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Annual Report
2010–2011



RAND

NATIONAL SECURITY RESEARCH DIVISION

Annual Report
2010–2011



NATIONAL SECURITY RESEARCH DIVISION

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Director's Message



Eric Peltz, Associate Director;
Jack Riley, Director; Nancy
Pollock, Director, Operations
and Planning, NSRD

Top national security policymakers are placing a priority on ways to save money and promote efficiencies.

We are entering a climate in which austerity is likely to be the watchword for federal budgets. Both major political parties recognize that the deficits the government is running are unsustainable and that something must be done to narrow the gap between spending and revenues. Most likely, that means spending cuts, and spending cuts can hardly ignore the Department of Defense (DoD), which accounts for about half of the discretionary portion of the federal budget.

The resulting challenges to resourcing for defense will be formidable. What are the potential sources for spending reductions in DoD? There are only a few: the acquisition budget, in which *increases* are desirable to field the systems needed to counter new threats; the personnel budget, in which numbers of servicemembers can be reduced only modestly and decreases in compensation per capita are probably off the table; the operations and maintenance budget, which is not a good source for reductions given the ongoing U.S. involvement in Afghanistan and the increased outlays on care for the wounded and for military families; and the research, development, testing, and evaluation budget, the smallest of the four and the source of the United States' qualitative advantage in arms.

It will be very difficult to make choices in allocating cuts, or even slowdowns in budgetary growth, across these categories. This is particularly true in light of U.S. commitments to sustaining the balance of power in East Asia, ensuring outcomes that are favorable to U.S. security in Afghanistan and Iraq, and fulfilling treaty obligations elsewhere, notably to an expanded NATO membership, to say nothing of meeting continued terrorist and other subnational threats. And those are only the expected areas of involvement. As recent events in North Africa demonstrate, the demand for U.S. military action is not restricted to the scenarios usually planned for.

These considerations make it easy to understand the priority that top U.S. national security policymakers are placing on ways to save money and promote efficiencies. The RAND National Security Research Division (NSRD) is engaged in numerous efforts to find savings and efficiencies and to help with hard choices where they need to be made. NSRD supports decisionmakers in DoD through the National Defense Research Institute (NDRI), a federally funded research and development

center (FFRDC). Outside the FFRDC, NSRD works with the Intelligence Community and other non-DoD sponsors concerned with security issues, including foundations and allied governments acting out of similar concerns.

Whether it is searching for the root causes of problems in major acquisition programs or identifying ways to revise health benefits to reflect budgetary realities, finding the most cost-effective ways to get high-quality people into the services and keep them there or mapping out effective approaches to investing research and development dollars, NSRD is helping DoD address the key challenges of a resource-constrained era.

While savings and efficiency have attained particular salience within DoD, it has not been to the exclusion of other serious concerns—including effectiveness in achieving missions, accuracy in profiling threats, and organizational performance. NSRD has, among many other activities, participated in conceiving and implementing village stability operations in Afghanistan, helped clarify the dynamics of power in East Asia, and aided in devising ways to organize, conduct, and convey the results of intelligence collection and analysis.

In this report, we present some of NSRD's research findings and activities over the 12 months from the spring of 2010 through the winter of 2011. These highlights are grouped according to NSRD's six constituent research centers and prefaced by an overview conveying the organization of NSRD's research activities and the benefits of the RAND environment.

First, though, I want to briefly cite some of the key contributions of the past year—projects that have helped the government save money, or that have shown how it could be well spent. I hope they give a sense of our research agenda's breadth and its balance between addressing the issues that are among the most salient now and looking at those that may soon be so. They fall into several categories, as follows.¹

Improving strategies and tactics for counterinsurgency and counterterrorism campaigns.

- Analyzed historical insurgencies, empirically testing (and, as it turned out, validating) the Army's *Counterinsurgency* field manual and the need for a comprehensive approach (page 16).
- Conducted historical and field research on local defense forces, leading to the establishment of village stability operations in Afghanistan (pages 13 and 55).
- Identified weaknesses in information operations in Afghanistan and recommended improvements that have been implemented.
- Drew lessons for deradicalizing Islamist extremists from analogous experiences around the world (page 22).

Providing direct analytic support to ongoing operations.

- Assessed the Afghan National Security Forces, leading to changes in those forces and their training.
- Provided on-site senior analysts and rotating deployed staff support to the commanders of the International Security Assistance Force in Afghanistan and U.S. Forces–Iraq (pages 13 and 55).

Maximizing the value of programs and investments.

- To assist with reporting to Congress, conducted rapid assessments of root causes of problems in major defense acquisition programs.
- Analyzed tests of the new Joint Tactical Radio System, showing that contractor claims of successful scalability were unsubstantiated.
- Identified an option for destruction of U.S. chemical weapons that could dramatically reduce costs and help meet the target date for completion (page 25).
- Identified flaws in the Small Business Administration's size thresholds for defining small defense-sector businesses (the thresholds have been hindering DoD's achievement of congressional small-business participation targets).

NSRD is helping DoD address key challenges of a resource-constrained era.

Ensuring that the design of forces and institutional arrangements meet contemporary needs.

- Evaluated the U.S. Army's transition to a modular force in response to a Senate Armed Services Committee request for input into its resourcing decisions.
- Assisted the Advisory Panel on DoD Capabilities for Support of Civilian Authorities After Certain Incidents (page 63).
- Showed that reserve-component units were less stable than had been assumed, affecting deployment train-up (page 45).
- Recommended changes in the organization of U.S. Marine Corps intelligence capabilities (page 52).
- Outlined a list of steps that the Haitian government could take to build a more resilient state following the January 2010 earthquake (page 19).

Efficiently providing a high-quality workforce.

- Found that recent larger investments in bonuses helped cost-effectively attract and retain the personnel needed to prosecute the wars in Iraq and Afghanistan (page 38).
- Showed that although authorizations for captains in the Army reserve components were filled at low rates, they were increasing such that they would reach 100 percent before officers from a proposed National Guard academy would reach that grade, thus saving the expense of establishing such an institution (page 39).

Ensuring and managing a diverse workforce.

- Made extensive analytic contributions to the DoD study assessing the impact of repealing "Don't Ask, Don't Tell" (page 42).
- Provided the research director for the Military Leadership Diversity Commission and helped draft the commission's report.

Improving the well-being of servicemembers and their families.

- Identified gaps between DoD suicide-prevention activities and comprehensive practices (page 48).
- Identified paths to improved military family resilience.

It has become clear over RAND's long history of service to DoD and other national security-related sponsors that these decisionmakers consistently value RAND's analytic support. Whether defense budgets are increasing in real terms or decreasing (but especially when they are decreasing), NSRD can help in identifying and evaluating choices that must be made under resource constraints. RAND's cardinal values of independence and objectivity, its insistence on quality, and its reputation for protection of sensitive data are always timely. We expect the coming years to yield as strong a record of accomplishment as has been the case in the past 12 months.



Jack Riley
Vice President, RAND Corporation
Director, National Security Research Division
Director, National Defense Research Institute

¹ Some important contributions were made through projects whose findings were not publicly released and cannot be discussed here.

Overview

The RAND National Security Research Division (NSRD) conducts research on complex national security problems with an emphasis on the most pressing and difficult strategy and policy concerns of high-level policymakers and their staffs. NSRD provides independent and objective analytical support to decisionmakers in the U.S. Department of Defense (DoD) and elsewhere in the wider national security and intelligence communities, both in the United States and abroad, by

- developing innovative solutions to complex problems using multidisciplinary teams of researchers
- providing practical guidance and clear policy choices while also addressing barriers to effective implementation
- meeting the highest research standards using advanced empirical methods and rigorous peer review
- maintaining independence and objectivity by scrupulously avoiding partisanship and vested interests
- serving the public interest by widely disseminating its research publications (subject to the constraints of national security) and encouraging staff to participate in public forums.

The RAND National Defense Research Institute

NSRD includes the RAND National Defense Research Institute (NDRI), established in 1984 as a federally funded research and development center (FFRDC) sponsored by the Office of the Secretary of Defense (OSD), the Joint Staff, the unified combatant commands, the defense agencies, and the defense Intelligence Community (IC). Through OSD, NDRI also performs research for the U.S. Navy and the U.S. Marine Corps. The multiyear FFRDC contract, coupled with NDRI's broad sponsorship and its sponsors' appreciation of its objectivity and independence, allows the institute to

- conduct a continuous, integrated research and analytic program with particular emphasis on enduring issues that cut across organizational boundaries
- look to the future, maintaining a mid- to long-range focus together with a quick-response capability.

In support of these goals, and by virtue of its 26-year relationship with DoD, NDRI has

- accumulated an in-depth understanding of DoD and its needs
- developed a staff that balances the breadth and depth of technical expertise needed to address the complex issues faced by its sponsors
- supported the development and sustained the currency of an advanced suite of models and other tools that facilitate the analysis of issues across the defense policy spectrum.

It is noteworthy that, to perform research requiring access to proprietary and other sensitive information not generally accorded commercial contractors, NDRI stays strictly independent of proprietary interests, in keeping with its FFRDC charter.

Research Centers and Agenda

Up through fiscal year 2009 (FY09), NSRD's research was largely conducted in four centers:

- International Security and Defense Policy Center (see p. 12)
- Acquisition and Technology Policy Center (see p. 25)
- Forces and Resources Policy Center (see p. 38)
- Intelligence Policy Center (see p. 51).

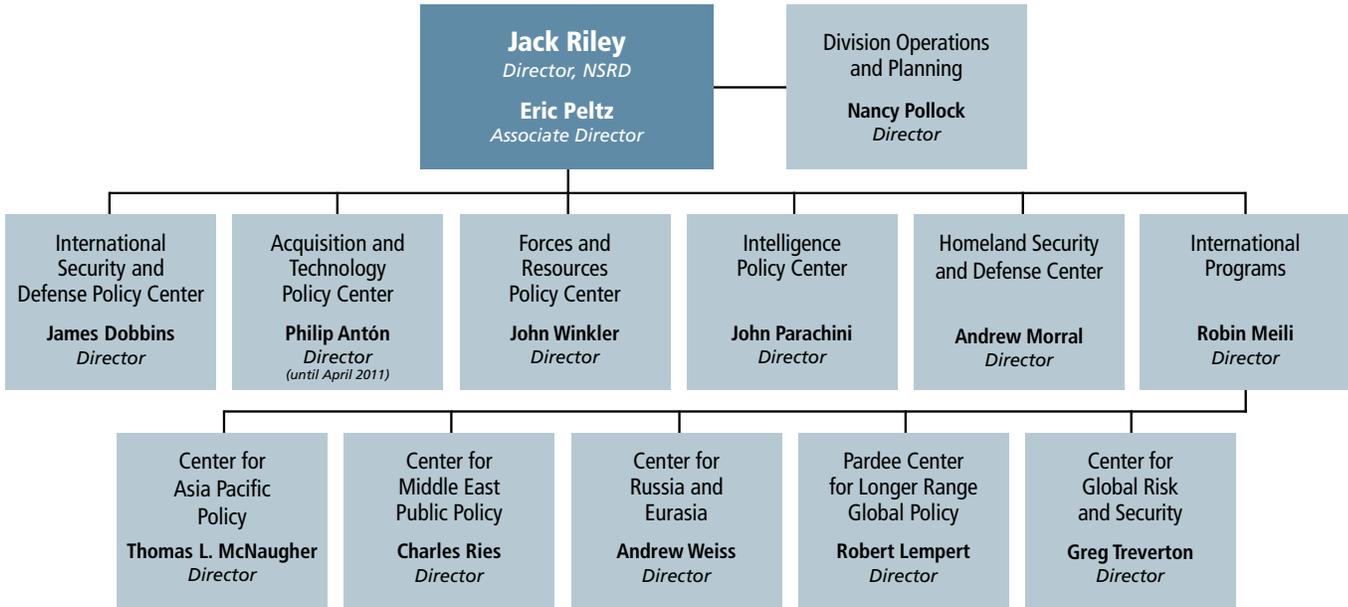
NSRD provides independent and objective analytical support to decisionmakers in the United States and abroad.

These centers correspond in scope to the purviews of the four under secretaries of defense whom NSRD is most often called upon to support. Most of the work conducted by these centers, taken together, is carried out within NDRI. However, the centers also perform research for non-DoD sponsors in the IC, the U.S. Department of State, allied governments and their ministries of defense, various foundations, and other organizations.

At the beginning of FY10, NSRD assumed oversight of the RAND Homeland Security and Defense Center (see p. 61), in collaboration with RAND Infrastructure, Safety, and Environment. This new center carries out research under the sponsorship of the federal departments of Homeland Security, Defense, and Justice, as well as other organizations charged with security and disaster preparedness, response, and recovery, within the United States and internationally.

NSRD also houses RAND's International Programs (see p. 64), which facilitates the growth and understanding of RAND's internationally focused research, particularly that funded by non-DoD and non-IC sponsors (such as allied governments, foundations, and private contributors). Because this research lies at the intersection of international policy and transnational trade, education, health care, information technology, and energy and the environment, it is often carried out by other RAND units, though some is conducted within NSRD. To expand knowledge on emerging issues of potential concern to the national security community but that currently have no specific sponsor, and to expand the state of the art in analytic methodologies, RAND supports some NSRD research through its own discretionary funds. The latter are derived from fees earned on client-funded research, independent research and development funds provided by DoD, and unrestricted private donations.

The research agenda of NSRD and NDRI emerges from relationships with clients that are long-standing, mutually reinforcing, and dynamic. NSRD and its FFRDC help their sponsors identify and evaluate new policies, frame alternative ways to implement current policies, and provide other analytic and technical assistance. That assistance includes helping decisionmakers develop political and technological responses to evolving terrorist threats, sustain a robust all-volunteer force,



reform intelligence collection and analysis, and set other policy directions serving U.S. security interests. At the same time, NDRI acts to sustain and invigorate its core investigational, theoretical, and methodological capabilities—the institutional foundations that will enable it to address pressing national security concerns for years to come.

The RAND Environment

The RAND Corporation is a nonprofit institution that helps improve policy and decisionmaking through research and analysis. Since its founding in 1948, RAND has studied the most pressing problems of the day, producing in-depth, objective analyses; basic and applied research; and analytic tools used in government, academia, and the private sector.

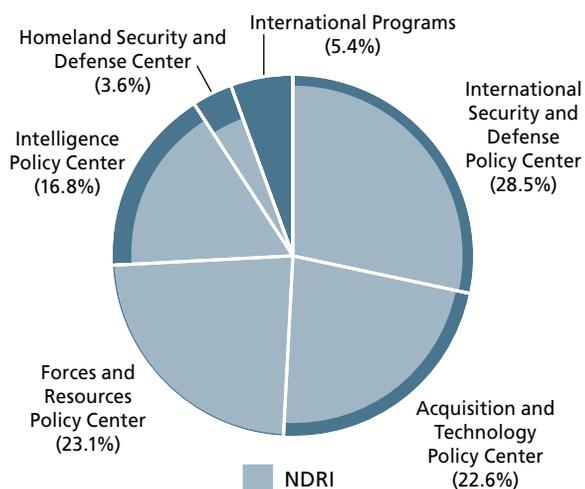
Policymakers rely on RAND for help in analyzing choices and developments in many areas, including national defense and homeland security, health care, labor and population, education, civil justice, public safety, and the nation’s infrastructure and environment. RAND also offers several advanced training programs: the Pardee RAND Graduate School’s doctoral program in policy analysis and the military fellows programs, which sponsor one-year tours at RAND by mid-career officers in the military services and the Coast Guard.

In addition to NDRI, RAND houses two other FFRDCs offering additional analytic resources to DoD:

- RAND Project AIR FORCE—RAND’s oldest studies and analysis organization—focuses on issues of enduring concern to U.S. Air Force leaders, such as the role of air and space power in the future security environment, force modernization to meet changing operational demands, workforce characteristics and management, and acquisition and logistics cost control.²
- The RAND Arroyo Center, as the U.S. Army’s only studies and analysis FFRDC, also emphasizes mid- and long-range policy questions while helping the Army improve efficiency and effectiveness, providing short-term assistance on urgent problems, and serving as a catalyst for needed change.³

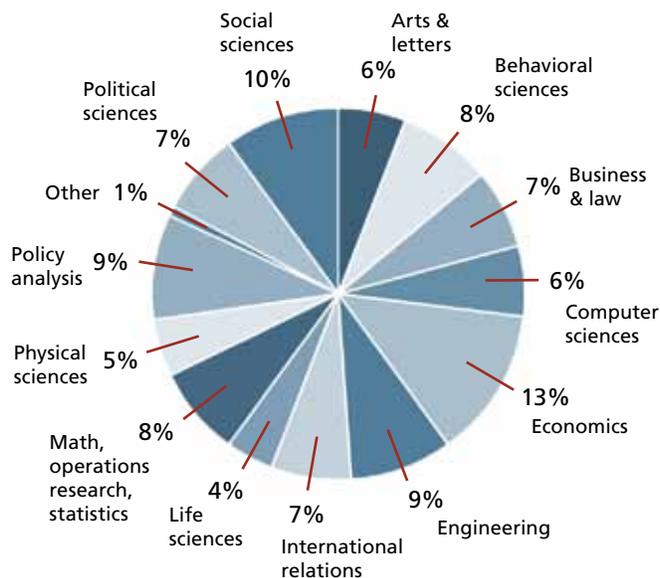
Policymakers rely on RAND for help in analyzing choices and developments in a range of areas.

NSRD Revenues by Organizational Element, FY10
(Total \$61.6 million)



The NSRD research agenda is balanced across major issue areas.

Percentage of staff with degree in



RAND’s multidisciplinary staff provide breadth and depth to research activities.

Offices in Europe, Mexico, and the Middle East provide international reach and perspective.



RAND has a matrix-type organization. Research units such as NSRD administer the research programs; the corporation, through its Staff Development and Management Office, recruits, develops, and evaluates the staff, in consultation with the units. Approximately 1,700 people from more than 50 countries work at RAND, representing diversity in work experience; academic training; political and ideological outlook; and race, gender, and ethnicity. Eighty-nine percent of the research staff hold advanced degrees, with two-thirds of those being doctorates.

