroyo's publications in 2010 appears in the following pages.
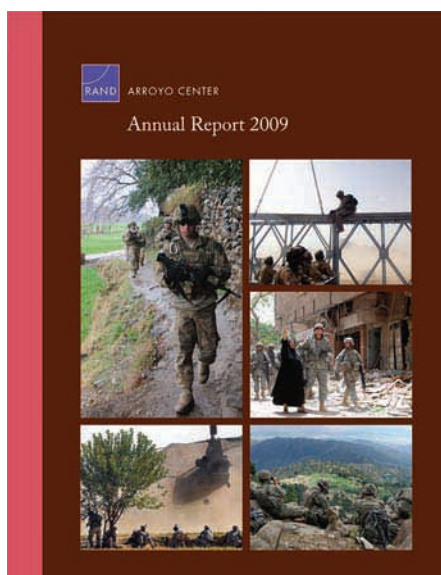
RAND Arroyo Center Annual Report 2009

http://www.rand.org/pubs/annual_reports/AR7147.html

As the Army's federally funded research and development center for studies and analyses, RAND Arroyo Center is charged with helping the leadership to identify the most critical challenges confronting the Army and with providing high-quality, objective research and analysis to support sound decisionmaking. This annual report describes Arroyo's research activities in FY 2009. It provides a detailed overview of the FY 2009 research agenda, features summaries of noteworthy projects selected to illustrate its breadth, and presents the results of quick-response studies conducted to help the Army leadership respond to pressing near-term problems. The full range of research products and services that Arroyo provided to the Army is covered, including peer-reviewed publications and the analytic training of officers in the Army Fellows Program.

Army Deployments to OIF and OEF

Timothy M. Bonds, Dave Baiocchi, Laurie L. McDonald

DB-587-A • http://www.rand.org/pubs/documented_briefings/DB587.html

In light of some publicly voiced misconceptions regarding the Army's capacity to deploy additional soldiers to Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), RAND Arroyo Center was asked to assess the demands placed upon the Army by these deployments. Analyzing Department of Defense deployment data, Arroyo found that the Army has provided over 1 million troop-years to OIF and OEF, and that most active-duty soldiers now deployed to these operations are on their second or third tour. Those active-duty soldiers who have not yet gone to Iraq or Afghanistan typically fall into one of two categories: new soldiers, needing to complete training before deployment; and experienced soldiers, needed for other missions. The demand for active-duty soldiers in OEF and OIF would have exceeded supply under the Army's normal deployment policies, so the Army and the Department of Defense took several actions to increase supply: they increased the overall size of the active component; they reassigned soldiers from other assignments and missions to the pool of soldiers rotating to OEF and OIF; and they greatly increased the rate at which soldiers rotate to and from the wars. Despite these adaptations, the Army retains very limited unutilized capacity to deploy additional active-duty soldiers beyond the current troop levels in OEF and OIF.
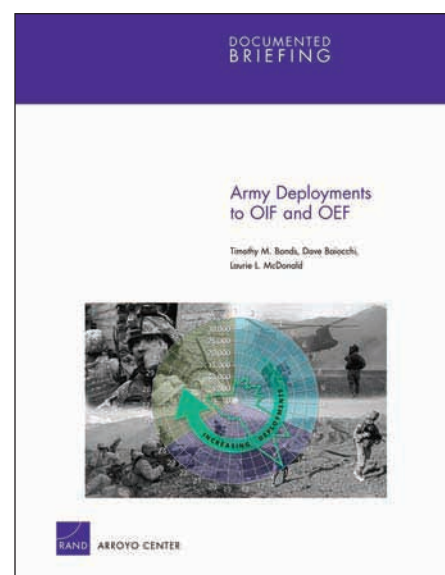
Developing U.S. Army Officers' Capabilities for Joint, Interagency, Intergovernmental, and Multinational Environments

M. Wade Markel, Henry A. Leonard, Charlotte Lynch, Christina Panis, Peter Schirmer, Carra S. Sims
MG-990-A • http://www.rand.org/pubs/monographs/MG990.html

