This product is part of the RAND Corporation corporate publication series. Corporate publications describe or promote RAND divisions and programs, summarize research results, or announce upcoming events.
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.
Dear Soldiers and Leaders,

RAND Arroyo Center is the Army’s federally funded research and development center for studies and analyses. Our mission, defined in Army Regulation 5-21, is to help Army leaders make decisions that are informed by independent, objective, high-quality analysis.

As defense budgets decline, Army leaders need these analyses to support difficult investment and cost-cutting decisions. Recent Arroyo studies have recommended ways to increase efficiency, avoid costs, and achieve savings across a broad range of Army activities. One example of such studies determined when it is cost-effective for the Army to invest in refurbishing its most critical and expensive equipment.

Arroyo studies also help the Army describe to OSD and Congress the full range of its value to the nation. Such communications become credible and compelling when backed by analysis from an independent source. This is particularly true when Arroyo’s findings overturn conventional wisdom about the demand for the Army’s capabilities. For instance, our analysis of the potential roles of ground forces in countering the proliferation of weapons of mass destruction, mentioned on page 4, is helping the Army establish the size and capabilities of ground forces needed for this critical mission. Similarly, Arroyo analyses of Army roles in the Asia-Pacific (page 5) and in countering anti-access and area denial threats (page 8) are informing future plans in these important topical areas.

This Annual Report provides a brief introduction to RAND Arroyo Center, focusing on the research and analyses conducted for the Army in FY12. I hope that you find it informative and useful. Please contact me if you want to discuss any of these items with us, or if you would like to explore new areas in which Arroyo and the Army can work together to find future solutions and successes.

With best regards,

Tim Bonds
703.413.1100, x5213
bonds@rand.org
**Mission**

RAND Arroyo Center is the United States Army’s federally funded research and development center (FFRDC) for studies and analysis. 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. 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.

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.

Arroyo provides Army leadership with research products and services in four major categories (see table at right).

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**Bruce Held is the Deputy Director of RAND Arroyo Center, and Marcy Agmon is the Operations Director.**
## Arroyo Research Products and Services

### Studies and Analyses
- Research programs on enduring challenges
- Quick-response studies to address emerging issues

### Research Capital
- Monthly research highlights
- Publications and summaries
- Web site

### Training and Education
- Army Fellows Program
- Temporary assignments

### Subject Matter Experts
- Tailored briefings and seminars
- Embedded analysts

### Oversight and Management
The Army’s oversight and management of RAND Arroyo Center are stipulated by Army Regulation 5-21. The regulation establishes a governing board of Army leaders known as the Arroyo Center Policy Committee (ACPC), co-chaired by the Vice Chief of Staff of the Army and the Assistant Secretary of the Army (Acquisition, Logistics and Technology). See list at right. The ACPC provides overall guidance, reviews the annual research plan, and approves individual projects.

At RAND, Arroyo is managed within the Army Research Division. Arroyo organizes its work for the Army into five research programs:
- Strategy, Doctrine, and Resources
- Manpower and Training
- Force Development and Technology
- Military Logistics
- Army Health.

These programs are described in the following pages.

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### The Honorable Dr. Joseph W. Westphal, Under Secretary of the Army, chaired the April 3, 2012, and September 19, 2012, meetings of the ACPC.

- **Honorable Heidi Shyu (Co-chair)**
  Assistant Secretary of the Army (Acquisition, Logistics and Technology) and Army Acquisition Executive

- **General Lloyd J. Austin, III (Co-chair)**
  Vice Chief of Staff, U.S. Army

- **Honorable Thomas Lamont**
  Assistant Secretary of the Army (Manpower and Reserve Affairs)

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

- **General Robert W. Cone**
  Commanding General, U.S. Army Training and Doctrine Command

- **General David Rodriguez**
  Commanding General, U.S. Army Forces Command

- **General Dennis L. Via**
  Commanding General, U.S. Army Materiel Command

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

- **Lieutenant General James O. Barclay**
  Deputy Chief of Staff, G-8, U.S. Army

- **Lieutenant General Howard B. Bromberg**
  Deputy Chief of Staff, G-1, U.S. Army