NSRD draws on analytical talent in six RAND offices in the United States and five abroad and in a wide array of disciplines. For instance, experts in the social sciences—economists, psychologists, sociologists, and demographers—contribute to studies of personnel and intelligence issues. Work on the effectiveness of evolving military technologies draws on staff skilled in engineering, information systems, computer modeling and simulations, and scenario design and testing. Political scientists and experts in military operations conduct research on the uses and limitations of the application of U.S. military power and alternative forms of leverage in addressing threats to peace and freedom.

NSRD works with other RAND units on topics of mutual interest. For instance, RAND Health brings crucial insight from its civilian health research to questions concerned with the provision and management of military medical services and with the effects of combat duty on mental health. Research on defense issues for U.S. allies is done in part through RAND's independently chartered European subsidiary, RAND Europe. This work also provides perspective for U.S. national security issues. The RAND-Qatar Policy Institute serves as a source of analysis of the most important and difficult issues facing public and private decision-makers in the Middle East, North Africa, and South Asia.

Leading the Way in Defense Research and Analysis

RAND is an international leader in defense analysis. Government officials, academics, and business leaders in the United States, Europe, Asia, Australia, and the Middle East rely on RAND's advice. They turn to RAND for assistance with the complex problems they must confront. RAND has demonstrated the ability to analyze a problem, place it in the appropriate context, and identify options to help leaders make the best-informed decisions. NSRD's programs are a major component of RAND's overall success and reputation in national security research.

² For more information, see *Annual Report 2010*, RAND Project AIR FORCE, AR-7156-AF. Online at http://www.rand.org/pubs/annual_reports/AR7156.html

³ For more information, see *Annual Report 2010*, RAND Arroyo Center, AR-7157-A. Online at http://www.rand.org/pubs/annual_reports/AR7157.html

International Security and Defense Policy Center



**James Dobbins, Director
International Security
and Defense Policy Center**

U.S. national security decisionmakers must meet the challenge of achieving favorable outcomes in Iraq and Afghanistan in the face of a fluid security situation, complicated by Pakistan's ambiguous role. They must succeed there as they continue to address the broader threats of terrorism and the proliferation of weapons of mass destruction. Other challenges must also be faced, such as the spread of terrorism to Europe and the changing security situation in Northeast Asia. Because the United States cannot handle these issues alone, U.S. policymakers will need to continue efforts to maintain and enhance current coalitions and create new ones.

NSRD's International Security and Defense Policy Center (ISDPC) elicits the implications of political, strategic, economic, and technological challenges for U.S. and international security. It assists U.S. national security decisionmakers in developing strategies and policies to manage and adapt to such challenges and to protect U.S. and allied interests at home and abroad. ISDPC helps U.S. policymakers better understand how terrorism intersects with other emerging threats in the post-9/11 world. It helps assess the efficacy of current counterinsurgency strategies and devise new approaches to fighting insurgencies. It investigates

the sources of state failures and explores new means by which acceptable levels of governance can be assured or restored in such areas. And it explores ways of holding together the coalitions that can further U.S. interests through assistance with basing and access, participation in battle, and support for subsequent reconstruction and stability operations.

Some Recent and Ongoing Projects

Synthesizing Knowledge About Stability Operations

The importance of stability operations to U.S. national security is now widely recognized, as are the challenges posed by such operations. These challenges result from the multifaceted nature of these operations, which require the orchestration of political, military, social, and other factors in the postconflict environment. To support DoD in assessing alternative strategies and proposals for stability operations, RAND researchers reviewed, synthesized, and integrated what is known about stability operations (considering both stabilization and reconstruction). In so doing, they drew upon the literature and expertise of diverse social science fields, including development economics, political development, conflict management, and the study of civil wars. Like RAND's earlier project to synthesize what is known about counterterrorism, this project included separate reviews of the relevant literatures as well as strong cross-activity coordination and analytical integration across fields. One of the recurring themes in the findings is the existence of common dilemmas at the core of many difficulties in stability operations. Some of the dilemmas are more apparent than real, some can be resolved through a better analytical understanding of the case in question, and others are irresolvable except at a given time, in a particular context, and often with experiments and iteration.

Sponsor: *Modeling and Simulation Coordination Office, DoD*

Project Leader: *Paul K. Davis*

Supporters of Iranian reformist presidential candidate Mir Hossein Mousavi hold hands during a rally in Tehran, after the presidential election in 2009.



Iranian Attitudes Toward the United States, Iran's Nuclear Program, and the Economy

In June 2009, Iran's presidential election and subsequent popular protests revealed the importance of public opinion in driving change in the Islamic Republic of Iran. A RAND team conducted a telephone survey to gauge Iranian attitudes about critical issues affecting U.S. interests, including U.S.-Iranian relations, the effects of sanctions, the Iranian economy, and the Iranian nuclear program. The survey revealed that respondents were deeply divided on issues that define Iranian politics. A majority of respondents viewed the economy as "average" or better, and most said that they did not view sanctions as having a negative effect on the economy. A majority of those expressing an opinion opposed the reestablishment of ties with the United States. Iranians were divided on the development of nuclear weapons, though a significant portion of the population appeared to support their development. In general, women and less-educated respondents tended to voice views on security and overall relations that were unfavorable to the United States, while men and those with greater social means tended to be more favorably inclined. The survey found that Iranians are highly reliant on state-controlled media and educational sources and do not have extensive access to other sources of information that may provide a positive picture of the United States. U.S. broadcasts to Iran and the provision of antifiltering technology to Iranian web users may be beneficial in this regard. The results also suggest that it is worth considering how opinions differ across subgroups of the Iranian population when crafting communications for the Iranian public.⁴

Sponsor: *Office of the Secretary of Defense*

Project Leader: *Alireza Nader*

Providing Analytical Support for Operations in Afghanistan

To support ongoing efforts in Afghanistan, Combined Forces Special Operations Component Command-Afghanistan (CFSOCC-A) is able to leverage a unique range and depth of special operations capabilities, including expertise in counter-insurgency, security force capacity-building, and strategic communication. CFSOCC-A is developing and training local citizen defenders in Afghanistan's rural village communities, promoting local development initiatives that give citizens access to essential services and economic opportunities, and connecting village communities to good governance at the local and national levels. RAND is providing direct support to CFSOCC-A by sending analysts to Afghanistan. The deployed staff are providing analytical support for the commander's initiatives and operations and for other elements of the command. They are also supporting a

variety of planning efforts (including those for special operations forces and counter-insurgency planning), strategic communication, civil-military operations, security force capacity-building, and assessments of the effectiveness of special operations activities and programs. RAND research into the history of other village stability operations (e.g., in Vietnam, El Salvador, the Philippines, Iraq) has identified lessons that can help shape current efforts to stabilize Afghanistan's rural communities. The RAND team is also examining ongoing village stability operations and identifying current operational best practices. Recommendations will address efforts to shape local community acceptance of coalition force engagement, selection and training of Afghan local police, economic and development initiatives, and governance. (This project grew out of work for the Marine Corps Intelligence Activity, summarized on p. 55.)

Sponsor: *Combined Forces Special Operations Component Command—Afghanistan (CFSOCC-A)*

Project Leader: *Todd C. Helmus*

A U.S. soldier of the 101st Airborne Division destroys opium poppies in Khost province, Afghanistan, in 2008. U.S. policy has since shifted away from poppy eradication and toward identification and prosecution of trafficking operations.



Integrating Law Enforcement and Military Operations to Counter Narcotics Trafficking in Afghanistan

Afghanistan produces the vast majority of illicit opium supplies worldwide, engaging in a trade that is widely recognized as fueling decades of government corruption, the violent and destabilizing primacy of warlords, and terrorist and insurgent activity. Recent shifts in U.S. policy away from poppy eradication and toward identification and prosecution of trafficking operations reflect a growing understanding of the complex effects of counternarcotics efforts on local support for coalition operations, drug prices, regional stability, and economic development. An effective counternarcotics policy requires close cooperation and coordination between the military and law enforcement bodies and their operations. To inform and improve the integration of these operations, RAND researchers are examining prior operations and efforts in Afghanistan and other relevant experience to identify the possible consequences, both intended and unintended, of counter-narcoterrorism operations. In ongoing research, an NDRI team is analyzing the ways in which interagency and intragovernmental resources can be marshaled to improve the attainment of U.S. objectives. The team is also identifying best practices for limiting narcotics flows and improving cooperation and coordination. The researchers aim to understand how counternarcotics efforts can contribute to and align with other goals—most importantly

counterinsurgency, but also other law enforcement, anticorruption, development, and stabilization missions—and how disconnects between missions can render efforts counterproductive. Recommendations will identify ways to incorporate lessons learned from the study into future military planning, law enforcement approaches, key policy documents, personnel policies, and institutional structures.

Sponsor: *DoD Counter-Narcoterrorism Technology Program Office*

Project Leaders: *Olga Oliker and Keith Crane*

China and India: A Comparative Assessment

China and India will exercise increasing influence in international affairs in the coming decades. As prominent members of the G-20, their influence will be manifest in the global economy, in global politics, and in the global security environment. Each country's role on the world stage will also be affected by the progress it makes and by the competition and cooperation that develop between the two countries. It is important for U.S. defense policymakers to have as full an understanding as possible of the trajectories of these two societies as background for planning for the security of U.S. interests in Asia.

NDRI undertook a project on the progress that China and India seem likely to achieve from 2010 through 2025, as well as some of the major problems they may encounter along the way. NDRI researchers assessed the prospects of China and India through 2025 in four domains: demography (e.g., population, health status, longevity), macroeconomics (e.g., GDP, investment, consumption, monetary and fiscal policies), science and technology (e.g., technological levels in the government and private sectors), and the defense sector (e.g., personnel, operations and procurement, spending levels, shares of GDP, growth rates). In each domain, the assessment sought to determine which country is ahead, by how much, and why. As indicated by the preceding list of domain elements examined, most of the analysis was quantitative, but some consideration was given to such qualitative elements as the environment for business entrepreneurship, morale and training of military forces, and incentives in science and technology.

Sponsor: *Director of Net Assessment, Office of the Secretary of Defense*

Project Leader: *Charles Wolf, Jr.*

⁴ For more information, see *What Do Iranians Think? A Survey of Attitudes on the United States, the Nuclear Program, and the Economy*, Sara Beth Elson and Alireza Nader, TR-910-OSD, 2011. Online at http://www.rand.org/pubs/technical_reports/TR910.html

A New Approach to Understanding Counterinsurgency Operations

- Historically, successful counterinsurgency (COIN) campaigns have used overlapping sets of effective practices; no single practice stands out as best.
- Outcomes are not determined by the unique characteristics of the case; a significant balance of good over bad practices wins every time.
- COIN successes depend on the extent to which the insurgents' ability to replenish and obtain tangible support, such as personnel and materiel, can be disrupted.
- COIN campaigns that begin badly do not necessarily end badly—if more-effective practices are adopted.

When a country becomes host to an insurgency, what counterinsurgency (COIN) approaches give its government the best chance of prevailing? Military experts have increasingly asked this question as U.S. interventions continue in Iraq and Afghanistan and as other “small wars” break out across the globe. Neglected during the Cold War, research and discussion on approaches to countering the political and military strategies of insurgents have recently been based solely on common sense or on but one or two detailed historical cases. An NDRI study has answered the pressing need for concrete research in this area through extensive data collection, rigorous analysis, and empirical testing. The characteristics of successful historical COIN efforts provide a firm and unambiguous foundation on which U.S. forces, allies, and partners may base strategic and operational decisions.

Historical Cases Were the Basis of Analysis

The study's findings were based on detailed case histories compiled for the 30 most recent resolved insurgencies around the world. The cases included variation in the battlefield (mountains, jungles, deserts, and cities), regional and cultural variation (Africa, Latin America, Central Asia, the Balkans, the Far East), and variation in the military capabilities of COIN and insurgent forces alike. Of the 30 cases, there were eight in which COIN forces prevailed or had the better of a mixed outcome (green, in the figure) and 22 COIN losses (red).

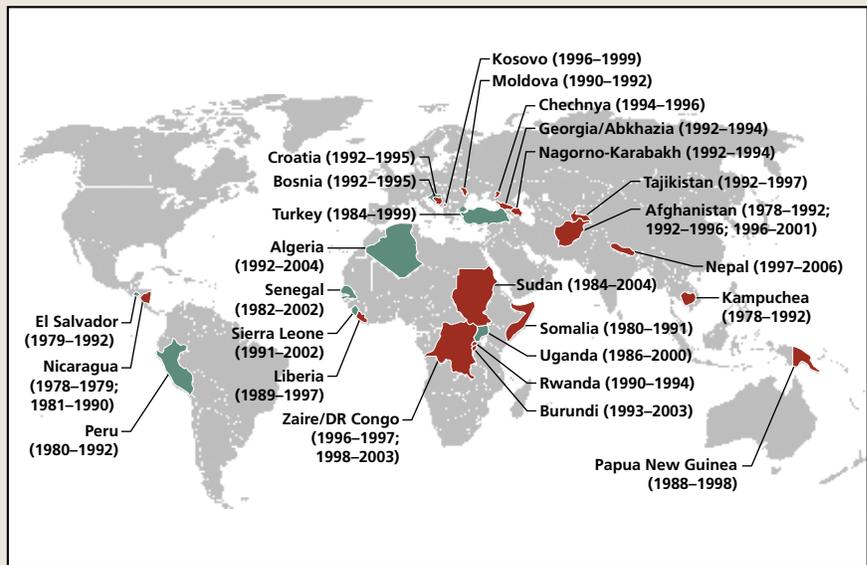
Literature on COIN enabled the researchers to identify 20 distinct approaches to it. Some of these approaches are based on classical perspectives on COIN from the previous century, like “pacification,” while others are contemporary approaches suggested for ongoing operations in Iraq and Afghanistan, such as the approach implicit in U.S. Army Field Manual (FM) 3-24, *Counterinsurgency*. Each approach to COIN was tested against the empirical evidence provided by the 30 case studies. Each approach was either supported by the available evidence, impugned by the evidence, or, for a few of the approaches, could not be tested with these data because the approach was not tried in the 30 cases.

History Shows the Correlates of Success

The scope of the study was expansive, and the results were rich in detail. However, a number of findings in particular were identified as critical in formulating COIN operations.

Thirty insurgency cases revealed which approaches give governments the best chance of prevailing.

The RAND analysis considered the 30 most recent resolved insurgencies worldwide. Green indicates a COIN win (or the better of a mixed outcome); red indicates a COIN loss.



Effective COIN practices tend to run in packs. The first finding suggests that those who succeed in COIN operations do so by implementing a host of good COIN practices while avoiding adverse ones. This is wholly consonant with reports from commanders in both Iraq and Afghanistan that indicate success when engaging in numerous mutually reinforcing lines of operation. In the 30 cases studied, the frequency with which good COIN practices occurred in cases won by the government was high enough that it was impossible to discern any single practice as most important.

The balance of good versus bad practices perfectly predicts outcomes. The study revealed that COIN forces that engage in more good than bad practices win, and those that do not do so lose. When cases are considered individually, as in past studies, their outcomes have been explained as resulting from particularly distinctive or unique characteristics of the case. However, the unreduced level of analysis in the RAND study allowed the researchers to discern that the successful implementation of identified good practices always allows the COIN force to prevail, independent of any unique case scenario.

Much of the received wisdom on COIN is good, but some is not. Counterinsurgency is as old as insurgency, and to maintain effectiveness, related doctrine needs to be continuously examined and refined according to real operational experience. Of the 20 approaches tested, 13 receive strong empirical support. For example, “boots on the ground,” an approach that entails maintaining a favorable force ratio either between counterinsurgents and insurgents or between COIN forces and the population, enabled six out of eight COIN successes. A further two approaches received partial support. Three approaches, however, are not supported as effective by the evidence: resettlement, various insurgent support strategies, and repression. In fact, the analysis showed unambiguously that repression is a bad COIN practice. Only two of eight COIN winners—Turkey and Croatia—used escalating repression and collective punishment during the decisive phase of the conflict. While these two COIN forces employed repression, they also employed a pack of good COIN practices, which were apparently enough to offset the negative impact of repression. Repression was shown to win intermediate phases, but in these case studies, the vast majority of phases won with repression preceded ultimate defeat.

Tangible support trumps popular support. COIN successes or failures ultimately depend on the ability of the insurgents to replenish and obtain tangible support, such as personnel, materiel, financing, intelligence, and sanctuary. This proved true in all 30 of the historical cases examined. In the eight cases in which the COIN force prevailed, forces disrupted at least three tangible insurgent support factors, while none of the COIN forces in the 22 losing cases managed to disrupt more than two.

Most interesting is the relationship between tangible support and expressions of support from a nation's citizenry. Unsurprisingly, in 25 of the 30 cases, if the majority of the population in the area of conflict wanted the COIN force to win, the COIN force was able to disrupt at least three tangible insurgent support factors; if the insurgents had majority popular support, the COIN force was unable to reduce tangible support in any significant way. However, in three cases (Moldova, Rwanda, and Tajikistan), the COIN force had the support of the majority of the population but failed to significantly reduce the insurgents' tangible support (which came primarily from supporters outside the three countries). In these cases, the COIN force lost. In two cases (Turkey and Croatia), the COIN force did not have the support of the majority of the population in the area of conflict but managed to significantly reduce tangible support to the insurgents anyway. The COIN force prevailed in those cases. This suggests that when insurgents' tangible support needs are being met by sources other than the citizenry, a successful COIN campaign will require additional areas of emphasis.

Poor beginnings do not necessarily lead to poor ends. The analysis showed that getting off to a poor start in the early phases of a conflict does not necessarily lead to a COIN loss. Of the eight cases won by the COIN force, in only two (Senegal and Croatia) were the outcomes of all phases favorable to the COIN force. In fact, in three of the cases won by the COIN force (Peru, Sierra Leone, and Uganda), it had the upper hand only in the decisive phase. Changing practices can lead to changed outcomes.

Conclusion

As long as international unrest persists, COIN will continue to matter. There is no single COIN approach or other "magic bullet" that can bring insurgencies to a desired conclusion. Rather, the United States and its allies should be prepared to engage in as many good COIN practices as possible for as long as it takes.