Law, policy, and ongoing operations require the Department of Defense and the Army to develop a cadre of officers skilled in the integration of joint, interagency, intergovernmental, and multinational (JIIM) capabilities into military operations. Based on interviews and focus groups with Army officers and their counterparts and co-workers from other services, agencies, and nations, this monograph identifies and describes the knowledge, skills, and abilities that enable Army officers to succeed in JIIM contexts. Using surveys of experts in officer assignments, the researchers identified the kinds of assignments that develop capabilities in these domains. They also used inventory modeling to assess the Army's ability to develop and maintain a cadre of officers with these capabilities. The current operating environment seems to provide JIIM experience reliably at echelons as low as battalion commanders, executive officers, and operations officers. The researchers concluded that the Army can probably produce and maintain enough "experts" in the JIIM domains to meet likely requirements.

Assessment of the USCENTCOM Medical Distribution Structure

William Welser IV, Keenan D. Yoho, Marc Robbins, Eric Peltz, Ben D. Van Roo, Adam C. Resnick, Ronald E. Harper
MG-929-A • http://www.rand.org/pubs/monographs/MG929.html

This study examined whether there might be a medical supply and distribution structure for U.S. Central Command (USCENTCOM) that would maintain or improve performance while reducing costs. We evaluated the likely performance and cost implications of the range of possibilities, considering both the medical and nonmedical logistics structures, for providing medical supplies to support medical activities in USCENTCOM. We found that three options would preserve or improve performance while either lowering or not increasing costs. Additionally, we considered how the value of these solutions would likely change with future shifts in USCENTCOM operations.
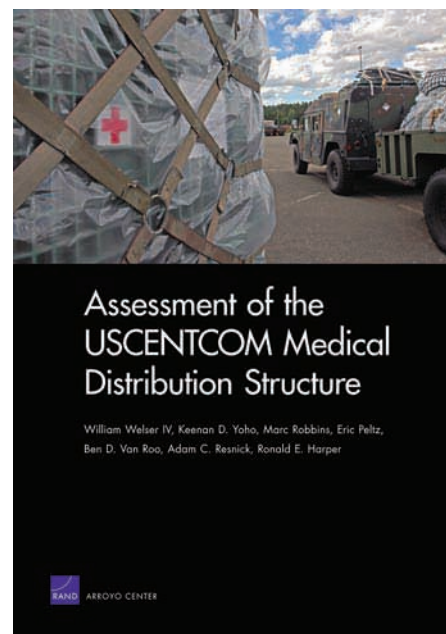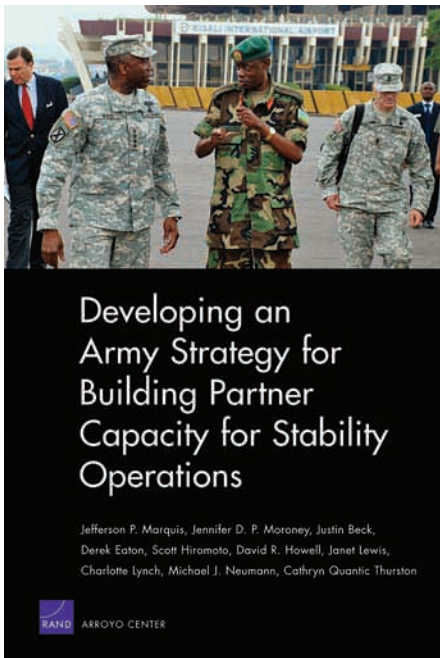
Developing an Army Strategy for Building Partner Capacity for Stability Operations

Jefferson P. Marquis, Jennifer D. P. Moroney, Justin Beck, Derek Eaton, Scott Hiromoto, David R. Howell, Janet Lewis, Charlotte Lynch, Michael J. Neumann, Cathryn Quantic Thurston
MG-942-A • http://www.rand.org/pubs/monographs/MG942.html