- **Lieutenant General John F. Campbell**
  Deputy Chief of Staff, G-3/5/7, U.S. Army

- **Lieutenant General Charles Cleveland**
  Commanding General, U.S. Army Special Operations Command

- **Lieutenant General Michael Ferriter**
  Assistant Chief of Staff for Installation Management/Commanding General, Installation Management Command, U.S. Army

- **Lieutenant General Patricia Horoho**
  Commanding General, U.S. Army Medical Command/The Surgeon General

- **Lieutenant General Susan S. Lawrence**
  Chief Information Officer/G-6, U.S. Army

- **Lieutenant General Mary Legere**
  Deputy Chief of Staff, G-2, U.S. Army

- **Lieutenant General Raymond V. Mason**
  Deputy Chief of Staff, G-4, U.S. Army

- **Lieutenant General Jeffrey W. Talley**
  Chief, Army Reserve, and Commanding General, U.S. Army Reserve Command

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**Lead Agent for RAND Arroyo Center**

**Major General Thomas W. Spoehr**

Director, Program Analysis and Evaluation

Membership effective December 2012.
**Strategy, Doctrine, and Resources Program**

“*The Strategy, Doctrine, and Resources Program is available to help Army leaders think through their major challenges as the strategic context changes, as they adopt and implement doctrinal innovations, and as resources become more limited.*”

Dr. Terrence Kelly, Director, Strategy, Doctrine, and Resources Program

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**Mission and Research Streams**

The Strategy, Doctrine, and Resources Program helps the Army identify the demands of and adjust to major changes in the nation’s strategic context, develop and implement the doctrinal innovations required to accomplish its mission in any context, and maximize the use of its resources.

Within six research streams (below), the program provides expertise and analysis developed over many years of focused and sustained research, as well as short-term, quick-response support on critical issues.

The program’s FY12 research agenda is displayed below, with projects arranged by research stream.

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**Sponsors of Strategy, Doctrine, and Resources Research**

Each study in the Strategy, Doctrine, and Resources Program is sponsored by one or more senior Army leaders (joint studies are often done). Before accepting funding for any new study, we work closely with sponsor and staff to ensure that the project focuses on a major policy concern and that its tasks are carefully scoped to allow objective, analytic research in a timely manner.

The Deputy Chief of Staff, G-3/5/7, U.S. Army, Deputy Chief of Staff, G-8, U.S. Army, U.S. Army Training and Doctrine Command, and U.S. Army Special Operations Command are the most frequent sponsors of studies in the Strategy, Doctrine, and Resources Program. However, we support a variety of other senior Army leaders.

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**Strategy, Doctrine, and Resources Program, Selected Studies FY12**

<table>
<thead>
<tr>
<th>Assessing Operating Environments and Their Implications for the Army</th>
<th>Analyzing How Operating and Generating Forces Meet Requirements</th>
<th>Analyzing AC/RC Institutional Issues</th>
<th>Improving Risk Analysis and Resource Management</th>
<th>Supporting Army Wargames and Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The Army in Asia</td>
<td>• Support to the Secretary of the Army’s Institutional Army Transformation Commission</td>
<td>• Army Aviation Structure Across Army Components</td>
<td>• Enhancing Strategic Management of the Army Force Management Process</td>
<td>• Support to Unified Quest 2012</td>
</tr>
<tr>
<td>• Future Joint Operational Concepts</td>
<td>• Assessing the Army Generating Force</td>
<td></td>
<td>• Improving the Army Hire-to-Retire and Deploy-to-Redeploy Processes</td>
<td>• Support to the Army War College for the Joint Integrated Contingency Model</td>
</tr>
<tr>
<td>• The Army’s Role in Prevent, Shape, Win</td>
<td>• Assessing the Impact of Crime on the Army</td>
<td></td>
<td>• ARFORGEN Costing Methodology Review</td>
<td>• Joint Integrated Contingency Model Enhancements</td>
</tr>
<tr>
<td>• Force Requirements for WMD-E in N. Korea</td>
<td></td>
<td></td>
<td></td>
<td>Supporting Center for Army Analysis</td>
</tr>
<tr>
<td>• Understanding the IW Environment</td>
<td></td>
<td></td>
<td></td>
<td>• Functionality Test of AMSAA’s Impact of Irregular Warfare Demand Signals on Force Generation Study Model</td>
</tr>
<tr>
<td>• Assessing Security Cooperation</td>
<td></td>
<td></td>
<td></td>
<td>• Direct Support to Pilot Army Security Cooperation Planners Course</td>
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<tr>
<td>• Afghanistan Pre-Deployment Training</td>
<td></td>
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<td>• Developing Partner Capabilities</td>
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<tr>
<td>• BOG:Dwell Time for Army Forces</td>
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<td>• Support to Unified Quest 2012</td>
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</table>