Christopher Paul

Project Leader

For more information, see *Victory Has a Thousand Fathers: Sources of Success in Counterinsurgency*, Christopher Paul, Colin P. Clarke, and Beth Grill, MG-964-OSD, 2010. Online at <http://www.rand.org/pubs/monographs/MG964.html>

Victory Has a Thousand Fathers: Detailed Counterinsurgency Case Studies, Christopher Paul, Colin P. Clarke, and Beth Grill, MG-964/1-OSD. Online at <http://www.rand.org/pubs/monographs/MG964z1.html>



Building a More Resilient Haitian State

Haiti's future prosperity requires building a more effective, resilient state. Examples of steps the Haitian government could take include

- implementing a reformulated strategy for administrative reform
- establishing a system for managing criminal cases that links justice-system elements
- eliminating unnecessary procedures involved in registering business and property
- subsidizing private-school teacher wages to match those of public-school teachers.

Donors should coordinate all project concepts through the Interim Haiti Recovery Commission.

The January 12, 2010, earthquake in Haiti demonstrated the weaknesses not only of the country's infrastructure but also of its state institutions. Although the earthquake was the cause of the disaster, Haiti's long history of poor governance was largely responsible for the extent of the devastation and the society's almost complete dependence on help from abroad to deal with the consequences.

Much has stabilized in Haiti since the earthquake, and the Haitian government has developed plans for reconstruction in consultation with the international donor community. However, more than physical reconstruction is needed: Hope for a more prosperous and peaceful future for the Haitian people lies in building a more effective, resilient state. Haiti's state institutions are riddled with weaknesses in human resources, organization, procedures, and policies. State-building should be at the forefront of efforts to recover from the earthquake.

A new RAND study identified the main challenges to more-capable governance and evaluated past and current plans to strengthen government institutions and improve the delivery of public services. Drawing on these appraisals, discussions with key stakeholders, and the experiences of other societies emerging from conflict and crisis, the researchers identified state-building priorities for the next three to five years and suggested measures that might produce palpable improvements during this time frame. Among the priorities emphasized are civil service reform, justice-system reform, and streamlined regulations for business.

Key Recommendations

The researchers developed common criteria for the recommendations: that they be fiscally sustainable, commensurate with the administrative capacity of Haiti's government, realistic in their prospects for implementation, geared toward enhancing the effectiveness of the state, and mutually coherent.

Governance and public administration. The principal constraints on the state's effectiveness, apart from the limited financial resources, are the lack of management systems within ministries and other government bodies and the lack of skilled, trained, and properly organized government personnel. All the government activities examined in the study are affected by institutional deficiencies in planning, budgeting, executing policy decisions, and managing people and resources.

Much has stabilized in Haiti since the earthquake, but more than physical reconstruction is needed.



The center dome of Haiti's National Palace is seen collapsed after the 7.0-magnitude earthquake that struck the nation in January 2010.

- The Haitian government, with donor-funded technical assistance, should implement a reformulated strategy for administrative reform. Within this strategy, civil service reform deserves the highest priority.
- Major donors need to employ their influence in concerted, carefully focused, discreet, subtle ways to promote the political reforms essential to any broad program of state-building.

Justice and security. Haiti's justice system is deeply flawed. The courts do not carry out their constitutional responsibilities, laws are not applied, prison conditions are horrific, and corruption is widespread. Efforts to reform the security sector have faced major challenges, including a volatile security situation, lack of consistent commitment to police reform, and a low level of institutional development within the Haitian National Police (HNP).

- With assistance from donors, the Haitian government needs to create and implement a comprehensive system for managing cases that links the police, prosecutors, judges, and prisons. Other priorities include pretrial detainee review and property-dispute resolution.
- Providing public security is critical. The Haitian government and the international community should agree to keep United Nations peacekeepers for at least the next five years and to then reduce the international military and police presence only gradually.
- Building the HNP's administrative capacity should also be a priority.

Economic policy and infrastructure. Haiti's primary economic challenge is generating economic growth. The country is poor in great part because of its difficult environment for business. The process of registering a business is one of the most complex and lengthy in the world.

The earthquake had a devastating effect on housing in Haiti, and providing permanent housing for the displaced continues to be a challenge. Infrastructure (roads, seaports, airports, the electric-power system, water, and sewage) needs to be improved and maintained if Haiti is to enjoy sustained economic growth.

- To accelerate economic growth, the Haitian government should quickly eliminate unnecessary procedures involved in registering businesses and property and reduce the cost and time needed to complete the remaining steps.

Without executive decisiveness and legislative action, state-building in Haiti cannot proceed—but donor assistance can be a key facilitator.

- The Haitian government, together with the donor community, should accelerate the removal of rubble, an essential step for reconstruction of housing and infrastructure.
- Other priorities include eliminating restrictions on the operation of private container ports and moving to full cost-recovery pricing for electricity.

Education and health care. Private, nonprofit, and religious institutions are the primary providers of education and health care in Haiti. Despite their efforts, the quality of and access to these services is the worst in the Western Hemisphere. Enrollment rates and levels of educational attainment are low, and approximately 40 percent of Haitians lack access to health care.

- To help close the gap in quality between private and public schools and to increase access to schools, the Ministry of Education and Training should subsidize private-school teacher wages to be on par with those of public-school teachers.
- In light of its lack of capacity and funding, the Ministry of Public Health and Population should shift operation of all health centers and hospitals to nongovernmental organizations and other private institutions, with performance-based contracting used for these operations.

Donor cooperation. Haiti has been a focus of concern for donors of humanitarian and development assistance for two generations. Nonetheless, Haiti's economic, social, and political situation has worsened.

- Donors should focus on making the Interim Haiti Recovery Commission (IHRC) an effective body by agreeing that all major donors will submit all project and program concepts to the IHRC for coordination and adapt them according to Haiti's and other donors' plans and preferences.
- The United States should better organize to engage politically with the Haitian government by appointing a full-time, high-ranking special coordinator or envoy. Similarly, a handful of major donors should organize for more-coordinated political engagement through a "friends" or "contact" group for Haiti.

Conclusion

State-building is intimately connected with politics. Without executive decisiveness and legislative action, state-building cannot proceed. But donors and international organizations can assist—not only by providing financial resources but also by promoting political consensus and encouraging adherence to strategic plans.



Keith Crane

Lead Author

For more information, see *Building a More Resilient Haitian State*, Keith Crane, James Dobbins, Laurel E. Miller, Charles P. Ries, Christopher S. Chivvis, Marla C. Haims, Marco Overhaus, Heather L. Schwartz, and Elizabeth Wilke, MG-1039-SRF/CC, 2010. Online at <http://www.rand.org/pubs/monographs/MG1039.html>

Deradicalizing Islamist Extremists

- Deradicalization (a change in beliefs) has been criticized as unrealistic compared with disengagement (a change in behavior), but deradicalization may be the only way to permanently defuse the threat posed by extremists.
- The most effective deradicalization programs are those that work to break militants' affective, pragmatic, and ideological commitment to the group and that provide considerable support thereafter.
- Because the best-designed deradicalization and counter-radicalization programs in the Middle East, Southeast Asia, and Europe leverage local cultural patterns to achieve their objectives, they cannot simply be transplanted from one country to another (e.g., to the United States).

The radicalization and recruitment of Islamist extremists has been the subject of intense research. However, until recently, relatively little attention has been focused on the *deradicalization* of those who have been recruited into Islamist extremist movements. Just as there are processes through which an individual becomes an extremist, there are also processes through which an extremist comes to renounce violence, leaves a group, or even rejects a radical worldview. Moreover, deradicalization is not merely the radicalization process in reverse: Deradicalization appears to have its own distinct features—some of which are quite different from the factors associated with the initial radicalization. An NDRI study supported by the Smith Richardson Foundation sought to analyze the processes through which militants leave Islamist extremist groups, assess the effectiveness of deradicalization programs, and identify policies that could help promote and accelerate the process of deradicalization.

Deradicalization is not merely the radicalization process in reverse.

Deradicalization as a New Focus

A key question is whether the objective of counter-radicalization programs should be disengagement (changing militants' behavior) or deradicalization (changing their beliefs). A unique challenge posed by militant Islamist groups is that their ideology is rooted in a major world religion, Islam. There is a view in the scholarly community that deradicalization of religious extremists might not be a realistic objective and that the goal of terrorist rehabilitation programs should be disengagement. But deradicalization may be necessary to permanently defuse the threat posed by these groups. If a militant agrees to stop fighting purely for practical reasons—such as a condition for one's release from prison—when the circumstances change, the individual may once again return to terrorism.

Moreover, the deradicalization process helps delegitimize the extremist ideology. When influential ideologues or operational leaders renounce extremism and explain their reasons for leaving, it can raise doubts in the minds of radicals who subscribe to similar worldviews. Therefore, challenging the extremist ideology with an alternative interpretation of Islam is not only likely to effect a more permanent change in the militant's worldview and reduce the risk of recidivism, but it also helps weaken the appeal of radical Islamism. An important indicator of the success of deradicalization is convincing rehabilitated militants to speak out against extremism.

Captured jihadis
in a Saudi Arabian
deradicalization
program near Riyadh.



Lessons from the Process of Leaving

The RAND study noted a set of common processes through which individuals and groups leave criminal gangs, cults, and terrorist organizations and identified lessons from this trajectory. First, it is important to recognize and facilitate disengagement early. Second, governments can implement counterterrorism measures that increase the appeal of disengagement and decrease the appeal of remaining in a terrorist organization. Third, deradicalization programs must provide rehabilitated individuals with practical assistance, such as helping them find jobs and alternative support networks. Fourth, unlike leaving gangs, leaving an Islamist group implies the rejection of a radical ideology, in whole or in part. Because counter-radicalization or deradicalization programs are embedded in a war of ideas, the counterideological component of these programs is extremely important.

Most Middle Eastern and Southeast Asian programs use a form of theological dialogue in which mainstream scholars and sometimes even former radicals engage extremists in discussions of Islamic theology in an effort to convince militants that their interpretation of Islam is wrong. However, because many of these programs are focused on eliminating the domestic terrorism threat, they may forbid terrorism in the home state because the government is Islamic but condone it elsewhere.

Lessons from Abroad

In reviewing deradicalization and counter-radicalization programs in the Middle East, Southeast Asia, and Europe, the NSRD team assessed the strengths and weaknesses of each program. Government-sponsored programs in the Middle East and Southeast Asia tend to be prison-based individual programs that promote a state-sanctioned brand of Islam. Examination of these programs identified several key policy implications. The success of the programs seems to hinge on identifying credible interlocutors, such as theologians who can form personal relationships with the prisoners. In addition, the programs need to maintain a balance of affective, pragmatic, and ideological components. And including the militant's family, through practical support or counseling, increases the probability that the individual will remain disengaged.

An alternative type of deradicalization involves the use of prison-based collective programs, such as when a state has defeated an extremist organization. Examination of these programs spurred several policy recommendations: Where feasible, these programs should be encouraged; however, governments must maintain a high

level of international cooperation in suppressing terrorist groups that are part of a global network. Further, whereas some state-sponsored programs target terrorist sympathizers more than hard-core radicals, governments may want to target the more devoted militants because they have more influence on rank-and-file group members.

In contrast to governments in Muslim countries, European governments have avoided getting directly involved in what they regard as religious matters and therefore do not challenge the Islamist ideology. Instead, they have implemented policies aimed at enhancing social cohesion and the integration of their Muslim populations. In these cases, governments must take extreme care in selecting their partners in the Muslim community to ensure that these leaders represent the voice of their people and that they are truly moderate.

Applying Lessons Learned to the United States

Because the best-designed deradicalization and counter-radicalization programs in the Middle East, Southeast Asia, and Europe leverage local cultural patterns to achieve their objectives, they cannot simply be transplanted from one country to another. Furthermore, data are limited on the short- and long-term effectiveness of most existing programs; thus, these programs need to undergo critical evaluation. Nevertheless, the researchers identified some components of successful programs. A key finding is that the most effective deradicalization programs work to break the militant's affective, pragmatic, and ideological commitment to the group. Individuals may vary in their level of each type of commitment, but because it is prohibitively costly to tailor a program to each person, rehabilitation efforts must include components to address each type of attachment and to provide considerable aftercare.

Data are limited on the short- and long-term effectiveness of most existing deradicalization programs.

Angel Rabasa

Project Leader

For more information, see *Deradicalizing Islamist Extremists*, Angel Rabasa, Stacie L. Pettyjohn, Jeremy J. Ghez, and Christopher Boucek, MG-1053-SRF, 2010. Online at <http://www.rand.org/pubs/monographs/MG1053.html>



Acquisition and Technology Policy Center



*Philip S. Antón, Director
Acquisition and Technology
Policy Center (until April 2011)*

The United States has achieved undisputed superiority in traditional military force-on-force conflicts. It has demonstrated the ability to

- project power rapidly to remote areas of the world
- conduct operations from afar with fewer casualties than its adversaries suffer
- moderate collateral damage to reduce its effect on broader U.S. strategic goals.

This technological advantage, however, does not provide America and its allies with an unchallenged or risk-free environment, as Iraqi and Afghan insurgents have shown by wielding improvised explosive devices. Furthermore, technology that has made its way into the hands of adversaries exposes U.S. and coalition military and civilian interests to threats and dangers.

In response, U.S. defense policymakers have expanded their areas of concern beyond traditional, symmetric threats to include irregular and catastrophic ones. As DoD fills increasingly diverse roles, U.S. forces are exposed to new vulnerabilities and face the challenges of acquiring and employing a wide range of capabilities in a creative, adaptive manner. They will need to accomplish this against a backdrop

of intensifying budgetary pressures, the degradation of equipment from Iraq and Afghanistan, and growing costs and overruns on major new system acquisitions. They also face increasing requirements for the interoperability of U.S. and allied defense systems and a defense-related technology and industrial base that is increasingly pressured by sporadic acquisitions and governed more by global commercial drivers than by military markets.

NSRD's Acquisition and Technology Policy Center helps U.S. and allied national security communities achieve and sustain an affordable technological advantage over a diverse array of threats while examining trade-offs and coping with fiscal and management challenges.

Some Recent and Ongoing Projects

Options for Completing the Destruction of U.S. Chemical Weapons

The United States has been destroying its stockpiles of chemical weapons for a number of years now and is under treaty obligation to complete the task by 2012. Unfortunately, the government is not expected to meet its treaty obligation—or to even meet the later statutory deadline of 2017. The reason is that public pressure led to the decision to use a new alternative destruction process at two remaining stockpile locations under the Assembled Chemical Weapons Alternatives (ACWA) program. Progress in the development of the ACWA processes and facilities has been very slow. One facility will not begin destruction operations until 2014, while the other will not begin until 2018. Moreover, the cost to develop, construct, and operate these two sites is several times the cost of an incineration technology used successfully at a number of other sites. Because the information available about the cost and time required for success has been evolving, OSD asked NDRI to review DoD's plans to complete the destruction of U.S. chemical weapons. Specifically, OSD sought potential schedule and cost efficiencies, recommendations on appropriate contracting strategies, and an

examination of the organizational constructs of the two extant disposal programs. In doing so, the NDRI team also explored any solution pathways that presented themselves. The researchers were able to propose an alternative strategy for destroying the chemical weapon stockpile at the two ACWA sites that could result in significant savings as well as compliance with the 2017 federal deadline.

Sponsor: *Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs*

Project Leaders: *Bruce Held and Christopher Pernin*

Changing the Aircraft Carrier Procurement Cycle from Four Years to Five

Nuclear aircraft carriers are among the most complex weapon systems purchased by the U.S. military. Because of their size and complexity and the time it takes to construct them, it is difficult to quickly change the number in the fleet and, especially, to increase it. The Navy's ability to increase the size of the fleet is affected by changes in the construction cycle for carriers. The 30-Year Shipbuilding Plan of August 2008 established an approximately four-year authorization cycle for new carriers. In April 2009, the Secretary of Defense suggested extending the acquisition cycle to five years. The Program Executive Office for Aircraft Carriers asked NDRI to examine the effect that a five-year acquisition cycle would have on various force-structure metrics and on current and future carrier construction and maintenance costs.

The original shipbuilding plan would result in a fleet of at least 12 carriers through 2040, when the number would drop to 11. An NDRI team determined that the new five-year plan would result in a force of ten carriers by 2040. As a result, between 2015 and 2045, the proportion of time in which forward-presence goals were met would be 55 percent under the shipbuilding plan but only 48 percent in the five-year cycle. Nevertheless, both cycles would ensure that, 97 percent of the time, the Navy would meet readiness goals requiring at least six carriers to be deployed or deployable in 30 days. The five-year cycle would result in slightly higher shipyard costs, mostly due to inflation and potential higher peak demands under currently scheduled refueling complex overhauls. Nevertheless, the analysis suggests that shifting to a five-year plan would have almost no effect on force-structure and industrial-base metrics in the next decade.⁵

Sponsor: *Program Executive Office for Aircraft Carriers, U.S. Navy*

Project Leader: *John F. Schank*

Assessing Vulnerabilities Arising from Aggregating Unclassified Information

DoD needs frequent access to current, detailed data on authorized force structures for all the military services. Having users aggregate this information themselves has been difficult, time-consuming, and error-prone. Hence, DoD launched the Global Force Management Data Initiative, which makes the entire DoD-authorized force structure visible, understandable, and accessible in a common format to DoD users for the first time. It can help support a wide range of DoD business, force management, and operational planning activities.

Although most of the data from the initiative are unclassified, creating a unified portal that facilitates data aggregation has raised concerns about what potential adversaries might be able to do if they gain access to the aggregated data. Should such data be classified and, consequently, stored exclusively on a secure network? NDRI researchers addressed this question by first developing a general framework for judging why material should or should not be classified. They suggested that classification is warranted only if

- it reduces the amount of information available to adversaries
- the information kept from adversaries would tell them something they did not know
- adversaries could make better decisions by having such information
- such decisions would damage the national security of the United States.