The U.S. government is facing the dual challenge of building its own interagency capacity for conducting stability operations while simultaneously building partner capacity (BPC) for stability operations. The purpose of this study is to assist the U.S. Army, the Department of Defense, and other U.S. government agencies in developing an integrated BPC for stability operations strategy. To accomplish this goal, a RAND Arroyo Center study team conducted an exploratory analysis of key strategic elements within the context of BPC and stability operations guidance as well as ongoing security cooperation programs, using a variety of analytical techniques. This study concludes that BPC and stability operations are receiving a good deal of attention in official strategy and planning documents. However, insufficient attention is being paid to the details of an integrated strategy. A baseline analysis of existing security cooperation programs needs to be undertaken to comprehend the type, scope, and target of activities related to BPC for stability operations. An assessment of these activities should then be conducted, focusing on both process outputs and operational outcomes. In addition, the Departments of State and Defense should develop a rigorous method for selecting and prioritizing partners whose stability operations capacity they wish to build.

Enhancing Army Joint Force Headquarters Capabilities

Timothy M. Bonds, Myron Hura, Thomas-Durell Young
MG-675-A • http://www.rand.org/pubs/monographs/MG675.html

The research in this document is aimed at helping the Army improve its ability to command and control joint, interagency, and multinational forces to accomplish diverse missions in a range of settings. The monograph describes steps that the Army might take to improve the ability of Army Service headquarters to command joint task forces. A particular emphasis was placed on suggesting ways to prepare Army headquarters, including Divisions, Corps, and Theater Armies, to perform as components of, or headquarters for, joint task forces. In addition, the monograph describes the capabilities that the Army will have to depend on others to provide to accomplish future missions—including the other services, joint organizations, and government agencies. The research addresses specific concerns expressed by policymakers in the Department of Defense; these include the amount of time it takes to establish these headquarters, the ability to staff them appropriately, and the Army's ability to coordinate the efforts of their forces with those of other services and agencies from diverse branches of the government and forces from different countries.
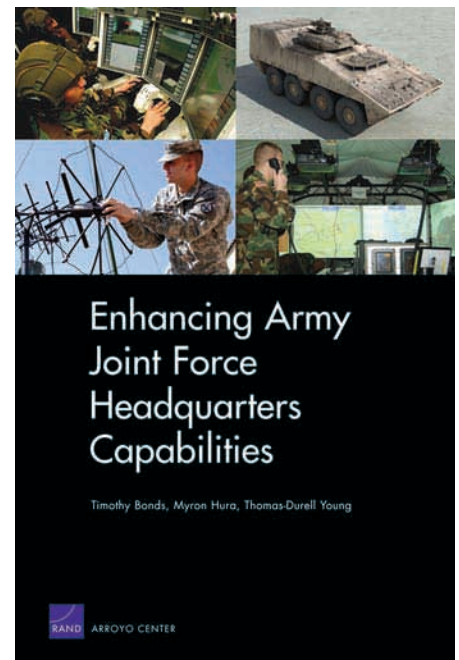
Harnessing Full Value from the DoD Serum Repository and the Defense Medical Surveillance System

Melinda Moore, Elisa Eiseman, Gail Fisher, Stuart S. Olmsted, Preethi R. Sama, John A. Zambrano
MG-875-A • http://www.rand.org/pubs/monographs/MG875.html

The Army manages the Department of Defense Serum Repository (DoDSR) of over 43 million serum samples and the associated Defense Medical Surveillance System (DMSS) database that links individual service member characteristics to these biological samples. The main mission and use of these resources has been for military health surveillance. The Army turned to RAND Arroyo Center to systematically examine current requirements and capabilities of the DoDSR and DMSS, identify gaps, and suggest strategies to improve their ability to meet current and potential future military health needs in the areas of surveillance, outbreak investigation, research, and clinical support, particularly as these relate to influenza and other infectious disease threats. The research drew information from written documents and interviews with military and civilian experts. The study identified a number of opportunities to improve the management, content, and use of the serum repository and associated database. There were six main recommendations: (1) clarify and communicate the missions of the DoDSR and DMSS both within and beyond DoD; (2) empower, structure, and resource the organizational oversight of DoDSR and DMSS so that they can fulfill the full range of their missions; (3) create an integrative data plan for comprehensive health surveillance; (4) enhance the utility of specimens; (5) plan for the next repository facility; and (6) raise awareness of and expand access to DoDSR and DMSS.