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Analysis for TRADOC looked at the Army’s role in the “prevent, shape, win” strategy. The study assessed the range of challenges that combatant commanders might face in the 2017–2022 time frame and the capabilities that might be needed in response. Results were integrated to assess how well various force structures would respond to various sets of challenges and uncertain conditions.

A study for the Army Deputy Chief of Staff, G-8, identified lessons that the U.S. joint force could learn from the Israeli military’s experience fighting Hezbollah in southern Lebanon in 2006 and from its experience fighting in Gaza in 2008–2009. The study found that joint combined-arms fire and maneuver are key to fighting sophisticated hybrid opponents—who can have fairly effective weapons provided by state sponsors—and that armored forces reduce operational risk and minimize friendly casualties. Precision standoff fires and responsive air and intelligence, surveillance, and reconnaissance (ISR) support are also important capabilities.

Another study sponsored by the Army G-8 examined the effectiveness of security cooperation. This study looked to determine if there is a statistical correlation between security cooperation investments of certain types and improved stability of partner nations. It also considered important characteristics, such as more democratic forms of governance, the maturity of government institutions in these nations, and government reach. Additional analysis in FY 2013 for the Deputy Chief of Staff, G-3/5/7 expands this effort to consider other security cooperation effects and considerations.

The program began work on the Army’s role in Asia. An initial paper explored different plausible sources of conflict—the collapse of North Korea, possible dwindling relations between Taiwan and China, or other contingencies involving Japan or India. The authors discussed the operational implications each might present the United States and then turned to the requirements for defense and deterrence. Future conflicts could escalate geographically or into the cyber and economic realms.

Continuing this effort, a second Arroyo study looked at U.S. and Chinese interests and likely strategies globally, posited three potential future scenarios, and examined the military and Army’s role in achieving U.S. national goals given these future scenarios. Among the roles considered for the Army are developing military to military relationships with China and providing security cooperation to regional partners, as well as the capabilities it would need in case of conflict in the Western Pacific. A follow-on study that began in 2013 will examine the U.S. Army’s role in Asia in greater detail, with an eye on specific implications for the institutional Army.

Joint combined-arms fire and maneuver are key to fighting sophisticated hybrid opponents.
Mission and Research Streams

The Manpower and Training Program focuses on policies that help the U.S. Army attract and retain the right people and train and manage them in a way that maximizes their capabilities. This includes active-duty personnel, members of the Army Reserve and Army National Guard, civilians, and contractors.

The program sustains research streams in five policy domains (below). Within these streams, the program provides expertise and analysis developed over many years of focused and sustained research, as well as short-term, quick-response support on critical issues.

The program’s FY12 research agenda is displayed below, with projects arranged by research stream.

Sponsors of Manpower and Training Research

Each study in the Manpower and Training Program is sponsored by a senior Army leader; a study may be jointly sponsored by two or more leaders. Before accepting funding for any new study, we work closely with sponsor and staff to ensure that the project focuses on a major policy concern and that its tasks are carefully scoped to allow objective, analytic research in a timely manner.

The Deputy Chief of Staff, G-1, U.S. Army, the Assistant Secretary of the Army for Manpower and Reserve Affairs, and the U.S. Army Training and Doctrine Command are the most frequent sponsors of studies in the Manpower and Training Program. However, we support a variety of senior Army leaders, and we provide objective research and analysis for Army leadership with pressing issues in our research streams.