Using this framework, the researchers balanced the risks that the initiative poses against the costs to DoD of not having this information readily available to its

own analysts. They concluded that overall classification would not be necessary but suggested that some limited subsets might warrant additional protection. The framework developed for this study to assess classification decisions has potentially broad applicability, not least because many DoD organizations are developing large-scale integrated data systems that bring together unclassified databases from multiple sources for use by multiple users through DoD networks.⁶

Sponsor: *Directorate of Force Structure, Resource, and Assessment (J-8), Joint Staff*

Project Leader: *Beth E. Lachman*

A fully armed MQ-9 Reaper aircraft taxis down a runway in Afghanistan.



Allocating and Apportioning Unmanned Aircraft Systems in Iraq and Afghanistan

U.S. Central Command (USCENTCOM) has faced major challenges in determining how to apportion and allocate unmanned aircraft systems (UASs) in support of combat operations in Iraq and Afghanistan. As the fight in USCENTCOM's area of responsibility has shifted from major combat operations to counterinsurgency, there have been corresponding changes made to doctrinal tasking and execution processes for multirole intelligence, surveillance, and reconnaissance and strike assets, such as UASs. Existing command-and-control doctrine is well defined for a major combat operation but not for operations in a counterinsurgency environment.

The Joint UAS Center of Excellence requested that NDRI examine USCENTCOM's evolving processes for apportioning and allocating UAS assets with a maximum takeoff weight greater than 1,300 pounds and capable of full-motion video, such as the Predator and Reaper. NDRI was asked to capture USCENTCOM's best practices and determine applicability to other combatant commands. The research team also identified key lessons that may be applicable in Iraq, Afghanistan, and other areas of operations.

The team examined the processes used in apportionment and allocation in a historical context. The researchers analyzed USCENTCOM data associated with the supply of, and demand for, UAS assets capable of full-motion video and, when possible, captured the way in which these assets were used. Best practices were inferred from data analysis, interviews with military personnel at every echelon of USCENTCOM's UAS operations, and judgments based on past research.

Sponsor: *Joint Unmanned Aircraft Systems Center of Excellence*

Project Leader: *Carl Rhodes*

Requiring Justification and Approval of Sole-Source DoD Contracts to Native American Organizations

Among the benefits to participants of the federal 8(a) Business Development Program—named for Section 8(a) of the Small Business Act—is the ability to receive government contracts set aside for such businesses. If the contract is less than \$6.5 million in manufacturing industries or \$4.0 million in other industries, it need not be subject to competition. Small businesses participating in the 8(a) program and owned by special types of Native American organizations, such as Alaska Native Corporations (ANCs), have been able to receive noncompetitive contracts above these thresholds. Contract revenues to such firms, especially those owned by ANCs, have risen rapidly. One analysis found that federal contract obligations to 8(a) firms owned by ANCs increased from \$285 million in 2000 to \$3.9 billion in 2008.

Concern over these exemptions led Congress to establish a requirement for justification and approval of noncompetitive contract awards exceeding \$20 million. However, the effect that this requirement would have on the contracting process and the competitiveness of firms owned by Native Americans was unknown. Accordingly, Congress requested a report on how this provision may affect the contracting process, whether it places an administrative burden on contracting personnel, and what might be done to mitigate any unintended negative consequences. An NDRI team is fulfilling this request by assessing contracts awarded to Native Americans; identifying key differences in the contracting process across sole-source contracts with justification and approval, contracts without justification and approval, and competitive contracts; and interviewing key stakeholders associated with past large, noncompetitive contracts awarded to ANCs and economically disadvantaged Indian tribes.

Sponsor: *Office of Small Business Programs, OSD*

Project Leader: *Nancy Y. Moore*

⁵ For more information, see *Changing Aircraft Carrier Procurement Schedules: Effects That a Five-Year Procurement Cycle Would Have on Cost, Availability, and Shipyard Manpower and Workload*, John F. Schank, James G. Kallimani, Jess Chandler, Mark V. Arena, Carter C. Price, and Clifford A. Grammich, MG-1073-NAVY, 2011. Online at <http://www.rand.org/pubs/monographs/MG1073.html>

⁶ For more information, see *What Should Be Classified? A Framework with Application to the Global Force Management Data Initiative*, Martin C. Libicki, Brian A. Jackson, David R. Frelinger, Beth E. Lachman, Cesse Ip, and Nidhi Kalra, MG-989-JS, 2010. Online at <http://www.rand.org/pubs/monographs/MG989.html>

Alternative Fuels for the Military

- Military fuels can be produced from sources other than petroleum, but near-term options that offer to reduce greenhouse-gas emissions may not be economically competitive unless crude oil prices are well above \$100 per barrel.
- There is no tactical or operational *military* benefit to alternative fuels, so investment by DoD in their development would have to be justified by other *national* benefits, which may be substantial.
- Ongoing DoD efforts to test and certify alternative fuels for use in tactical systems are far outpacing commercial development and production of those fuels.

The Department of Defense seeks to reduce its reliance on petroleum-based fuels. In addition to ongoing efforts to improve fuel efficiency, all four military services have expressed a clear interest in being early users of alternative fuels in their tactical weapon systems. The potential of such fuels to serve military needs led Congress, in the National Defense Authorization Act for FY09, to call for a study on the use of alternative fuels in military vehicles and aircraft. Specifically, the study was to examine

- opportunities to produce alternative fuels in a way that reduces life-cycle greenhouse-gas emissions
- the military utility of forward-based alternative fuel production
- goals and progress of DoD research, testing, and certification efforts directed at alternative fuels
- the prospects for commercial production of nonpetroleum military fuels.

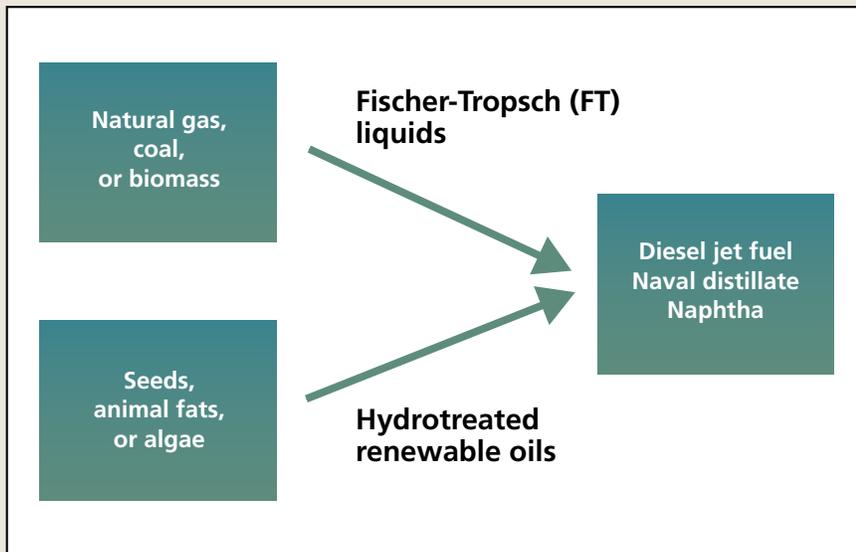
The Defense Logistics Agency asked NDRI to conduct the study and deliver it to the Secretary of Defense and Congress. RAND researchers focused on alternative liquid fuels that might be candidates for military applications over the next ten years, with emphasis on those that have been the focus of research and testing efforts within DoD. Efficiency initiatives and other energy efforts, such as greater use of renewable energy to make electricity, were outside the scope of this study.

Opportunities to Produce Alternative Fuels with Lower Greenhouse-Gas Emissions

The Fischer-Tropsch (FT) method, invented in Germany in the 1920s, can produce alternative fuels that can substitute for petroleum-derived military fuels, such as jet propellants and naval distillate. The method accepts a variety of feedstocks, including coal, natural gas, and biomass. Recently built FT plants using this method with natural gas are in commercial operation, but not in the United States.

Coal and biomass resources in the United States are sufficient to support FT fuel production of several million barrels daily. Considering this production potential, commercial status, and projected production costs, FT fuels produced from a mixture of coal and biomass are a near-term option for meeting both DoD and civilian fuel needs. However, to yield greenhouse-gas emissions that are appreciably lower than petroleum-derived fuels, the carbon dioxide emissions generated in the

RAND researchers focused on alternative fuels that might be candidates for military applications over the next ten years.



There are two potential types of alternatives to petroleum-based military fuels, but both have drawbacks.

FT process must be captured and sequestered. A sequestration method in which carbon dioxide is used to enhance crude recovery from conventional oil fields is also a mature process. Whether low-emission FT technology reaches its potential depends crucially on gaining early production experience in the United States. Such experience would reduce large uncertainties regarding production costs. Federal support may be forthcoming for construction of a few small biomass-only FT plants. To date, no federal agency has announced plans to promote the more economical FT plants that would use a combination of coal and biomass.

Alternatively, fuels from hydrotreated renewable oils can also substitute for petroleum-based military fuels. Such fuels are produced by processing animal fats or seed oils with hydrogen. Unfortunately, it is highly unlikely that appreciable amounts of these renewable oils can be affordably and cleanly produced. Animal fats and other waste oils are already used for other commercial purposes and are in limited supply. Producing just 200,000 barrels per day of alternative fuels from seed oils (the equivalent of 1 percent of U.S. petroleum consumption) would require an area equal to about 10 percent of currently cultivated U.S. croplands. Moreover, seed oil production for fuel can cause land-use changes that could result in greenhouse-gas emissions that exceed those of conventional petroleum fuels.

Finally, advanced approaches using algae or other microorganisms may offer a sustainable approach for producing hydrotreated renewable oils suitable for military applications. However, technology development challenges suggest that it is highly unlikely that these advanced approaches will constitute an important fraction of the commercial fuel market until well beyond the next decade.

Military Utility of Forward-Based Alternative Fuel Production

Concepts for production of alternative fuels in or near theaters of operations do not offer a military advantage. The researchers examined two approaches: a large floating barge that could be towed to or near a theater of operations and a small-scale alternative fuel production system that could be deployed with tactical units. Both approaches suffer from severe operational problems, especially in terms of feedstock delivery, and may require a dedicated defense. Specifically, available evidence suggests that both concepts are tactically disadvantageous compared with conventional delivery of fuels.

Concepts for production of alternative fuels in or near theaters of operations do not offer a military advantage.

DoD Goals and Progress on Alternative Fuels

While the alternative fuels examined in this study are no less able than conventional fuels to meet military needs, they offer no particular *tactical or operational military* benefit over their petroleum-derived counterparts. For example, even if they can be produced at costs below the prevailing prices of conventional fuels, alternative fuels will be priced at market rates. Although DoD is a large fuel purchaser, its total needs are less than 2 percent of national demand. The research team was unable to find any credible scenario in which the military could not access wholesale supplies of the petroleum fuels that are required to meet defense needs. For these reasons, DoD goals for alternative fuels in tactical weapon systems should be based on national benefits, which can be substantial if a large, competitive alternative fuel industry develops in the United States.

The study team found that ongoing DoD efforts to test and certify alternative fuels for use in tactical systems are far outpacing commercial development. Considering the fairly small amount of global production of FT fuels (less than 0.5 percent of global petroleum production), there is no need to extend certification efforts to blends with a high FT fuel content. Similarly, because the prospects for appreciable domestic production of hydrotreated oils over the next decade are so unlikely, there is no benefit to DoD efforts (outside laboratory research and development) to test and certify such fuels.

If DoD continues to research alternative liquid fuels, it should consider consolidating its programs and shifting support to longer-term goals of supporting development capability for fuels with large-scale promise. To cost-effectively promote early industrial production of alternative fuels, DoD requires extended contracting authority for fuel purchases. Long-term fixed-price fuel purchase agreements should be avoided in favor of a guaranteed floor price and income-sharing in the event of higher-than-anticipated world crude oil prices.

Conclusion

The finding that alternative fuels offer the armed services no direct tactical or operational military benefit is consistent with findings of other recent studies on military energy issues—namely, that the military is best served by ongoing efforts to use energy more efficiently. This suggests that DoD and Congress should decide whether to continue to support the development of advanced technology for producing alternative liquid fuels through defense appropriations.



James T. Bartis

Project Leader

For more information, see *Alternative Fuels for Military Applications*, James T. Bartis and Lawrence Van Bibber, MG-969-OSD, 2011. Online at <http://www.rand.org/pubs/monographs/MG969.html>

Results from the Congressionally Mandated Study of U.S. Combat and Tactical Wheeled Vehicles

- There are no fundamental flaws in the processes for developing vehicle requirements. However, compromises must be made and risk accepted due to the impossibility of designing vehicles that are optimal for all future threats across protection, power, and performance. Furthermore, DoD may want to develop policy for all vehicles with respect to managing this risk.
- There are four key technical challenges: protection, electrical power generation, fuel cost and availability, and sensors, networking, and complexity.
- Business practices and policy changes could enhance the acquisition process in several areas, including cost-estimating procedures and alignment of modeling and simulation tools to support decisionmaking.

Historically, the research, development, and acquisition process to procure military vehicles has been challenging. Sometimes, the difficulty lies in translating the threat (such as an enemy antitank guided missile) into a design criterion (such as a protection requirement for armor plating). In other instances, problems have included a mismatch between cost estimates and actual costs, creeping requirements, unrecognized risk from immature technologies, or overly ambitious designs.

In 2010, Congress directed the Secretary of Defense to request that an independent body assess activities for modernizing the technology of the ground combat vehicle and armored tactical wheeled vehicle fleets. NDRI was asked to conduct the study and to provide a detailed discussion of requirements and capability *needs*, identify capability *gaps* for vehicles, identify critical technology elements or integration *risks*, and recommend *actions* to address the identified capability gaps.

The research focused on a set of vehicles representative of different classes and at different stages of development. The set comprised the Army ground combat vehicle (GCV); the joint light tactical vehicle (JLTV); the Marine Corps' expeditionary fighting vehicle (EFV) and medium tactical vehicle replacement (MTVR); and the Army Heavy Expanded Mobility Tactical Truck (HEMTT).

Requirements-Related Issues

The researchers found no fundamental flaws in the requirements development processes for the vehicles considered. However, predicting future threats over the expected life spans of vehicles now in production is very difficult, and choices must be made and risk accepted due to the impossibility of designing vehicles that are optimal for all future threats.

Choices must be made and risk accepted due to the impossibility of designing vehicles that are optimal for all future threats.



Examples of ground vehicles: Joint light tactical vehicle (JLTV), Abrams M1 tank, Bradley M2 infantry fighting vehicle (IFV), USMC expeditionary fighting vehicle (EFV), and Heavy Expanded Mobility Tactical Truck (HEMTT)

The “iron triangle” of trade-offs is permanent. In particular, DoD will always want vehicles that provide better protection, have more power (electrical and mechanical), and perform better or are more capable (in terms of weight, mobility, and so on). Investments in these areas will always be beneficial.

Inevitably, DoD will have vehicles in its fleets that were designed and built for requirements that differ somewhat from those it will face in the future. However, while the vehicles resulting from this process may fail to meet all requirements, they may nevertheless be satisfactory. Furthermore, DoD should have a policy for managing risk across all vehicle fleets.

Technology-Related Issues

The analysis identified four technical challenges faced by the research, development, and acquisition communities. Improving protection will be a permanent task requiring contributions from the areas of technology and engineering; it will never be “good enough” relative to what soldiers want. The advent of tactical networks and computer-based battle command systems, along with expectations of battle command on the move, drives demand for electrical power generation upward. Fuel costs and availability are major factors in ongoing and possible future operations. Finally, sensors and networking contribute to vehicle complexity, which increases the risk of schedule slippage and cost growth for vehicles under development.

Issues Related to Acquisition Policy and Business Processes

The study identified seven areas in which business practices, processes, and policy changes could significantly enhance the services’ ability to field vehicles that are appropriate for the anticipated operating circumstances:

- Tactical vehicles are acquiring more situational awareness and protection capabilities, which increases costs.
- Funding instability and creeping vehicle requirements are among the biggest threats to these programs.
- Different acquisition decisions would be made and net life-cycle costs reduced if cost estimates included life-cycle cost considerations.
- Modeling and simulation (M&S) efforts need to be better aligned with the decisions they are meant to support; this will require continual adjustment of scenarios and vignettes, greater transparency in the modeling process, and improved decisionmaker understanding of the choice of M&S tools.
- Risk (rather than simply total dollars involved) should be the dominant factor in designating acquisition categories (ACATs).⁷
- Experts interviewed emphasized the need to ensure that programs (especially large, complex ones) receive appropriate fiscal and human resources from the outset.
- Unanticipated independent tests and evaluations sometimes lead to new performance requirements for vehicles at the end of a system’s development, potentially causing delays in the vehicle’s final certification and adding to program cost and schedule slippage. The operational test and evaluation community should be included earlier in the development process to minimize unexpected requirements.



Overall Trends

Equipping the armed services with ground combat and tactical wheeled vehicles will remain a challenging endeavor. The study identified both positive and negative trends.

Positive trends include the preference among program managers for relatively mature technologies at the beginning of a program's technology development phase, the services' appreciation of the need for better systems engineering expertise, and the responsiveness of the research, development, and acquisition communities (e.g., to produce needed vehicles rapidly).

Negative trends include rising costs and the persistent vulnerability of the vehicle fleets to changing threats. The potential of robotics and autonomous systems may seem significant, but until the military services develop concepts for applying these technologies in roles that would reduce the threat to ground combat and tactical wheeled vehicles, their future utility remains uncertain.

What Congress Can Do

The study identified a number of considerations for Congress:

- Congress should consider requiring DoD to present the strategic rationale for vehicle fleet development choices *fleetwide*, as well as to explain how each proposed vehicle fits within this rationale.
- In its oversight role, Congress should consider taking steps to ensure that defense programs adequately address each of the key technical challenges (i.e., improved protection, power generation, fuel consumption, sensors and networking).
- Congress should consider a range of actions to address issues related to acquisition policy and business processes. These actions may take the form of guidance, changes to laws, or clarification of congressional intent with a focus on regulations (e.g., adopting ACAT decision practices that more realistically address risk). And some, if not all, have cost implications that Congress should factor into the way it oversees vehicle fleet development (e.g., the rising costs of tactical wheeled vehicles).
- Finally, Congress should provide support and guidance for a more comprehensive M&S capability—and leaders who are empowered to use it—for a range of purposes, including establishing future requirements, research and development, engineering, program design, and manufacturing.