New Equipping Strategies for Combat Support Hospitals

Matthew W. Lewis, Aimee Bower, Mishaw T. Cuyler, Rick Eden, Ronald E. Harper, Kristy Gonzalez Morganti, Adam C. Resnick, Elizabeth D. Steiner, Rupa S. Valdez
MG-887-A • http://www.rand.org/pubs/monographs/MG887/

The U.S. Army uses Combat Support Hospitals (CSHs)—mobile, deployable hospitals housed in tents and expandable containers—to provide surgical and trauma care close to combat action. CSHs typically operate as hospitals only when deployed, and deployments occur only once every three to five years under the Army's rotational cycle. When not deployed, CSHs keep a partial set of equipment at home station for training or possible local emergency medical missions, while the remainder of the unit's equipment is in long-term storage at a site in the high desert of Northern California. This strategy of providing equipment for CSHs has created maintenance and obsolescence challenges. RAND Arroyo Center researchers developed a new equipping strategy for the Army's CSHs. The research team proposed eliminating much of the unit-owned equipment now residing in long-term storage. Deploying units would instead draw on a shared pool of up-to-date and well-maintained equipment. The proposed strategy would reduce total equipment costs from $1 billion to less than $700 million.
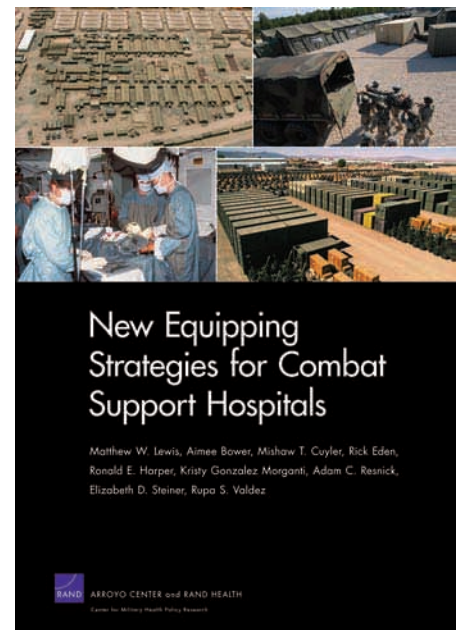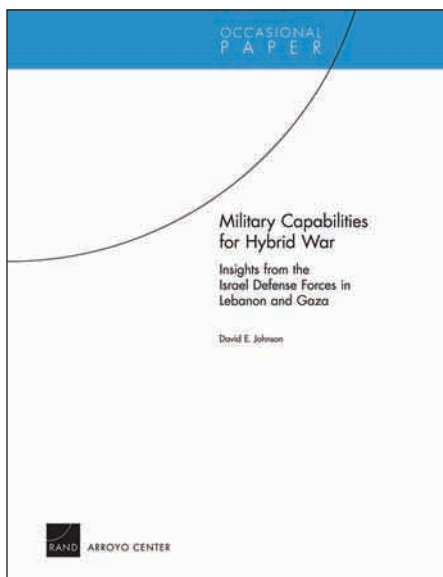
Military Capabilities for Hybrid War: Insights from the Israel Defense Forces in Lebanon and Gaza
David E. Johnson
OP-285-A • http://www.rand.org/pubs/occasional_papers/OP285.html

The Israel Defense Forces have gained much experience against hybrid opponents—Hezbollah and Hamas—in the recent conflicts in Lebanon and Gaza. The lessons from these Israeli experiences are relevant to understanding the capabilities that the U.S. Army and the joint force will require in the future. Principal findings include the following. The basics of combined arms fire and maneuver are necessary for successful operations against sophisticated hybrid opponents who, like Hezbollah and Hamas, have a modicum of training, organization, and advanced weapons, particularly if they are operating "among the people." Additionally, precision, standoff fires are critical, but not sufficient, to cope with sophisticated hybrid opponents. Furthermore, responsive and adequate air, artillery, and unmanned aerial system support are critical components of the combined arms fight against hybrid opponents. Finally, heavy forces—based on tanks and infantry fighting vehicles—are key elements of any force that will fight sophisticated irregular opponents, because they reduce operational risk and minimize friendly casualties.