Manpower and Training Program Studies FY12

<table>
<thead>
<tr>
<th>Total Force Management</th>
<th>Recruiting and Retention</th>
<th>Training and Readiness</th>
<th>Education and Leader Development</th>
<th>Soldier and Family Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Holistic Process for Increasing Deployability</td>
<td>• Improving the Army’s Recruitment and Hiring/Accessioning of Medical, Dental, and Behavioral Health Professionals</td>
<td>• Knowledge and Lessons Learned Transfer Process</td>
<td>• Enhancing Distributed Learning for Leader Education Through Blended-Learning Methods and Technologies</td>
<td>• Institutionalizing the Tactical Human Optimization, Rapid Rehabilitation and Reconditioning (THOR3) Program</td>
</tr>
<tr>
<td>• Strategically Shaping the Army’s Civilian Workforce</td>
<td>• Army Medical Corps Recruiting Incentive Analysis</td>
<td>• Monitoring Skill Trends</td>
<td>• Using Metrics to Improve Installation Soldier and Family Support Programs and Services</td>
<td></td>
</tr>
<tr>
<td>• Enhancing Diversity of the Army’s Future Leadership</td>
<td>• Pinnacle Implications for Recruiting Force Composition</td>
<td>• Strategic-Level Support to SOF Training Exercises at JRTC</td>
<td></td>
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</tr>
<tr>
<td>• Expansibility and Modularity of the U.S. Army</td>
<td></td>
<td>• Adapting Live Training Strategies to Better Support Full-Spectrum Operations and Persistent Conflict and to Leverage Advancing Technologies</td>
<td></td>
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</tr>
<tr>
<td>• Meeting Human Capital Needs of the Army’s Military Intelligence and Civil Affairs Workforces</td>
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</tbody>
</table>
Analysis for the Assistant Secretary of the Army for Manpower and Reserve Affairs supported decisions about the design of the Generating Force (GF). The study used a model that links GF workloads to demands from the Operational Army. The model assesses potential changes in the demand for GF activities, highlighting differences by organization, career program or occupation, and pay grade.

A study sponsored by the U.S. Army Training and Doctrine Command supported the Army’s efforts to improve the distributed delivery of Intermediate Level Education (ILE). It examined outcomes associated with delivering the Army’s Advanced Operations Course (AOC) to students in a blended distributed learning format. The goal was to assess the AOC’s effectiveness, to identify best practices in computer-supported cooperative learning, and to identify options for improving the course. Recommendations focused on changes to course design and delivery and on a broader range of approaches and data sources to use in course evaluation.

Research and analysis for the U.S. Army Special Operations Command recommended options for improving the Tactical Human Optimization, Rapid Rehabilitation and Reconditioning (THOR3) program across DOTMLPF-P. Recommendations focused on potential changes to military, Department of the Army civilian, and contractor staffing.

U.S. Army Cadet Command received support in developing policies to increase commissions and their demographic and STEM (science, technology, engineering and mathematics) diversity. The analysis focused on factors related to ROTC completion rates, allocation of production missions and related resources across school types, and tactics, techniques, and procedures (TTPs).

A study for the U.S. Army Special Operations Command reviewed its Lessons Learned Program (LLP) and identified potential modifications to organizational structure, processes, and information transfer.

A comprehensive examination of the Army’s processes for managing its Training and Leader Development programs concluded that although current processes are not set up for major, integrated changes, these processes do need major change. Especially important is a more business-like approach to making resource allocation decisions that achieve the best possible overall readiness benefit. Out of this examination came specific directions for improving training and leader development processes, including upgrades of analytical and data collection processes and changes to its governance structures and processes.

Arroyo helped develop policies to increase ROTC commissions and their diversity.
Mission and Research Streams

The Force Development and Technology Program explores how technological advances and new operational concepts can improve the Army’s effectiveness in current and future conflicts. Its research agenda focuses on helping the Army maintain its technological edge against adaptable adversaries. This is accomplished by performing assessments of a technology’s feasibility, performance, cost, and risk.

Within four research streams (below), the program provides expertise and analysis developed over many years of focused and sustained research, as well as short-term, quick-response support on critical issues.

The program’s FY12 research agenda is displayed below, with projects arranged by research stream.