⁷ Acquisition programs are currently classified into any of several different categories (ACATs), depending on expenditure or procurement dollar amounts, where the decision authority lies, and whether the program is an information system. This categorization has implications for oversight.

Congress should consider a range of actions to address issues related to acquisition policy and business processes.

Terrence K. Kelly and John E. Peters (pictured) Project Leaders

For more information, see *The U.S. Combat and Tactical Wheeled Vehicle Fleets: Issues and Suggestions for Congress*, Terrence K. Kelly, John E. Peters, Eric Landree, Louis R. Moore, Randall Steeb, and Aaron Martin, MG-1093-OSD, 2011. Online at <http://www.rand.org/pubs/monographs/MG1093.html>



Finding Solutions for Space Debris: Lessons from Outside the Aerospace Industry

- Space debris is not a unique problem from the perspective of risk management. A class of comparable problems can be addressed using the same approach, and these problems can yield insights for the debris problem.
- The space industry is currently using regulations and incentive structures to manage risks from debris.
- Commercial industry's lack of substantial investment in remediation technology suggests that space debris is not yet recognized as a great-enough risk to warrant the development of a space-based "garbage truck."
- Developing the prototype technology now for such a remedy may prove to be a wise decision because on-orbit collisions are likely to continue.

Space debris represents a growing threat to the operation of satellites. There are currently hundreds of thousands of objects greater than one centimeter in diameter in Earth's orbit. The collision of any one of these objects with an operational satellite could cause catastrophic failure of that equipment.

The Defense Advanced Research Projects Agency (DARPA) recently undertook a project to investigate potential technical solutions for remediating the debris issue. As part of that work, DARPA asked NDRI to look outside the aerospace industry to learn how other industrial sectors approached problems that shared some of the characteristics of the space debris issue. RAND researchers identified a class of problems that are similar to space debris, and they used a literature review and discussions with subject-matter experts to glean a set of lessons that could be applied to the debris problem.

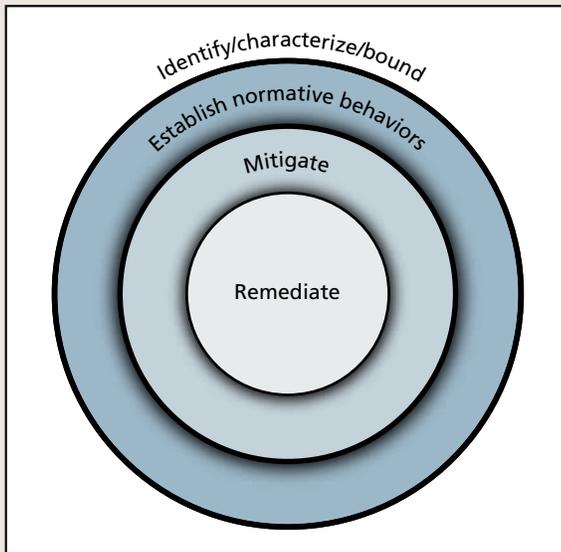
Identifying Comparable Issues

The research focused on nine issues that share certain similarities with space debris: acid rain, airline security, asbestos, chlorofluorocarbons (CFCs), hazardous waste, oil spills, radon, spam, and U.S. border control. These problems share several characteristics. In each case, there is general agreement that a problem exists; however, the existing state of affairs does not provide an acceptable solution. In addition, the risk of collateral damage in each case is significant. In all cases, there will always be an endless supply of "rule-breakers," who, whether intentionally or by accident, cause the problem to proliferate. Finally, none of these problems is likely to ever be considered "solved" because the root cause in each case is difficult to eliminate.

A Framework for Addressing Space Debris and Other Problems

Space debris, like the comparable problems, is best addressed using a series of increasingly aggressive measures designed to discourage the accidental or intentional creation of debris, as shown in the figure. The first step is to identify, characterize, and bound the problem as an issue of concern. The next step is to set normative behaviors, i.e., expectations for acceptable conduct. While norms tend to discourage unwanted behavior, some individuals or groups will flout them. To discourage these wrongdoers, the third step is to establish mitigation practices, which may consist of

Space debris is one of a set of problems whose root causes are difficult to eliminate.



A framework of increasingly aggressive measures is appropriate for addressing problems of the space debris type.

any combination of rules, regulations, standards, incentives, or penalties designed to reduce the severity of the problem or its effects. The final step is remediation. When a problem is in remediation, the aim is either to relocate the problem's source to a place where it poses less risk or to eliminate it entirely.

Problems evolve in different ways. Progression through the four stages is determined by the risk tolerance of the people and organizations affected. In some of the cases studied, it took several years to identify the problem (e.g., acid rain, asbestos), while in others, a single critical event was enough to propel the problem through several of the stages at once (e.g., airline security, oil spills, radon). Decisionmakers should proceed to the next stage when the number or severity of unwanted incidents exceeds the community's risk tolerance level.

Eliminating the problem is not necessarily the primary objective. Instead, the goal should be to reduce the risk posed by unwanted phenomena to a level that the affected stakeholders find acceptable. Once in remediation, a problem is not always "solved." Airline threats, hazardous waste, oil spills, radon, and spam are all examples of problems that are difficult to completely eliminate.

The events of the 2010 Deepwater Horizon spill highlight a number of additional lessons that are applicable to the space debris problem:

- **Simply having a remedy available is not sufficient; remedies must be tested and proven to work in the expected operating conditions.** Approaches used to contain the oil spill failed because none had been tested to ensure that it would work reliably at a depth of 5,000 feet.
- **When reacting to a catastrophe, a "dragnet" approach is needed to address the aftereffects; after a catastrophe, a "targeted" solution focused on a specific issue may also be needed.** In the days following the oil spill, a number of workers set out to deploy booms, spray dispersants, and collect animals for cleanup. These dragnet techniques were useful in addressing the resulting oil slick, but a targeted approach was needed to stop the leak at the wellhead.
- **Remedies must evolve to face the latest challenges.** Containment domes were developed several decades earlier for use in treating spills at underwater depths of 100–1,000 feet, but this technique did not keep up with drilling capabilities and thus was not effective when deployed in the course of the spill.

Although mitigation may be acceptable for now, it may be wise in the near term to develop a prototype remediation technology for space debris.

The Case for Additional Mitigation in Space Debris

Mitigation appears to be an effective way to deal with the space debris problem in the near term. The problem is currently managed through a series of rules, policies, and regulations that have been established by agencies such as the U.S. Air Force, NASA, the European Space Agency, and the United Nations.

When viewed in light of the comparable problems, there is evidence to suggest that space debris does not currently pose a great-enough risk to warrant the deployment of a remediation technology. While everyone in the space community agrees that space debris poses a risk, the lack of significant private-sector funding for this effort suggests that the perception of risk has not yet crossed a critical threshold that would prompt demands for remediation.

The Case for Developing Remediation Technologies

Although mitigation may currently represent an acceptable option for addressing the problem of space debris, RAND's research presents several lessons suggesting that it may be wise in the near term to develop a prototype remediation technology (i.e., a space-based "garbage truck" or some other concept).

A community of stakeholders must be prepared for "shocks" or catastrophic events. Developing a prototype technology for a remedy now could prove to be a wise decision because on-orbit collisions are likely to continue in the future.

Remedies must be designed and tested to work under actual operating conditions. This is the biggest lesson from the Deepwater Horizon spill. Fielding a demonstration technology will prove useful only if it will provide operators and engineers with relevant information on technology performance under actual working conditions.

One remedy is not often good enough. A remedy is typically used to respond to an event that has already occurred. As a result, remediation technology is often very specialized, and, for many problems, several different techniques are necessary.

When a problem's effects are not directly observable, a community is likely to underestimate the risk posed by the effects. Because the threat posed by space debris is virtually invisible until a major collision occurs, the broader community may tend to underestimate the potential risk. This is likely the biggest challenge faced by the space community: It is hard to convince the public to support investment for a problem it cannot see.



Dave Baiocchi and William Welsch IV
Project Leaders

For more information, see *Confronting Space Debris: Strategies and Warnings from Comparable Examples Including Deepwater Horizon*, Dave Baiocchi and William Welsch IV, MG-1042-DARPA, 2010. Online at <http://www.rand.org/pubs/monographs/MG1042.html>

Forces and Resources Policy Center



*John D. Winkler (2011) and James Hosek (2010),
Directors, Forces and Resources Policy Center*

Military operations in Iraq and Afghanistan have been the longest and most demanding test of the all-volunteer force since its inception in 1973. More than 2 million servicemembers have been deployed in these operations. Obtaining the needed personnel for the armed forces requires policies to maximize recruiting and retention, including setting compensation and providing benefits at cost-effective levels. But having enough people is just the first step. Within its total workforce of active- and reserve-component military personnel and civilians, DoD must recruit or develop people who have the skills necessary to meet the demands of a variety of defense missions.

At the same time, DoD faces structural challenges. For example, the reserves have been transformed from solely a strategic force to both a strategic and an operational one, while the finer

points of achieving jointness are a continuing challenge. DoD must also respond to concerns regarding jobs and health care for returning veterans, including those who are wounded, ill, or injured, and, more generally, the reintegration of deployed servicemembers into their families and communities. For reservists, this includes reintegration into the civilian workforce.

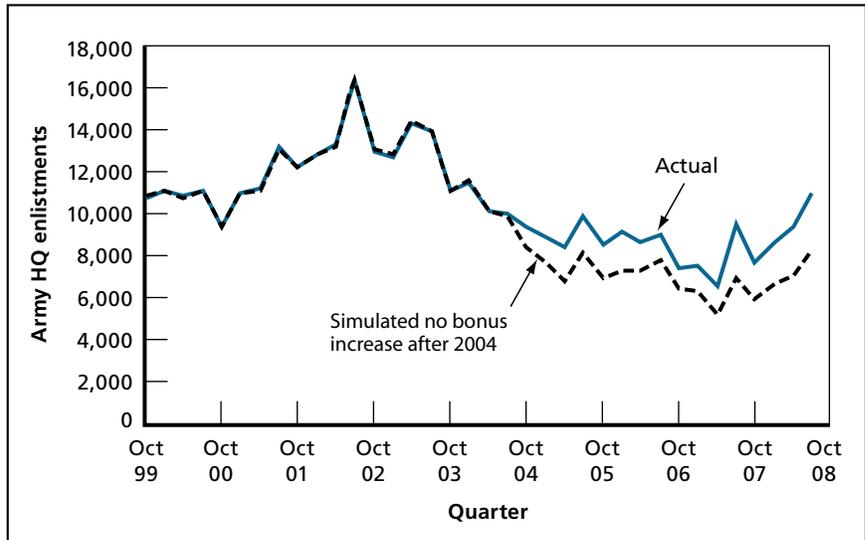
All these issues have been the topic of research by NSRD's Forces and Resources Policy Center, which has been actively involved for almost four decades in helping the United States sustain the all-volunteer force. The extensive body of manpower research done by NSRD has helped DoD understand and respond to the recruiting and retention crises in 1979 and 1999, the transition to a mature volunteer force in the 1980s, the post-Cold War drawdown, and—after 9/11—the global war on terrorism. Much of the earlier research focused on the supply of volunteers, but over the past 20 years, the center's research agenda has become more diverse. Supply-oriented projects continue, but there has been more work on military health policy, the quality of military life, and the management and development of military and civilian personnel, including research directed specifically toward reserve-component issues. This varied program of research has helped DoD adapt its organizations, policies, and processes to current and evolving manpower and other resource challenges.

Some Recent and Ongoing Projects

The Effectiveness of Military Enlistment and Reenlistment Bonuses

Between 2000 and 2008, the DoD budget for enlistment and reenlistment bonuses increased by 75 percent in real terms, to approximately \$2 billion. This increase raised questions in Congress and at the Government Accountability Office about the scope and efficacy of bonuses. Congress directed DoD to provide information on the number and average amounts of bonuses and on metrics of bonus performance. DoD requested that NDRI conduct the analysis in response to the congressional mandate. To determine whether bonuses were effective in maintaining or increasing the supply of personnel, the researchers drew on data for each service (but with a particular emphasis on the Army) to conduct an empirical review of bonuses' effects. They found that bonus programs had been important in helping the services meet

The number of high-quality recruits would have been lower without the increased use and generosity of bonuses in the period studied.



recruiting and retention objectives. Bonuses increased the numbers of recruits (see figure) and both the probability of reenlistment and the length of the term signed up for. The services had also managed bonuses flexibly by targeting them to specific groups and adjusting them in a timely manner. Bonuses helped overcome declining youth attitudes toward enlisting in the military and the adverse effects of frequent and long deployments. Finally, bonuses were cost-effective relative to pay as a recruiting and retention resource: An additional person-year of service could be secured more cheaply through bonuses than through an overall pay increase.⁸

Sponsor: *Office of the Under Secretary of Defense for Personnel and Readiness*
Project Leaders: *Beth J. Asch and James Hosek*

The Company-Grade Officer Shortfall in the U.S. Army Reserve Components

For more than a decade, the inventories of company-grade officers (lieutenants and captains) in the U.S. Army Reserve and Army National Guard have fallen short of authorizations. As a result, Congress requested that DoD conduct a study of this shortfall and how to remedy it. In particular, Congress wanted the study to consider the establishment of a National Guard military academy. In response, RAND researchers modeled the officer inventory to project future fill rates. They also used data analysis in combination with interviews to generate preferred approaches to addressing the issue. Those interviewed included representatives of the Army secretariat and staff and the Army reserve components. The researchers found that the overall company-grade officer fill rates in Army National Guard and Reserve units are improving gradually; captain fill rates have slowly increased (to 71 and 75 percent, respectively, in 2009), and lieutenant fill rates increasingly exceed 100 percent. However, aggressive measures would be needed to dramatically improve the captain fill rate in both the National Guard and Reserve. Modeling demonstrated that the Army reserve components could achieve a 100-percent captain fill rate in five to ten years if they can sustain recent low loss rates, increase officer accession rates, and promote lieutenants to captain more quickly. The researchers thus concluded that the National Guard could achieve a 100-percent captain fill rate before a new National Guard academy could produce captains. Increased officer accession rates could be achieved, for example, by motivating more active-component officers to transfer to the reserves or more ROTC cadets to join a reserve unit early in their educational tenure. Either would necessitate resources, but these costs would not likely approximate those of establishing and continuing to operate a new postsecondary institution.

Sponsor: *Office of the Assistant Secretary of Defense for Reserve Affairs*
Project Leader: *Catherine H. Augustine*

Longitudinal Assessment of Family Readiness

The success of military operations depends not only on servicemembers' own preparation but also on the preparation of their families, a concept known as family readiness. Recently, the military has provided considerable funding for programs aimed at promoting family readiness, but it remains unclear exactly what it entails or how it is achieved. What skills and tools are most important in meeting the challenges of military life? How are these tools related to family well-being and functioning during deployment? What are the characteristics of families that are more or less successful in meeting the challenges of deployment? Addressing these questions would allow military policymakers to design programs that target the families most likely to need support and to tailor those programs toward interventions most likely to address real needs.

A RAND study team is designing and implementing a survey to assess family readiness among all services. The aim of the study is to understand the factors in the lives of military families that promote or detract from resilience in the face of unique stressors, such as deployment. The team will survey a group of families to identify characteristics of family functioning, health, and readiness over time. Unlike previous efforts, this survey will assess the experiences of multiple family members (the servicemember, his or her spouse, and one of their children, if they have any). The new study will also include far more waves of data collection than have previously been attempted: nine altogether, covering 36 months spanning the predeployment, deployment, and postdeployment phases.

The study is being conducted through the RAND Center for Military Health Policy Research, a joint initiative of NDRI, RAND Arroyo Center, and RAND Health.

Sponsors: *Office of the Assistant Secretary of Defense for Health Affairs and the Army Surgeon General*

NDRI Project Leaders: *Margaret C. Harrell and Anita Chandra*

Innovative Practices in DoD's Support of Psychological Health and Traumatic Brain Injury

Increasing operational tempo in Iraq and Afghanistan has created new health care challenges for U.S. military personnel. Although most servicemembers cope adequately, longer and more frequent deployments have increased the risk for mental health issues, such as post-traumatic stress disorder. At the same time, there is growing concern about the incidence of traumatic brain injury (TBI) in this group. In response, the military has implemented a large number of programs to help personnel and their families address these issues. These programs address several of the biological, psychological, and social influences on health at diverse phases of health services provision, including development of resilience, screening, prevention, and treatment.

An ongoing challenge for DoD is to identify and characterize the nature and effectiveness of these various activities. While there have been some attempts to generate inventories of programs, these lists have not been comprehensive, nor have they included information with respect to program content or outcomes. Very few (if any) of these programs or initiatives have been carefully evaluated to measure their impact or to ensure desired effectiveness or continuous improvement. Such information would help policymakers in determining which programs to expand, modify, or eliminate.

In response, RAND researchers are engaging in the following activities: (1) identifying and describing existing programs; (2) constructing a preliminary set of evaluation tools; (3) evaluating a small subset of the programs, with priority placed on programs that have not previously undergone evaluation; and (4) fostering the dissemination and adoption of evaluation methods. This study, like the preceding one, is being conducted through the RAND Center for Military Health Policy Research.

Sponsor: *Office of the Assistant Secretary of Defense for Health Affairs*

Project Leaders: *Robin M. Weinick and Carrie Farmer*

Creating Flexibility and Agility in Military Officer Management Systems

DoD's officer management system evolved in the decades following World War II and culminated with the Defense Officer Personnel Management Act of 1980 (DOPMA) and the Reserve Officer Personnel Management Act of 1994 (ROPMA). There have been some modifications to the system since, but the fundamentals remain unchanged. A previous ten-year retrospective assessment of DOPMA, conducted by NDRI, concluded that the system is more a static description of the desired officer structure than a dynamic management tool. The system was ill suited to manage the significant changes in force structure during the 1980s and 1990s. Subsequent RAND research has demonstrated how adopting alternative assignment, promotion, and retirement laws and policies could create a more flexible, dynamic system. Other organizations have recently endorsed or proposed similar changes in law and policy. Most notably, in 2008, the Commission on the National Guard and Reserves recommended the creation of a single officer career management system for active- and reserve-component officers. The system envisioned by the commission would fundamentally change the basis for officer management from temporal milestones to officer competencies and skills.