Observations on Recent Trends in Armored Forces
David E. Johnson, John Gordon IV
OP-287-A • http://www.rand.org/pubs/occasional_papers/OP287.html

For an ongoing project entitled "An Army for Full Spectrum Operations: Lessons from Irregular Wars," RAND Arroyo Center researchers assessed recent "irregular" conflicts and their implications for U.S. Army force mix and capabilities, as well as for the elements that support or operate with ground forces. This paper provides initial research observations on how various militaries view the role of heavy forces (tanks and other armored vehicles) in irregular warfare (IW) and hybrid warfare environments. The views of the U.S. Marine Corps, the British Army, the Canadian Army, the Danish Army, and the Israeli Army are discussed. What emerges from the research to date is that each of these forces believes that there is a role in IW and hybrid warfare for heavy forces, including tanks, because they reduce operational risk, minimize friendly casualties, and provide an intimidation factor against adversaries.
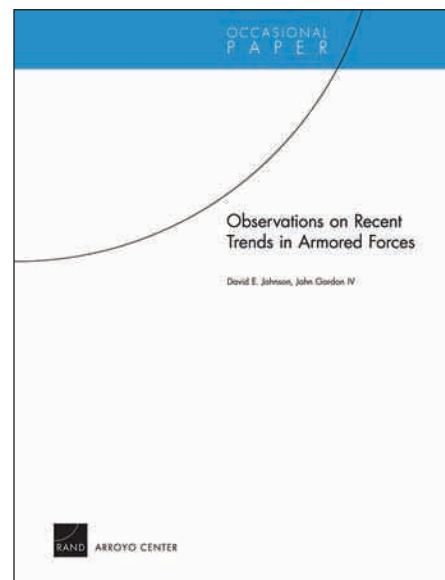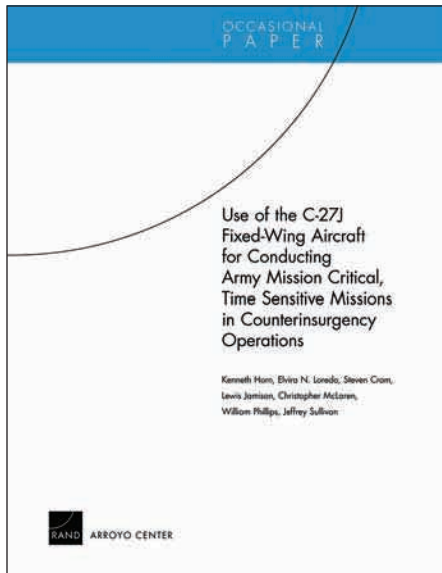
Use of the C-27J Fixed-Wing Aircraft for Conducting Army Mission Critical, Time Sensitive Missions in Counterinsurgency Operations

Kenneth Horn, Elvira N. Loredo, Steven Cram, Lewis Jamison, Christopher F. McLaren, William Phillips, Jeffrey Sullivan

OP-254-A • http://www.rand.org/pubs/occasional_papers/OP254/

The Army believes that it needs a replacement for the C-23 Sherpa aircraft that provides transport of mission critical, time sensitive (MCTS) cargo and passengers to brigade combat teams conducting combat operations. This issue is particularly relevant in counterinsurgency operations in Iraq and Afghanistan where ground forces are widely dispersed across long resupply distances. This occasional paper concludes that the C-27J Spartan is a reasonable replacement for the MCTS cargo and passenger mission in all performance categories. The Army's direct support approach for moving MCTS shipments using its organic aircraft is inherently more responsive than that of the Air Force, but both services should be able to improve the responsiveness of delivering MCTS shipments. However, the Army should be in a better position to do so if it retains direct control of its fixed-wing and rotary-wing aircraft.