Sponsors of Force Development and Technology Research

Senior Army leaders sponsor each study, designed to help answer top Army policy questions. The Deputy Chief of Staff, G-3, the Assistant Secretary of the Army for Acquisition, Logistics, and Technology, and U.S. Army Training and Doctrine Command are the principal sponsors of work in this program. Other clients include the Chief Information Office, G-6, and Deputy Chief of Staff, G-8, among other key leaders in the Army. Our research streams address a broad mandate across the Army and help us to provide both quick-turn and longer-term support to Army decisions.

Force Development and Technology Program, Selected Studies FY12

<table>
<thead>
<tr>
<th>Understanding Past, Current, and Possible Future Army Operations in the 21st Century</th>
<th>Assessing Technology Development and Its Application to Army Operations</th>
<th>Understanding and Improving Army Cyber and Network Capabilities</th>
<th>Improving Army Acquisition and Modernization</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Determining How Capability Changes Improve Dismounted Operational Effectiveness</td>
<td>• Advanced Technology Sensors and Data Exploitation</td>
<td>• Developing and Integrating Intelligence Products into Cyber and Cyber-Related Operations</td>
<td>• Business Case Analysis of the Potential Transfer of the Patriot Ballistic Missile Defense (BMD) Materiel Development from the Army to MDA</td>
</tr>
<tr>
<td>• Army’s Role in Projecting Power in an Anti-Access/ Area-Denial Environment</td>
<td>• Assessing New Energy Technologies for Meeting the Future Army Installation Needs</td>
<td>• Understanding Signal Soldier Workload in Brigade Combat Team Network Operations (NETOPS)</td>
<td>• Portfolio Optimization of Army Renewable and Alternative Energy Investments</td>
</tr>
<tr>
<td>• Airborne Forces Support to DoD Strategic Priorities</td>
<td>• Assessment of the MQ-1C Unmanned Aircraft System’s Contributions to BCT Mission Accomplishment</td>
<td>• Adapting and Implementing the Afghanistan Combined Joint Operations Area Mission Network for Future Coalition Operations</td>
<td>• Analytic Support to the Ground Combat Vehicle Program</td>
</tr>
<tr>
<td>• Review of Army Processes for Accounting for, Documenting, and Reporting Readiness of Army Capabilities</td>
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<td>• PEO Realignment Review</td>
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<td>• Business Case Analysis for the Paladin/FAASV Integrated Management (PIM)</td>
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</tbody>
</table>
Analysis for the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA[ALT]) examined whether the Army should move the Patriot Ballistic Missile Defense Program from the Army to the Missile Defense Agency. The study analyzed the costs and value of such a move.

An ongoing series of studies for the U.S. Army Training and Doctrine Command (TRADOC) and ASA(ALT) defined major problems encountered by small units, i.e., a threat’s ability to surprise U.S. forces and its ability to flee after an encounter. The analysis showed the Army ways to address the capability gaps thus created. The study determined intelligence, surveillance, and reconnaissance solutions that will help dismounted soldiers improve their operational effectiveness and reduce negative outcomes.

A study for TRADOC and the Deputy Chief of Staff of the Army, G-3, explored possible future conflicts in which the enemy employs anti-access and area-denial strategies. The study produced a series of scenarios that the Army has used in wargames to help define requirements for the force. The study identified joint solutions that entail significant contributions from all services to counter A2AD strategies.

For the G-3, the program took a detailed look at how the Army should counter enemy use of unmanned aerial systems to shed light on gaps in the Army’s defense of key capabilities. The technological evolution of UAVs, and their proliferation among nations worldwide, make their use a particular risk for Army units on the ground in terms of both identification and retaliatory efforts. The study identified key communication and command and control limitations to counter UAS employment, and provided analytic support for a medium-range missile to fill a current gap in coverage.

In a study for the Army’s Chief Information Officer/G-6, an Arroyo research team described the genesis and evolution of the Afghanistan Mission Network and provided lessons for how the Army should develop the next coalition network. The successes of the AMN can be linked to having the right balance of interoperability and security among coalition members, the right concepts and principles governing the development, and out-of-theater testing to ensure viable technologies.