NDRI has undertaken a two-year project, now in progress, to enhance the analytical tools and the knowledge base to support OSD in addressing a range of potential officer management issues. NDRI researchers have created a collaborative online tool for reviewing law, policy, and practice pertaining to military officer management. They have also significantly enhanced simulation tools that enable quantitative and qualitative analyses of the effects of a range of proposed changes. The changes may be in such areas as career longevity, assignment length, promotion timing, strength management, compensation, retirement policies, and integration of DOPMA and ROPMA into a single system.

Sponsor: *Office of the Under Secretary of Defense for Personnel and Readiness*

Project Leader: *Peter Schirmer*

⁸ For more information, see *Cash Incentives and Military Enlistment, Attrition, and Reenlistment*, Beth J. Asch, Paul Heaton, James Hosek, Francisco Martorell, Curtis Simon, and John T. Warner, MG-950-OSD, 2010. Online at <http://www.rand.org/pubs/monographs/MG950.html>

Sexual Orientation and the U.S. Military Revisited

- Repeal of “Don’t Ask, Don’t Tell” will have little impact on recruiting and retention of military personnel or on unit cohesion and performance.
- Major U.S. allies have allowed gay individuals to serve in their militaries without restriction for a number of years. They report no effect on unit performance or the ability to meet recruitment goals.
- U.S. police and fire departments, as well as federal agencies, major corporations, and colleges, all report that they have integrated gay individuals without serious problems.
- Successful change must be motivated, clearly communicated, and sustained through monitoring and reinforcement.

The law commonly known as “Don’t Ask, Don’t Tell” (DADT), passed by Congress in September 1993, allowed gay individuals to serve in the U.S. military as long as they did not reveal their sexual orientation. In exchange, the policy stipulated that the military would not ask about their sexual orientation and would not pursue information about their orientation unless it was credible. In 2010, President Barack Obama announced that he would work with Congress to repeal DADT. As part of a broader DoD review of the issues associated with repeal, NDRI was asked to update its 1993 report *Sexual Orientation and U.S. Military Personnel Policy: Options and Assessment*.

NDRI’s update addressed four key issues: (1) how the environment has changed within and outside the military since the inception of DADT, (2) how the repeal of DADT might affect military readiness and effectiveness, (3) what military personnel think about repeal, and (4) what has been the experience of other institutions in which gay people currently serve, work, and study.

The Environment Within and Outside the Military in 2010

Society’s views of gay individuals have changed substantially since 1993. Polls show that more than half of Americans are accepting of gay people, and nearly 90 percent agree that gay individuals should have equal rights in job opportunities.

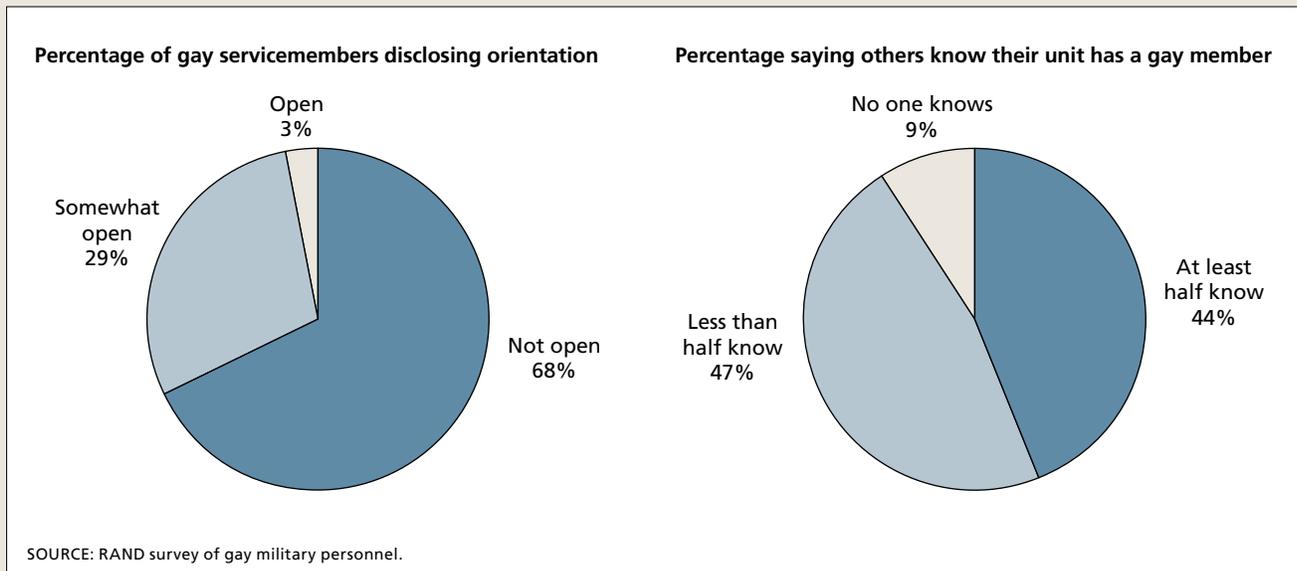
Polling data also show an increase in the number who favor allowing gay people to serve in the military without restriction. Drawing on data from the National Longitudinal Study of Adolescent Health, the NDRI team estimated that the percentage of gay men in the military (2.2 percent) is close to the percentage of gay men in the civilian population in the same age group (3.2 percent) and that lesbians serve in the military at disproportionately high rates (10.7 percent in the military compared with 4.2 percent in the civilian population).

Effect of the Repeal of DADT on Military Readiness and Effectiveness

Concerns have been expressed that allowing gay men and lesbians to serve in the military without restriction would affect military readiness and effectiveness by making recruitment and retention more difficult and eroding unit cohesion and performance.

Recruitment. To estimate how the repeal of DADT might affect recruitment, RAND researchers used data from two DoD surveys, administered in spring and summer of

Polling data show an increase in the number of Americans who favor allowing gay people to serve without restriction.



The majority of servicemembers surveyed were not open about their sexuality but acknowledged that others were aware that their unit had a gay member.

2010, which asked youth and young adults ages 15–24 about their intentions to join the military and how they thought repeal of DADT might affect those intentions. Based on responses from the May 2010 survey, the team estimated that repeal might cause a 7-percent drop in enlistment. Based on responses from the August 2010 survey, the team estimated a 4-percent increase in enlistment. Given these results, the team concluded that the potential effect was uncertain but likely to be small.

Retention. Data from a third DoD survey of military personnel, this one with questions related to retention, did not allow the RAND team to directly estimate an effect. However, the data allowed the team to identify the group most likely to leave in the event of repeal. Those are the respondents who said that they would leave if DADT were repealed and who also said that DADT was more important than any other factor in this decision. This group represents slightly less than 6 percent across the services; the percentage was higher among Marines and lower among Navy and Air Force personnel.

Unit cohesion and performance. *Cohesion* is a term that is used in the military to refer to the forces that bind individuals together as a group. However, most studies, including recent work in the military, sports, social psychology, and industrial-organizational behavior literatures, distinguish between *task cohesion* (commitment to mission) and *social cohesion* (interpersonal liking). A substantial body of research has shown that task cohesion is a stronger predictor of successful unit performance than is social cohesion. The research further shows that successful performance is a stronger predictor of cohesion in a unit than cohesion is a predictor of performance.

Based on recent studies—and even going back to the experience of infantry and air crews in World War II—it appears that divergences of background and outlook in civilian life have little meaning in combat. The key is the shared experience in the face of the enemy. Emotional bonds clearly play a role in combat motivation, but trust, not liking or affection, leads to unit cohesion. Studies also show that military leadership and training are essential ingredients for building cohesion and improving unit performance.

Opinions of Military Personnel

NDRI researchers conducted 22 focus groups at ten military installations and talked with more than 200 serving military personnel. The team also conducted a peer-to-peer survey of currently serving gay personnel.

Focus groups. The majority of focus group participants said they knew gay men and lesbians who were serving and respected their contributions to the unit. Group members had diverse opinions about allowing gay personnel to serve without restriction but agreed that the military could meet the challenge.

RAND survey of gay military personnel. The majority of the 208 gay men and lesbians who responded to the online survey reported that they do not talk about their sexual orientation with their military colleagues. However, they also reported that many members of their units know that there is a gay servicemember in the unit (see figure). Survey respondents attributed a range of personal problems to DADT, including risk of blackmail, damage to personal relationships, stress and anxiety, and mental health problems. The respondents overwhelmingly claimed that they would be selective in revealing their sexual orientation after the repeal of DADT.

Experience of Other Institutions

NDRI researchers also visited a number of foreign militaries—in Australia, Canada, Germany, Israel, Italy, the Netherlands, and the United Kingdom—all of which have removed restrictions on gay individuals serving in their forces. None of these militaries reported that having gay servicemembers had affected unit performance or their ability to meet recruitment goals. No country provides special accommodations for privacy or special training on sexual orientation.

The NDRI team also conducted interviews with officials in domestic organizations, including police and fire departments in seven cities, federal agencies with which the military often operates at home and abroad, major private-sector companies, and American colleges and universities. These organizations all reported that they had integrated gay individuals—without serious problems, negative effects on performance, or making specific accommodations—by applying a strict policy of antidiscrimination.

Implementing Change

The NDRI team reviewed the extensive literature on implementing change in large organizations and synthesized the experience of the foreign militaries, domestic organizations, and federal agencies that were studied. Both the literature and the wide range of real-world experience suggest that successful change must be motivated, clearly communicated, and sustained through monitoring and reinforcement. The role of leaders at all levels of the organization is critical.

Bernard D. Rostker

Project Leader

For more information, see *Sexual Orientation and U.S. Military Personnel Policy: An Update of RAND's 1993 Study*, National Defense Research Institute, MG-1056-OSD, 2010. Online at <http://www.rand.org/pubs/monographs/MG1056.html>



Most focus group participants said they knew gay men and lesbians who were serving and respected their contributions to the unit.

Reserve-Component Unit Instability: The Problem, Its Causes, and Potential Solutions

- In Army reserve-component units, personnel instability is widespread. In the units studied, almost half the soldiers who deployed had been with their unit less than a year; this instability complicates training prior to deployment.
- The primary sources of instability are soldiers moving to another unit or leaving the service and soldiers who do not deploy with their unit.
- The reserve components will have to live with considerable instability in the run-up to mobilization and deployment. Changes in the timing of training could ameliorate the problem in some respects, but they have their own drawbacks.

Military forces place a high value on unit stability—keeping a unit’s membership constant over time—particularly in units deploying to a theater of operations. Yet, active and reserve Army units typically have considerable personnel turbulence as they approach mobilization and deployment. Some members leave the unit or do not deploy with it, and new personnel are transferred in (“cross-leveled”) so the unit can meet its target for deploying strength. Thus, the unit must repeat some training for the newcomers. This situation is widely viewed as a potential problem, particularly in reserve units, which have limited time to train before mobilizing.

Drawing on longitudinal data from DoD monthly records for all Army personnel from 1996 to 2008, NDRI researchers assessed the extent of the problem, along with its causes and potential policy solutions. The analysis focused on 153 reserve-component unit deployments from 2003 to 2008, representing more than 40,000 authorized positions. The units included infantry battalions, military police companies, and truck companies as representatives of combat, combat support, and combat service support units, respectively.

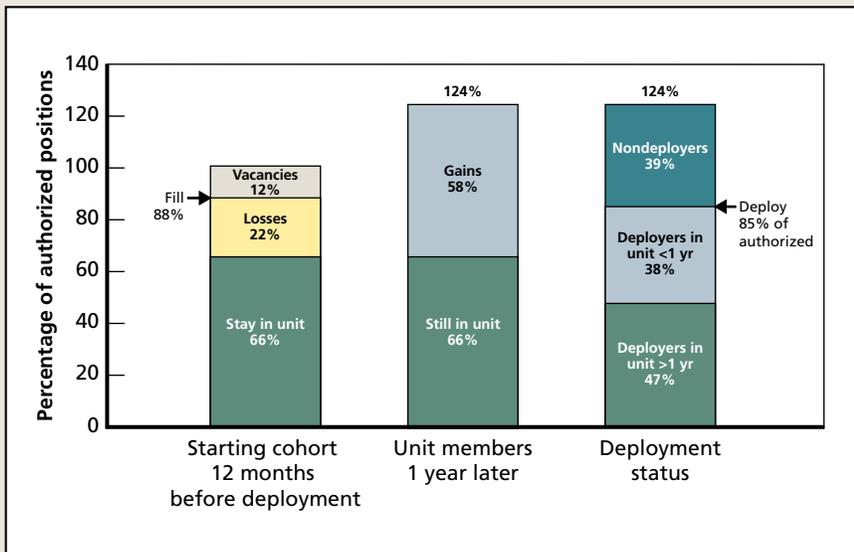
Instability Is Widespread

Of all the soldiers who actually deployed with the units studied, 40–50 percent were new arrivals who had been in the unit for less than a year. This picture of instability was widespread across all types of deploying units (including active units), affecting all grade levels: junior enlisted personnel, noncommissioned officers, and officers. In fact, instability was highest among officers, who are more likely than enlisted personnel to be transferred out of a deploying unit into another unit.

Several Factors Account for Instability

The primary factors creating instability were soldiers moving to another unit or leaving the service and personnel who did not deploy with their unit (nondeployers). Across the unit types studied, between 25 and 40 percent of personnel assigned to the unit 12 months before mobilization left the unit during the subsequent year. But these loss rates may be more benign than the numbers suggest: They were not higher than in a previous baseline period, and they did not rise appreciably as mobilization approached. And many unit losses were moves to other Army units rather than losses from the Army. In fact, those same soldiers often deployed with their new unit, sometimes even before the source unit deployed.

Across the units studied, between 25 and 40 percent of personnel assigned to the unit 12 months before mobilization left during the subsequent year.



Gains and losses created instability in deploying Army National Guard battalions (data from 2003–2008).

About one-third of soldiers in the reserve-component units on the deployment date did not deploy, as illustrated in the figure (“Nondeployers”). Some did not deploy with their unit but moved to another unit. Some deployed later. Some stayed at the home station as part of a rear detachment. Some had prior activations and thus were probably exempt from another near-term deployment. And some were new recruits who had not yet completed initial training.

In some cases, unit movers or nondeployers represented an Army accommodation of the servicemember’s personal circumstances or hardship; other cases resulted from deliberate Army actions (e.g., to fill higher-priority deploying units) or conditions normal to the reserves (e.g., the presence of untrained new recruits).

Instability Affects Training Prior to Deployment

The rapid buildup of personnel begins four to six months before mobilization. But units have often been conducting important training events for 12 months or more beforehand. When that training is done early, the new arrivals miss key events, which means that the unit must arrange training for them. In some cases, training in significant subjects was conducted early enough that 30–50 percent of the deployers would have missed it. Examples of such subjects include weapon qualification, combat lifesaver training, urban warfare techniques, and dealing with improvised explosive devices. This pattern of missed training events was common across all types of units studied. Still, the system has proved resilient: Ninety-five percent of those who deployed were in place by the mobilization point, newcomers did complete their training, and no theater arrival dates were slipped.

Units recognize that instability affects training efficiency and, especially, scheduling. Thus, many units tried to schedule much of their training closer to mobilization, when unit manning was more stable.

Options for Managing Instability

Analysis of the effects of possible policy interventions showed that, even with multiple policy changes and reasonable degrees of success, the reserve components will have to live with a substantial amount of instability in the run-up to mobilization and deployment. Of course, other alternatives exist, but each comes with its own trade-offs.

For example, DoD could *encourage more units to cluster training just before mobilization*, ensuring that most soldiers are together in the unit for training and

The reserve components will have to live with a substantial amount of instability in the run-up to mobilization and deployment.

avoiding the inefficiencies of training earlier. But concentrating intensive training into a short period just before mobilization could result in lower participation rates if the time demands are too high.

Alternatively, DoD could *postpone some training until after mobilization*, accomplishing more training when all deploying soldiers are present, relieving pressure on the premobilization period, and potentially offering greater efficiencies by operating in centralized facilities. Recent data on unit preparation and deployment suggest that more training could be done after mobilization while still maintaining planned levels of “boots-on-the-ground” time, but such a change would need to be tested. If it required more time, DoD would face two less attractive options: Increase the duration of mobilization (keeping soldiers away from their homes and civilian jobs for a longer continuous period) or reduce time in theater (requiring a faster unit turnover rate in theater and thus more units to cover a given period of operations).

In the longer term, DoD might experiment with some more-aggressive initiatives that aim to foster better unit-level retention, control interunit moves, lower vacancies through intensified recruiting, and accelerate initial training. In addition, it might try initiatives to enhance training efficiency, such as more-centralized training, greater use of mobile training teams, and distributing individual training to personnel who will move into a deploying unit just before mobilization. Such initiatives could require substantial investments with uncertain payoffs, so they would need to be tested for credible evidence of their effects and costs.

Thomas F. Lippiatt and J. Michael Polich
Project Leaders

For more information, see *Reserve Component Unit Stability: Effects on Deployability and Training*, Thomas F. Lippiatt and J. Michael Polich, MG-954-OSD, 2010. Online at <http://www.rand.org/pubs/monographs/MG954.html>

Preventing Suicide in the U.S. Military

- The increasing number of suicides among military personnel is causing concern within DoD.
- Empirical evidence is insufficient to define “best” practices, but comprehensive programs share some common characteristics: raising awareness and promoting self-care, identifying those at risk, facilitating access to high-quality care, providing such care, restricting access to lethal means, and having a strategy for responding to suicides and suicide attempts.
- Suicide-prevention programs in DoD and across the services have some of these characteristics but not others.
- DoD can take some specific steps to make its programs more comprehensive.