Security Cooperation Organizations in the Country Team: Options for Success

Terrence Kelly, Jefferson P. Marquis, Cathryn Quantic Thurston, Jennifer D. P. Moroney, Charlotte Lynch

TR-734-A • http://www.rand.org/pubs/technical_reports/TR734.html

Security assistance and security cooperation are interrelated missions that rely on military staffs in U.S. embassies in partner countries. In countries threatened by insecurity or instability, actions may be required that are not easily accomplished under current systems. This report examines three options for improving current approaches to security assistance and cooperation. They range from changes in current practices to options requiring new policies, procedures, organizations, or authorities.
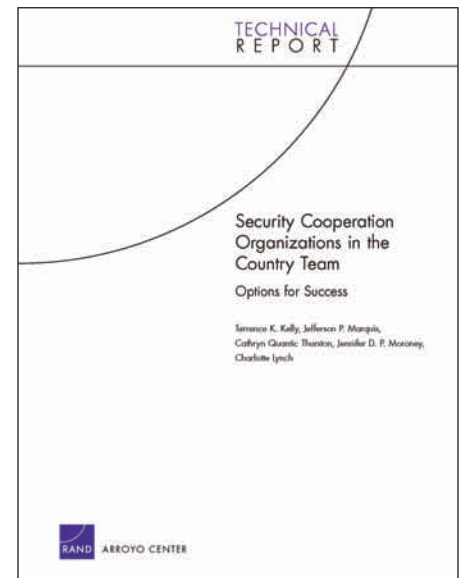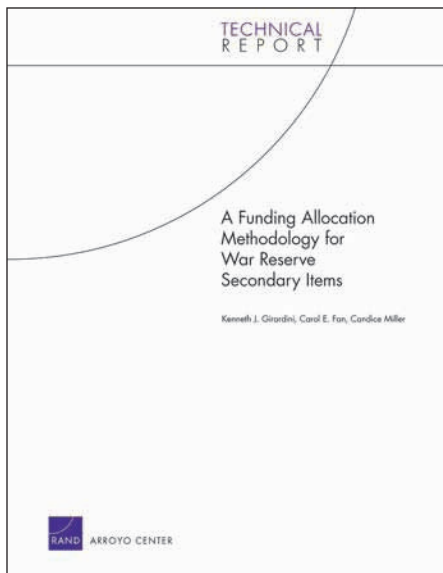
A Funding Allocation Methodology for War Reserve Secondary Items

Kenneth J. Girardini, Carol E. Fan, Candice Miller

TR-793-A • http://www.rand.org/pubs/technical_reports/TR793.html

Army units must be ready to deploy rapidly in the event of a contingency. Army Prepositioned Stock (APS) is designed to relieve the initial strain on the supply chain by reducing early airlift requirements and by meeting contingency demands until the production base can respond. The sustainment stock portion of APS is called war reserve secondary items (WRSI). Historically, WRSI requirements have been under-resourced, yet no methodology has existed by which to prioritize WRSI requirements. As part of an ongoing process for determining WRSI around the world, the Army asked RAND to use empirical demand data for a quick-turn analysis to prioritize item-level spending on WRSI for a northeast Asia (NEA) contingency with a planning-based deployment schedule. This document describes the methodology used to develop the resource allocation and forward positioning recommendations for the use of $467 million for WRSI. The authors describe how the input data was developed; explain the resource allocation methodology, focusing on the computation of benefit functions using the demand forecasts, item characteristics, and estimates of an item's readiness contribution; and describe two solutions for prioritization. One of these solutions was the basis for FY 2008 spending on WRSI for a NEA scenario.

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The Hizara Province
Oil painting by SFC Elzie Golden
2003
Image used courtesy of the Army Art Collection, U.S. Army Center of Military History.

Photo credits:
Diane Baldwin, Paula Dworek, and Carol Earnest

As the Army's federally funded research and development center for studies and analyses, RAND Arroyo Center is charged with helping the leadership to identify the most critical challenges confronting the Army and with providing high-quality, objective research and analysis to support sound decisionmaking. This annual report describes Arroyo's research activities in FY 2010. It provides a detailed overview of the FY 2010 research agenda, features summaries of noteworthy projects chosen to illustrate the agenda's breadth, profiles selected researchers, and presents the results of quick-response studies conducted to help the Army leadership respond to pressing near-term problems. The full range of research products and services that Arroyo provided to the Army is covered, including peer-reviewed publications and the analytic training of officers in the Army Fellows Program.