In a study for the ASA(ALT), Arroyo provided a business case analysis for competing the Army’s Paladin acquisition program. The study looked at historical cases of competition, identified current impediments to competition in the case of the Paladin program, and estimated the likelihood of whether competition would provide financial value to the Army.

Arroyo identified ways to help dismounted soldiers improve their operational effectiveness and reduce negative outcomes.
Military Logistics Program

"We understand the crucial role of logistics in generating combat power, and we are committed to supporting the Army's logistics professionals as they ensure the U.S. Army's warfighting dominance."
—Dr. Kenneth J. Girardini, Director, 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.

Within four research streams (below), the program provides expertise and analysis developed over many years of focused and sustained research, as well as short-term, quick-response support on critical issues.

The program’s FY12 research agenda is displayed below, with projects arranged by research stream.

Sponsors of Military Logistics Research

Each study in the Military Logistics Program is sponsored by a senior Army leader; a study may be jointly sponsored by two or more leaders. Before accepting funding for any new study, we work closely with sponsor and staff to ensure that the project focuses on a major policy concern and that its tasks are carefully scoped to allow objective, analytic research in a timely manner. The Deputy Chief of Staff, G-4, U.S. Army, the Assistant Secretary of the Army for Acquisition, Logistics, and Technology, and the U.S. Army Materiel Command are the most frequent sponsors of studies in the Military Logistics Program.

Military Logistics Program Studies FY12

<table>
<thead>
<tr>
<th>Supply Chain Management</th>
<th>Fleet Management and Modernization</th>
<th>Infrastructure Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improving Army End-to-End (E2E) Supply Chain Measurement and Performance Using Automatic Identification Technology (AIT)</td>
<td>• Analytic Support of Army Materiel Integration</td>
<td>• Developing a Framework for Effectively Leveraging Industry Investments for Installation Water Activities</td>
</tr>
<tr>
<td>• Developing Collaborative Tools for Managing Distribution Operations</td>
<td>• Logistics Efficiencies</td>
<td>• Analysis of Abrams Production Shutdown and Restart Costs</td>
</tr>
<tr>
<td>• Reducing the Causes of Serviceable Retrograde</td>
<td></td>
<td>• Enabling the Effective and Efficient Transition of Army Systems from CLS to Army Depots</td>
</tr>
<tr>
<td>• Using Turns and Other Metrics to Improve Army Inventory Efficiency</td>
<td></td>
<td>• Alternative Support Strategies for Tire Assembly Repair Locations in SWA and Army-Wide</td>
</tr>
<tr>
<td>• Identifying and Correcting Part Quality Problems</td>
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<tr>
<td>• Implementing Improved Parts Support for Newly Fielded Equipment</td>
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<tr>
<td>• Support for and Expanding the Capabilities of the Army’s Expert ASL Team</td>
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<tr>
<td>• Identifying Efficiencies in OCIE Inventory Management for Regional Warehouses</td>
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<tr>
<td>• Improving APS ASL and Sustainment Processes</td>
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<tr>
<td>• Improving Inventory Management of OCIE at Active Component CIFs</td>
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<tr>
<td>• Identifying Efficiencies in the Supply Chain for Training Ammunition</td>
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Logistics Force Development

• Retrograde Planning Factors Derived from Current Operations
A project undertaken for G-4 continued to seek improvements to the Army’s supply chain for organizational clothing and individual equipment (OCIE), extending work across CONUS and into Europe and the Pacific and computing Army-wide retention levels to identify any excess OCIE for disposal. An AMC-sponsored project extended the work to determine which OCIE items should be sent to regional repair centers.

A G-4 sponsored project has continuously improved algorithms used by the Army to set inventory and retention levels throughout Iraq and Afghanistan to improve readiness and hold down costs, allowing the Army to reduce retrograde by significantly attriting on-hand inventory during the drawdown of forces in Iraq.

AMC sponsored a joint project between RAND and Army Materiel Systems Analysis Activity (AMSAA) that developed metrics on inventory turns, identified dormant stocks and prioritized them by storage costs, and identified inventory that was not assessable to customers due to out-of-date ownership or usage codes.