The casualty toll exacted by the wars in Iraq and Afghanistan is well known. But also emerging is another cost: stress among servicemembers, which can manifest in a variety of negative ways. One of the most disturbing manifestations is suicide, which has increased among U.S. military personnel over the past decade. DoD asked NDRI to examine data on military suicides, identify what the scientific literature and leaders in the field indicate to be state-of-the-art suicide-prevention strategies, and recommend ways to ensure that the programs in each service reflect the state of the art.

Suicides in the Military

In 2008, among servicemembers on active duty, the Army and Marine Corps had the highest suicide rates, at 18.5 and 19.5 per 100,000, respectively; corresponding rates in the Air Force and the Navy were 12.1 and 11.6, respectively. In DoD, across all services, the suicide rate climbed from just over ten per 100,000 in 2001 to almost 16 per 100,000 in 2008; the change stems largely from an increase in the Army rate. The DoD suicide rate was lower than it has been among civilians with age, sex, and race comparable to those in the military, but the civilian rate was not rising.

The research team identified the characteristics of those who attempt suicide and of those who are most at risk. For example, members of the military services are disproportionately male, and men are generally more likely than women to die by suicide. Other predictors include having a mental disorder, harmful substance use, and a traumatic brain injury. The best predictor of dying by suicide is a prior suicide attempt, but even that does not have strong predictive power. Other factors include triggering events, such as a rupture in marital or familial relations; some evidence indicates there may be a “contagion” effect (from learning of another person’s suicide). But these factors are thought to primarily affect those with an underlying vulnerability, such as a mental illness. The evidence also consistently indicates that the availability of lethal means, such as firearms, correlates with suicide.

Suicide Prevention

RAND researchers reviewed the evidence pertaining to a wide range of suicide-prevention strategies, including those that target entire populations, those that focus on at-risk groups, those that concentrate on making the environment safer, and those

As of 2008, the DoD suicide rate was lower than that among civilians, but, in contrast to the DoD rate, the civilian rate was not rising.

Goal	Army	Navy	Airforce	Marines
Raise awareness and promote self-care	Primary awareness campaigns, with fewer initiatives aimed at promoting self-care			
Identify those at high risk	Expansive but mostly rely on gatekeepers	Mostly rely on gatekeepers	Investigation policy	Mostly rely on gatekeepers
Facilitate access to high-quality care	Stigma addressed primarily by locating behavioral health care in nontraditional settings			
	No policy to assuage privacy or professional concerns		Limited privilege	No policy
	No education about benefits of accessing behavioral health care			
Provide high-quality care	Not considered in domain of suicide prevention		Past efforts exist with a sustainment plan	Past efforts exist but not sustained
Restrict access to lethal means	No current policies exist		Limited guidance	No policy
Respond appropriately	Personnel/teams available, but limited guidance			
	 Present in program Present to some degree Not present			

The military services' programs are meeting the objectives to raise awareness and promote self-care, but they have been less comprehensive in other areas.

that are implemented following a suicide. The assessment of these programs identified some *promising* practices, but there has not been enough evidence of suicide reduction to identify any *best* practices. However, any comprehensive program should accomplish the following objectives (see table).

Raise awareness and promote self-care. A focus on skill-building may be important at all stages of prevention and for reducing known risk factors, such as substance abuse and mental health problems. Recommendations in this area include the following:

- Include training in skill-building, particularly help-seeking behavior, in programs and initiatives that raise awareness and promote self-care.
- Define the scope of what is relevant to preventing suicide, and form partnerships with the agencies and organizations responsible for initiatives in other areas.

Identify those at high risk. A comprehensive suicide-prevention program should have a way of identifying those at risk, such as screening for mental health problems—one of the strongest risk factors for suicide. Recommendations:

- Evaluate the training of gatekeepers, persons who connect those at risk of suicide with behavioral health care providers or chaplains.
- Develop prevention programs based on research and surveillance; selected programs should be based on clearly identified risk factors specific to military populations and to each service.
- Ensure, in a way that respects servicemembers' privacy and autonomy, that continuity of services and care is maintained when servicemembers or their caregivers transition between installations.

Facilitate access to high-quality care. Access to high-quality behavioral health care is an integral component of many suicide-prevention programs. But often, multiple barriers obstruct such access, including perceptions that behavioral health care is ineffective or will harm a person's military career. Recommendations include the following:

- Make servicemembers aware of the benefits of accessing behavioral health care and specific policies and repercussions for accessing such care, and conduct research to inform this communication.
- Make servicemembers aware of the different types of behavioral health caregivers available to them, including information on caregivers' credentials, their capabilities, and the confidentiality afforded by each.

- Improve coordination and communication among caregivers (e.g., behavioral health care providers and chaplains).
- Assess whether there is an adequate supply of behavioral health care professionals and chaplains available to servicemembers.

Provide high-quality care. The strongest empirical support for effectively preventing suicide involves quality mental health treatment and specific interventions focused on suicide. The study's findings point to the following recommendation:

- Train chaplains, health care providers, and behavioral health care professionals in evidence-based or state-of-the-art practices for behavioral health generally and in suicide risk assessment specifically.

Restrict access to lethal means. Evidence consistently shows that means restriction relates to lower suicide rates. This includes not only restricting access to firearms but also attending to the way in which potentially lethal medications are packaged, among other things. There was one primary recommendation in this area:

- Develop creative strategies to restrict access to lethal means, particularly among servicemembers indicated to be at risk of harming themselves.

Respond appropriately. Given the possibility of imitative suicides, suicide-prevention programs must have a strategy for response that focuses on how details of the suicide are communicated in the media, as well as how the information is passed on to groups to which the deceased belonged. The study resulted in the following recommendation:

- Provide formal guidance to commanders about how to respond to suicides and suicide attempts.

Two further recommendations cut across all objectives:

- Track suicides and suicide attempts systematically and consistently. The recently implemented DoD-wide surveillance program to track suicides and suicide attempts is a step in the right direction, but the services and installations should use the same criteria to determine which suicide attempts require completion of a surveillance report.
- Evaluate existing programs and ensure that new programs contain an evaluation component when implemented. Evaluation provides a basis for decisionmaking and helps ensure that resources are used effectively and achieve anticipated outcomes.

Suicide is a tragic event—and often a preventable one. The recommendations resulting from the study and based on the best available evidence suggest that some of these untimely deaths could be avoided.

The strongest empirical support for effectively preventing suicide involves quality mental health treatment and focused interventions.

Rajeev Ramchand

Project Leader

For more information, see *The War Within: Preventing Suicide in the U.S. Military*, Rajeev Ramchand, Joie Acosta, Rachel M. Burns, Lisa H. Jaycox, and Christopher G. Pernin, MG-953-OSD, 2011. Online at <http://www.rand.org/pubs/monographs/MG953.html>



Intelligence Policy Center

Over the past year, the United States has been shaping its course in Afghanistan in anticipation of a drawdown of forces that is expected to begin soon, while Iraq moves toward a phase with little significant U.S. military presence. Meanwhile, tensions have been increasing on the Korean peninsula, the Iranian government moves closer to a nuclear capability, and at home, officials are struggling to understand and contain the damage wrought by the Wikileaks releases. To respond to trends and events like these, senior U.S. policymakers turn to the Intelligence Community—its leaders and the thousands of professionals serving under them—for the collection and analysis of vital information to support decisionmaking. In many ways, the policy challenges faced by the United States are unprecedented in their diversity, and the IC must labor mightily to provide insight, warning, and context for senior decisionmakers and operational forces in the field. The IC must address daily needs as well as conduct long-term assessments.

NSRD's Intelligence Policy Center (IPC) helps IC analysts and decisionmakers understand the external environment and manage the

IC enterprise. This context is characterized by shifting operational environments in current conflict zones and other emerging threats around the globe that are as varied as climate change, pandemics, and financial crises. The center also helps defense intelligence officials anticipate the demands of policymakers and warfighters across a range of future eventualities. The intelligence capabilities needed for many missions may require years to develop and put in place. But the IC must also strive to be relevant for future threats in all their manifestations—not just augment capabilities that were used during the last war. RAND plays a critical role in supporting the community across this spectrum of challenges. NSRD's IPC has become a place for the IC to turn for rigorous methodological approaches to vexing problems and innovative options to address them.



**John Parachini, Director
Intelligence Policy Center**

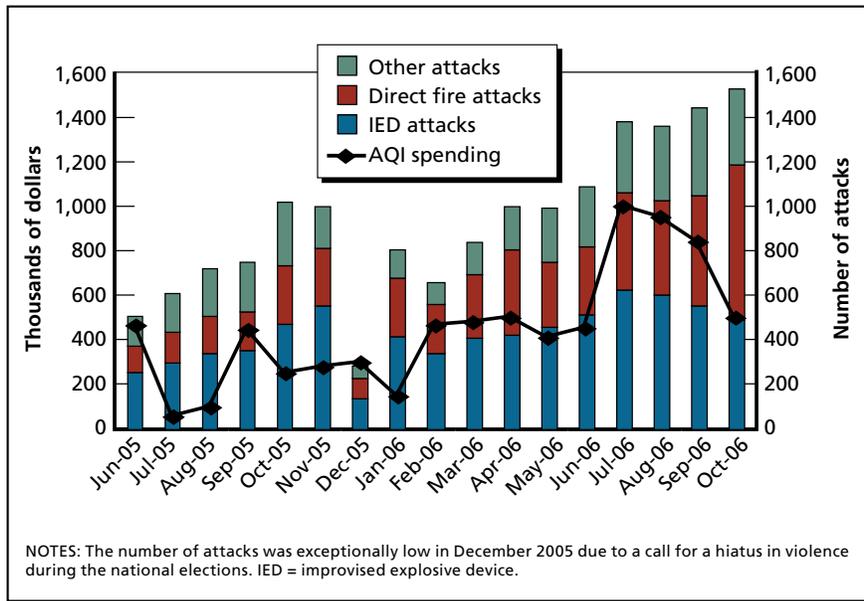
Some Recent and Ongoing Projects

An Economic Analysis of the Financial Records of al-Qa'ida in Iraq

Terrorist and insurgent groups have a fundamental need to mobilize resources. Yet, before last year, little research had been conducted on the economic and financial decisionmaking of such militant groups based on actual financial records. Drawing on captured documents, NDRI researchers analyzed the finances of al-Qa'ida in Iraq (AQI) in Anbar province during 2005 and 2006, the peak of the group's power and influence.

The records show that AQI was a hierarchical organization with decentralized decisionmaking. It relied on extortion, theft, and black-market sales to fund its operations. It needed large, regular revenue sources, but its administrative leaders did not hold much cash on hand. It did not appear to compensate its members for their dramatically higher fatality rates. Average annual household compensation among AQI members was \$1,331, compared with \$6,177 for average Anbar households, suggesting that AQI members were not motivated primarily by money. The records also indicate that the organization had significant recurring and administrative costs

U.S. government data on the number and types of attacks in Anbar province, nearly all of which were perpetrated by AQI, correlate with AQI spending.



beyond simply acquiring materiel, including transportation, payments to families of deceased members, and maintaining safe houses. Taking these costs into account, the best estimate is that, on average, the group spent \$2,700 over several weeks for each attack, an amount equivalent to 40 percent of the average annual household income in Anbar.

This work suggests that captured financial ledgers warrant greater emphasis as a source of strategic intelligence on militant groups, in part because they may reveal novel vulnerabilities. For example, the analysis of the AQI records provided new empirical support for the idea that disrupting militant financial flows disrupts the pace of attacks. Altogether, this research suggests that the U.S. government’s concept of “threat finance” intelligence should be broadened to “threat economics” because how militants spend money can potentially be more informative for policymakers than how they raise money.⁹

Sponsor: *Multi-National Force–Iraq*

Project Leaders: *Benjamin Bahney and Howard J. Shatz*

U.S. Marine Corps Intelligence Organization

The U.S. Marine Corps Intelligence Department has wide-ranging responsibilities. These stretch from representing the Marine Corps in the national IC and in DoD resource allocation processes to supporting the tactical needs of expeditionary forces deployed around the world. Particularly since 2001, it has had to tailor its organization to meet evolving expeditionary force demands. These changes have occurred in the context of an increase in Marine Corps end strength and a doubling in the number of Marines with intelligence specialties. The result has been a number of ad hoc arrangements and practices, encompassing operations in irregular, amphibious, joint, and coalition warfare. The demands of these operations, combined with the increasingly rapid pace of technological change, have challenged Marine Corps intelligence capabilities.

The Director of Marine Corps Intelligence asked NDRI to review how best to align Marine Corps intelligence to efficiently and effectively execute current and future missions and functions. The study built on earlier, similar organizational design and assessment work that NDRI conducted for the National Security Agency and for the Naval Sea Systems Command. The research team found that several Marine Corps intelligence structures are not optimally aligned with their evolving missions, leading to several suggestions for organizational improvement. The Marine

Corps Intelligence Department, for example, grew rapidly and reactively rather than in a planned manner. As a result, the names of its subunits do not reflect their actual functions, and the organization is difficult for outsiders to understand or engage with. The team also found that the Marine Corps Intelligence Activity faces challenges in prioritizing tasks from its many customers and stakeholders. Intelligence in the Marine Expeditionary Forces was found to focus too much effort on demands from the higher levels of the chain of command and tended to remain within comfortable disciplinary boundaries. All of these issues are addressed by structural changes recommended by the NDRI team.

Sponsor: *U.S. Marine Corps*

Project Leaders: *Harry J. Thie and Christopher Paul*

Analytic Support to the Marine Corps Intelligence Activity

In recent years, NDRI has conducted an array of activities in support of the Marine Corps Intelligence Activity (MCIA) in irregular warfare, cultural intelligence, and intelligence methodology. These projects include studies on counterinsurgency theory, analyses of specific Marine Corps areas of operation in Iraq and Afghanistan, and numerous briefings and conferences. This work is continuing in three ways. First, NDRI is providing research on long-term developments in irregular warfare and intelligence, including researching the circumstances that the Marine Expeditionary Brigade in Afghanistan might face in strategic withdrawal from theater. Second, NDRI is providing midterm research in direct support of operational and strategic planning in Afghanistan. That research addresses client-specified subjects matching IC standards, with RAND researchers retaining flexibility to meet changing conditions and shifts in sponsor requirements. Third, RAND researchers are providing planned and on-call analytic support to the MCIA's Analysis Division, engaging MCIA analysts weekly and remaining available for electronic and telephone consultation. This portion of the project also includes briefings and deployed analysis; four RAND analysts have traveled to Afghanistan to conduct research for the MCIA since early 2010. Specific topics of research have included local governance in Helmand Province, civil defense forces, Iranian activity in the Afghanistan Regional Command South, Pakistani Balochistan and border issues, counterinsurgency assessment in Afghanistan, Taliban structure and shadow governance, reconciliation and integration, and police forces of Afghanistan. The results of this work will be reported in four MCIA-sponsored monographs and several occasional papers.

Sponsor: *Marine Corps Intelligence Activity*

Project Leader: *Ben Connable*

DoD Capabilities for Military Deception

Military deception—that is, managing the perceptions of adversary military decisionmakers regarding friendly military intentions, capabilities, and operations—can offer advantages to U.S. forces. Military deception was central, for example, to the brevity and decisiveness of Operation Desert Storm 20 years ago. Yet, as a force multiplier, it is often underappreciated and insufficiently resourced. Senior military officers rarely gain the opportunity to build understanding of and experience with deception, in part because of deficiencies in training and professional military education, and also because it is rare for today's general and flag officers to have directed more than four battles in an entire career. Deception is rarely part of the battle plan. This lack of training and experience is compounded by the absence of a fully developed theory of deception. Lack of understanding of military deception thus limits the U.S. military's ability not only to practice it when needed but also to counter its use by adversaries, particularly in asymmetric warfare.

NDRI conducted a study to help DoD better understand its current capabilities for military deception, to identify its strengths and shortcomings in this area, and to better identify where added resources could optimally enhance a more

Alternative Futures and Their Implications for the National Geospatial-Intelligence Agency and the Intelligence Community

effective and enduring military deception capability. The study included interviews conducted at the combatant commands and with personnel from military components in selected joint and other relevant organizations. It covered issues of doctrine, organization, training, materiel, leadership and education, personnel, and facilities. The intent of this research was to provide DoD with the necessary foundation for a capabilities-based assessment. The study supported the sponsor's future actions in the JCIDS (Joint Capabilities Integration and Development System) acquisition process.

Sponsor: *Office of the Under Secretary of Defense for Intelligence*

Project Leaders: *James B. Bruce and Mark Monahan*

The National Geospatial-Intelligence Agency (NGA) and the broader IC face a future of dynamic national security challenges that will present new operating environments and generate new demands. These demands are likely to increase in diversity, type, difficulty, number, scope, and geographic distribution. At the same time, operating environments are likely to become more complex, contested, and lethal. NGA and the IC must plan now how they will adapt to uncertain future developments.

NDRI is helping NGA to explore possible futures that differ significantly from today's operating environment. These differences could manifest along economic, geopolitical, military, environmental, or social dimensions and may not be well addressed by current intelligence sources and methods. In the geopolitical dimension, for example, they may include the emergence of unexpected regional tensions or new centers of instability and conflict. Taken collectively, they will elevate the importance of flexibility and adaptability within the IC.

NDRI researchers are also identifying and characterizing emerging and evolving technologies that may be feasible in such futures and that may affect intelligence collection and analysis capabilities in general and geospatial intelligence capabilities in particular. Such effects include potential new sources of data and new computational constructs that could significantly change how information is collected and analyzed. They also include technology "surprises" that may arise from the future technology developments or acquisitions of key adversaries.

Finally, the researchers are addressing how NGA and the IC must adapt if they are to handle the dynamic security environment of the future. This may require, among other things, changes in the prevailing culture and in human capital.

Sponsor: *National Geospatial-Intelligence Agency*

Project Leader: *Steven Berner*

⁹ For more information, see *An Economic Analysis of the Financial Records of al-Qa'ida in Iraq*, Benjamin Bahney, Howard J. Shatz, Carroll Ganier, Renny McPherson, and Barbara Sude, MG-1026-OSD, 2010. Online at <http://www.rand.org/pubs/monographs/MG1026.html>

Improving Afghanistan's Political Stability Through Local Defense Forces

- Insurgency continues to pose serious challenges to the safety and security of citizens in rural Afghanistan. To improve security in these regions, RAND researchers investigated the viability of “bottom-up” strategies that might establish security and help mobilize rural Afghans against the Taliban and other insurgents.
- This research effort led to the design and implementation of the Afghan Local Police program, an integral part of the Afghan and U.S. counterinsurgency (COIN) strategy. Strategically leveraging traditional Afghan policing practices has markedly improved COIN prospects and, thus, the safety, security, and well-being of Afghan citizens.