Projects sponsored by G-4 transferred to the Army statistical process control algorithms that detect deterioration in performance or costs of distribution over time and alert managers. A second project, co-sponsored by ASA(ALT), leveraged data from automated information systems to detect problems in the distribution system in a more timely fashion.

An AMC-sponsored project leveraged existing demand data readily available from Army supply systems to detect and prioritize potential part quality problems.

A quick-turnaround study sponsored by PEO Ground Combat Systems estimated Abrams tank production shutdown and restart costs.

A G-4 sponsored project led to changes in inventory algorithms and information system changes that significantly reduced the number of serviceable retrograde transactions.

Arroyo developed algorithms that detect deterioration in distribution costs or performance and then alert managers.
Mission and Research Streams

The Army Health Program, in line with the Army Medicine mission, conducts research and analysis to inform the Army’s effort to improve readiness, save lives, and advance wellness for Army service members and families.

The program sustains research streams in four policy domains (below). Within these streams, the program employs military-specific expertise and analysis developed through the rich history of RAND Arroyo Center and also draws from the expertise of the renowned researchers within RAND Health.

The program’s FY12 research agenda is illustrated below.

Sponsors of Army Health Research

The Army Surgeon General and the Army Medical Command are consistent sponsors of Army Health Program research. However, many of the policy issues addressed in projects have broader implications for force readiness and the Total Army. As a result, co-sponsors of the research also include other Army leadership, such as the Deputy Chief of Staff, G-1, and the Assistant Secretary of the Army for Manpower and Reserve Affairs.

Army Health Program Studies FY12

<table>
<thead>
<tr>
<th>Soldier and Family Health and Wellness</th>
<th>Access, Quality, and Effectiveness of Care</th>
<th>Cost, Value, and Efficiency</th>
<th>Management and Employment of Medical Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Boots on the Ground and Dwell Time for Army Forces: Implications on Unit Effectiveness, Training, and Soldier Well-Being</td>
<td>• Enhancing the Effectiveness of the U.S. Army’s Participation in Medical Diplomacy: Implications from a Case in Trinidad</td>
<td>• Healthcare and Transition for Wounded, Injured, and Ill Soldiers</td>
<td>• The Future of the Army Medical Department’s Professional Filler System (PROFIS)</td>
</tr>
<tr>
<td>• Deployment Life Study: Defining and Measuring Family Readiness</td>
<td>• New Capabilities for Assessing Injuries Caused by Under-Body Blast (UBB)</td>
<td>• Assessing Value and Efficiency in the Military Health System</td>
<td></td>
</tr>
<tr>
<td>• Soldier Life Study: A Longitudinal Investigation of the Deployment Experience</td>
<td></td>
<td>• Policy Issues for Health Information Technology (HIT) and Health Informatics</td>
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Arroyo undertook a description and assessment of the functionality of the Army Medical Department’s Professional Filler System (PROFIS) in the current operating environment. This study described the effect of PROFIS, and deployments more broadly, on providers and other military personnel.

A study co-sponsored by the Surgeon General and G-1 empirically quantified the time that wounded, ill, and injured soldiers spent in Integrated Disability Evaluation System and Warrior Transition Units as they recovered and returned to duty or transitioned to civilian life. The study also suggested ways in which these processes and experiences could be improved for soldiers and staff managing their care.

In a project sponsored by the Surgeon General, our researchers identified and evaluated the Army Medical Department’s (AMEDD) current performance metrics. The analysis included the questions of whether existing metrics need to be changed to align with industry best practices and to improve the value of the Defense Health Program (DHP) investment. This research provided recommendations for how the Army’s performance measures could better reflect their own stated values and needs.

An ongoing study sponsored by the Surgeon General is examining family readiness and the effect of deployment on families. This longitudinal analysis follows Army families over the course of the deployment cycle (pre-, during, and post-), focusing on outcomes related to the emotional and physical health of each family member, family relationship quality and longevity, financial well-being, role performance, and school performance and social development in children.

Another ongoing study is investigating the psychological health and wellness of unmarried soldiers. This longitudinal effort, sponsored by the Surgeon General and G-8, will follow soldiers for approximately three years over the course of the deployment cycle, concentrating on emotional and psychological health, financial well-being, role performance, and social relationships.

For the U.S. Army Medical Research and Materiel Command, Telemedicine and Advanced Technology Research Center (TATRC), the program is reviewing key research and policy issues involving patient privacy, patient consent, and patient identity management, as relevant to health information exchange (HIE) in the Department of Defense (DoD). This study uses a multi-method approach consisting of a review of policy regarding privacy, patient consent, and patient identity management; a literature review on these topics as relevant to the Military Health System (MHS); and semi-structured telephone interviews with subject matter experts.

Arroyo is studying the emotional and physical health of deploying soldiers and their family members.
Among the research products and services that RAND Arroyo Center provides to the Army is the education of Army officers as analysts and informed consumers of research. 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 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.

Each year the Army selects a number of majors and lieutenant colonels to work at Arroyo as visiting analysts in the Army Fellows Program. (For more information, including eligibility requirements and application instructions, see http://www.rand.org/ard/fellows.html.) 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.

To date, 185 officers have participated in the program. Ten officers participated in the program in the 2012–2013 cohort.
Selected 2012 Publications

**Army Network-Enabled Operations**
*Expectations, Performance, and Opportunities for Future Improvements*
MG-788-A
www.rand.org/t/MG788

**Best Practices in Supplier Relationship Management and Their Early Implementation in the Air Force Materiel Command**
TR-904-A
www.rand.org/t/TR904

**Conflict with China**
*Prospects, Consequences, and Strategies for Deterrence*
OP-344-A
www.rand.org/t/OP344

**Employer Partnership Program Analysis of Alternatives**
TR-1005-A
www.rand.org/t/TR1005

**Funding Ammunition Ports**
TR-1204-A
www.rand.org/t/TR1204

**A Gap Analysis of Life Cycle Management Commands and Best Purchasing and Supply Management Organizations**
DB-615-A
www.rand.org/t/DB615

**Improving Army Basic Research**
*Report of an Expert Panel on the Future of Army Laboratories*
MG-1176-A
www.rand.org/t/MG1176

**Lessons from the Army’s Future Combat Systems Program**
MG-1206-A
www.rand.org/t/MG1206

**Lightening Body Armor**
*Arroyo Support to the Army Response to Section 125 of the National Defense Authorization Act for Fiscal Year 2011*
TR-1136-A
www.rand.org/t/TR1136

**Making Improvements to The Army Distributed Learning Program**
MG-1016-A
www.rand.org/t/MG1016

**National Guard Special Forces**
*Enhancing the Contributions of Reserve Component Army Special Operations Forces*
TR-1199-A
www.rand.org/t/TR1199

**Supplier Relationship Management at Army Life Cycle Management Commands**
*Gap Analysis of Best Practices*
DB-608-A
www.rand.org/t/DB608

**Toward Affordable Systems III**
*Portfolio Management for Army Engineering and Manufacturing Development Programs*
MG-1187-A
www.rand.org/t/MG1187

**The Uses and Limits of Small-Scale Military Interventions**
MG-1226-RC
www.rand.org/t/MG1226
The problem should be well formulated, and the purpose of the study should be clear.

- The study approach should be well designed and executed.

- The study should demonstrate understanding of related studies.

- The data and information should be the best available.

- Assumptions should be explicit and justified.

- The findings should advance knowledge and bear on important policy issues.

- The implications and recommendations should be logical, warranted by the findings, and explained thoroughly, with appropriate caveats.

- The documentation should be accurate, understandable, clearly structured, and temperate in tone.

- The study should be compelling, useful, and relevant to stakeholders and decisionmakers.

- The study should be objective, independent, and balanced.

For more information, see www.rand.org/standards
RAND Arroyo Center is the Army’s federally funded research and development center for studies and analyses. Its mission is to help Army leaders make decisions that are informed by objective, high-quality analysis.

This annual report describes Arroyo’s research activities in FY12. It profiles Arroyo’s five programs—Strategy, Doctrine, and Resources; Force Development and Technology; Manpower and Training; Military Logistics; and Army Health—describing the research streams, clients, and projects of each and highlighting its major impacts.