A decade after the September 11 attacks and the overthrow of the Taliban regime, the United States remains engaged in a major COIN campaign in Afghanistan. With a prospective date for transitioning lead security responsibility to the Afghan government in 2014, enabling Afghans to defend their communities has become a critical goal for U.S. and NATO forces.

A 2010 RAND study evaluated the viability of establishing “bottom-up” local defense forces in Afghanistan to enhance security, improve governance, and help mobilize rural Afghans against the Taliban and other insurgents. The project was funded by the Marine Corps Intelligence Activity and has proved foundational in initiating and implementing the Afghan Local Police and Village Stability Operations programs.

Focusing on Security at the Local Level

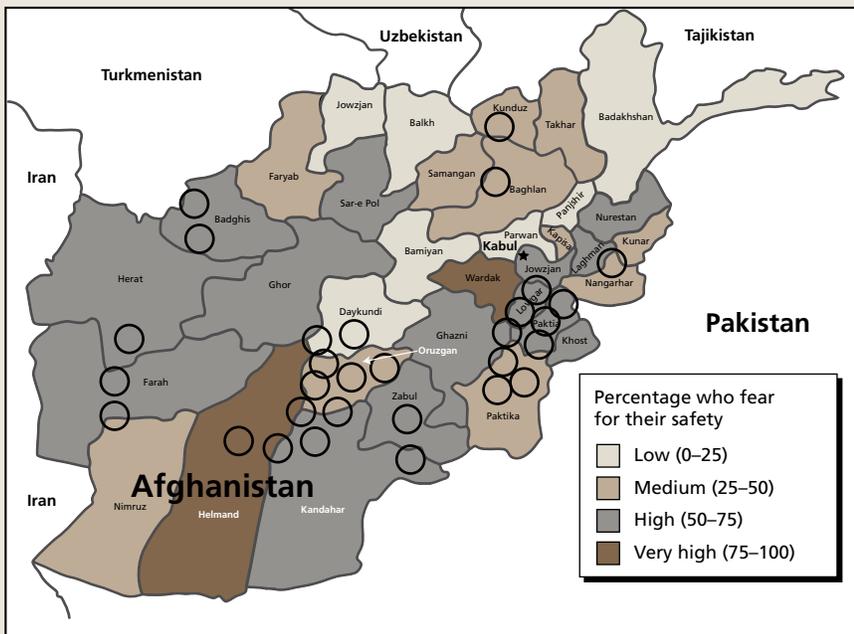
Security concerns have prevented most foreign government officials and academics from developing a nuanced appreciation of the local nature of power in rural Afghanistan. To fill this gap, RAND researchers compiled and assessed a list of nearly two dozen tribal and other local policing cases beginning in 1880. The research team met with dozens of tribal and community leaders across rural Afghanistan. It also examined anthropological work on tribal and community dynamics to better understand whether and how a local defense initiative could be implemented.

The study elicited a number of important findings that indicated how vital local security efforts have been—and can be—in rural Afghanistan. Security remains a challenge in much of the country, but there are not enough Afghan national army and police forces to provide security to rural villages, and the number of U.S. and other international forces will continue to decline. Given this reality, turning security responsibilities over to Afghans should be a pressing and time-sensitive goal.

Enabling Afghans to take the lead in their own security is viable because they can, and by tradition do, take such matters into their own hands. Between 1929 and 1978, the last period of relative peace in Afghanistan, security was established through a combination of top-down efforts from the central government and bottom-up efforts from local communities.

Individuals in Afghanistan tend to identify themselves by their tribe, subtribe, clan, *qawm*, or community. A *qawm* is a unit of identification and solidarity that

The study's findings indicated how vital local security efforts have been—and can be—in rural Afghanistan.



Local police forces have already been established in a number of rural Afghan communities, including those areas in which insurgency is primarily being waged.

could be based on kinship, residence, or occupation. It follows that most Afghan citizens' attention to politics is focused primarily at the local level. Rural communities tend to be motivated by self-interest and self-sufficiency, with citizens preferring to secure their own villages rather than having outsiders do it for them. There is a rich history of localized policing efforts in Afghanistan, including through traditional institutions such as *arbakai* and *chalweshtai*. These forces are not "militias," which typically refers to large, offensive forces under the command of individual warlords. Instead, they are small, defensive, village-level policing entities under the supervision of local elders.

These findings underscore the importance of combining "top-down" efforts from the Afghan central government and NATO activities with "bottom-up" efforts from local communities. International initiatives have mistakenly focused on establishing security from the top down through Afghan national security forces, rather than eliciting the assistance of local groups and actors that have always played a critical role in keeping law and order in rural areas. Notably, the Taliban has adopted a bottom-up strategy that involves co-opting or coercing tribes, subtribes, and other local communities in rural areas. The unpopularity of the Taliban and other insurgent groups among Afghan citizens, however, provides a unique opportunity for the United States and NATO to leverage traditional, local defense forces.

Organizing Local Defense Forces

Beginning in 2009, Combined Forces Special Operations Component Command-Afghanistan (CFSOCC-A) used this analysis to conceptualize and implement a bottom-up program to help Afghan villagers defend their communities. Now referred to as the Afghan Local Police program, it is an integral part of the Afghan and U.S. COIN strategy. Afghan President Hamid Karzai formally approved the program in August 2010. RAND researchers affiliated with this study assisted the CFSOCC-A commanding general in Afghanistan by advising ways to help Afghan villages protect themselves. This collaboration resulted in the establishment of local police forces throughout rural Afghanistan.

This analysis was used to conceptualize and implement a bottom-up program to help Afghan villagers defend their communities.

Shah Joy District Chief Abdul Qayum ties a red cloth to the arm of a member of Arbakai, or tribal militia, during a ceremony in Zabul province, Afghanistan, in September 2010. The Arbakai were to operate security checkpoints to protect a bazaar.



According to U.S. government assessments in 2011, the Afghan Local Police program contributed to a decline in Taliban control of territory, with many of the Taliban's losses concentrated in the south, its most important sanctuary. Local villagers in Kandahar, Helmand, Oruzgan, and other provinces took up arms against the Taliban and other insurgent groups, with support from Afghan and NATO forces. In several areas of Kandahar province, for example, security has significantly improved in the villages. Schools have reopened and economic conditions have bettered as the improving security environment has facilitated the return of basic activities, such as trade in local bazaars.



Seth G. Jones and Arturo Muñoz
Project Leaders

For more information, see *Afghanistan's Local War: Building Local Defense Forces*, Seth G. Jones and Arturo Muñoz, MG-1002-MCIA, 2010. Online at <http://www.rand.org/pubs/monographs/MG1002.html>

Who Will Succeed Iran's Supreme Leader?

- The Supreme Leader plays a critical role in Iran's policies and approach to the outside world.
- A successor to Supreme Leader Ayatollah Ali Khamenei in the next few years will likely maintain the status quo—i.e., dominance of the principlists (fundamentalists) and militarization of Iranian politics.
- The next most likely of five possible scenarios is an absolute ruler who ignores or dissolves Iran's elected institutions. The abolition of the Islamic Republic is also a possibility.
- Factors that affect succession can change over time, so predictions should be adjusted as events unfold. The recent Arab uprisings and Iran's own internal instability can significantly affect succession over the longer run.

Iran's Supreme Leader, Ayatollah Ali Khamenei, stands at the center of the Islamic Republic, exerting a decisive influence on its character, policies, and worldview. Khamenei has held the position for over 20 years, more than two-thirds of the Islamic Republic's existence, but he is 71 and rumored to be in poor health. His eventual departure could mark a fundamental change in the nature of Iran for better or for worse, from the U.S. perspective. U.S. analysts and policymakers must begin preparing now for alternative possibilities for future succession.

In a study sponsored by the Intelligence Community, NDRI researchers identified the factors that will shape the succession to the next Supreme Leader and pinpointed indicators that observers can use to track important trends. They examined several different succession scenarios and developed five that seem to have the greatest relevance, given historical Iranian discourse on the subject and the current state of Iranian politics. Because the context in which the succession would take place becomes more uncertain the farther into the future one looks, the research focused on the near term—the next two or three years.

The 2009 Presidential Election Transformed the Institution of Supreme Leader

Khamenei's role in Iran's tumultuous 2009 presidential election provides important context. Only hours after the polls closed, Iran's interior ministry announced that the incumbent, Mahmoud Ahmadinejad, had won by a landslide. Upon hearing the news, opposition groups alleged fraud, and millions of Iranians poured into the streets in protest. The Islamic Revolutionary Guards Corps and the Basij militia violently cracked down on the uprisings, killing dozens and arresting thousands of demonstrators.

At the center of the storm stood Supreme Leader Khamenei. As the highest political authority in Iran, he was responsible for overseeing the conduct of the elections. As commander in chief, he ordered the government response to the protests. Having portrayed himself publicly throughout his rule as an even-handed arbiter between factions, above the political fray, he nevertheless decisively endorsed the hard-right bloc of Ahmadinejad supporters. In doing so, he significantly weakened his own legitimacy and that of the institution of Supreme Leader.

U.S. analysts and policymakers must begin preparing now for alternative possibilities for future succession in Iran.

Iran's Supreme Leader Ayatollah Ali Khamenei delivers his sermon in front of a picture of his predecessor, Ayatollah Ruhollah Khomeini, during Friday prayers at the Tehran University campus.



The unspoken contract between the government and the people—in which Iranians were permitted some political participation and limited personal space in return for acquiescence to the status quo—was shattered. The Islamist left faction, a key pillar of the Islamic Republic since its creation in 1979, was effectively pushed out of the political system. The Revolutionary Guards emerged as the dominant political and economic institution. Deep fractures among long-standing members of Iran's leadership and clergy, traditionally addressed in the Islamic Republic behind closed doors, were uncharacteristically aired in public, as key figures openly expressed their dismay at the government's handling of the election and subsequent protests. The country had taken an irrevocable turn.

Three Primary Factors Will Influence the Nature of the Office of the Supreme Leader Over the Next Two to Three Years

The RAND researchers identified three factors in particular that will influence the nature of the next Supreme Leader—or even whether there will be a Supreme Leader to follow Khamenei.

The factions and personalities in positions of power and influence. The faction that controls the organs of the state will play an important role in determining the succession to the next Supreme Leader. Currently, principlists (fundamentalists) within the Islamist right control the executive, judicial, and legislative branches.

The prevailing concept of the rule of the supreme jurispudent, which forms the ideological and political basis of the Islamic Republic. The formerly apolitical *velayat-e faghih* (supreme jurispudent) was reinterpreted by Khamenei's predecessor, Ayatollah Ruhollah Khomeini, to form the basis of an Islamic state led by the clergy. The principlists subscribe to the "absolutist" school of thought that views the Supreme Leader's authority as absolute and derived from divine will, a reading closely associated with Khomeini's. In contrast, those who favor the "democratic" view of the concept believe that the Supreme Leader must be popular as well as pious and derive his authority from the people.

The decisions and actions of Khamenei's personal network, including the Revolutionary Guards. Khamenei relies on a close network of supporters, including elements of the Revolutionary Guards, to maintain authority over the state. His network, dominated by the principlists, will want to protect its narrow interests in the next succession.

If the succession occurs in the longer term—a decade or more from now—other factors may assume a more decisive role. Examples of longer-term factors include the anti-regime Green Movement, the women’s rights movement, Iran’s declining economy, and Iranian relations with the United States.

The Most Likely Scenario Is the Status Quo or an Absolutist Supreme Leader

The study developed the following five scenarios:

- Status quo: Khamenei is succeeded by someone like him, possibly someone he hand-picks.
- Absolutist: Khamenei is succeeded by an absolute dictator with strong religious and political credentials who is supported by a cult of personality.
- “Democratic”: A reformist leader who is more accountable to the republican institutions and the electorate succeeds Khamenei.
- Leadership council: An executive leadership group replaces a single leader.
- Abolition: The Supreme Leader position is eliminated in favor of a secular democracy or a completely militarized political system.

The most likely succession scenario in the near term is the status quo. The “absolutist” scenario is a close second. The others are less likely in the near term, though the abolition of the office of Supreme Leader, and indeed the Islamic Republic, is a possibility.

Many Iranians believe that political change in their country is long overdue. The Islamic Revolution succeeded in overthrowing a repressive and anachronistic system of government. Yet it has failed to address in a satisfactory way the needs and desires of Iran’s dynamic and vibrant society, which has undergone a vast transformation since 1979. Ayatollah Khamenei and his supporters in the political system now stand in the way of such change. His passing will prove to be a critical moment in Iran’s future and its relationship with the United States.

Khamenei’s personal network, including the Revolutionary Guards, will want to protect its narrow interests in the next succession.

Alireza Nader and David E. Thaler Project Leaders

For more information, see *The Next Supreme Leader: Succession in the Islamic Republic of Iran*, Alireza Nader, David E. Thaler, and S. R. Bohandy, MG-1052-OSD, 2011. Online at <http://www.rand.org/pubs/monographs/MG1052.html>



Homeland Security and Defense Center



**Andrew R. Morral, Director
Homeland Security and Defense
Center**

Following the 9/11 terrorist attacks, the United States began a complex effort to reform the strategy, tactics, and management of securing the nation's borders, its critical infrastructure, and its people from threats foreign and domestic, as well as natural disasters. This mission is complex and fraught with uncertainty about the nature of the many possible threats, the benefits to be expected from alternative security strategies, and the management processes that will ensure that security is effective and efficient. Strategic planning for homeland security requires balancing cherished principles of freedom, privacy, and due process with responsible federal, state, and local preventive and protective measures. These are complex, often novel, planning problems requiring integrative and cross-cutting analysis. They raise controversial questions about judgments and priorities, meaning that analyses supporting decisionmaking must be transparent, objective, and grounded in a deep understanding of the technical, operational, policy, and historical context. RAND is uniquely capable and experienced in providing the kind of high-level systematic and independent planning and analysis that the nation requires to ensure that decisions are supported by the best available information.

The Homeland Security and Defense Center conducts analysis to prepare and protect the American people and critical infrastructure from terrorism and related threats. Its projects examine a wide range of risk management problems, including coastal and border security, emergency preparedness and response, defense support to civil authorities, transportation security, domestic intelligence programs, and technology acquisition.

The center's clients include the Department of Homeland Security, DoD, the Department of Justice, and other organizations charged with security and disaster preparedness, response, and recovery. The Homeland Security and Defense Center is a joint center of NSRD and RAND Infrastructure, Safety, and Environment.

Some Recent and Ongoing Projects

The Utility of TSA's Risk Management Analysis Tool

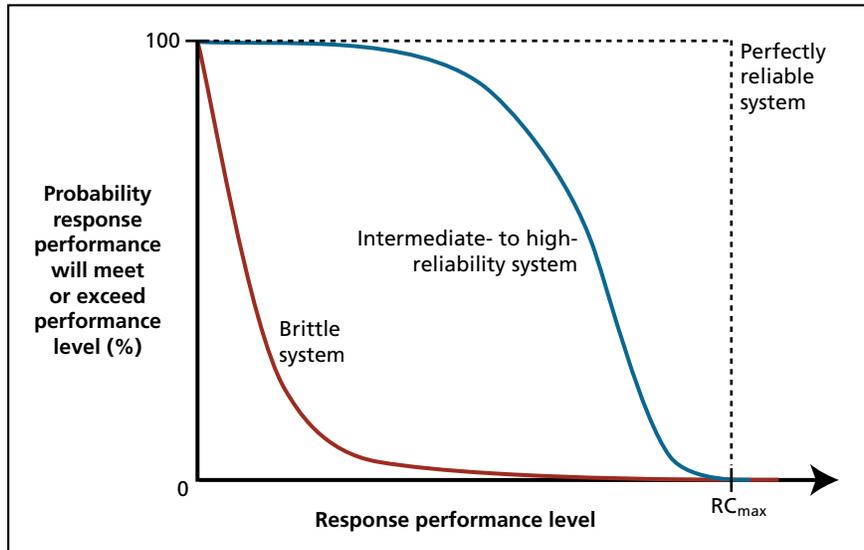
The Transportation Security Administration (TSA) is tasked with protecting the nation's transportation systems to ensure freedom of movement for people and commerce. To achieve that goal, TSA has partnered with a private contractor to create the Risk Management Analysis Process, a risk evaluation method intended to aid in assessing changes to risk, evaluating alternative countermeasures, and prioritizing them for investment. The process comprises an economic model and the Risk Management Analysis Tool (RMAT). TSA is in the process of developing a future strategy for RMAT, including a three-year plan to enhance TSA's use of the information it provides. In connection with that effort, TSA has identified the need for an independent validation to confirm that the RMAT approach can generate information to support the development of suitable insights. NDRI has undertaken this validation, which will also identify areas for potential future improvement. Specific topics include the adequacy of RMAT's threat scenarios list, RMAT's risk assessments of the commercial aviation environment, and its alignment with TSA risk doctrine.

NDRI will evaluate RMAT's suitability for tracking real-world system complexity and whether RMAT is likely to be useful in informing risk-based resource allocation decisions and evaluations of uncertainty and potential bias. The research team will also address RMAT's modeling of aviation and defense systems and of adversaries (including intelligence gathered on them), as well as of direct property damage and mortality consequences.

Sponsor: *Transportation Safety Administration*

Project Leader: *Andrew R. Morral*

It is important to understand how the likelihood that a response system will perform effectively changes with increasing incident size, from cases where only minimal capability is needed to incidents requiring near the maximum planned capability (RC_{max}).



The Reliability of Emergency Responses to Large-Scale Incidents

Although emergency responses to large-scale incidents are often effective, sometimes they fail, leaving the public and policymakers to wonder how much confidence they should have that the response to the next natural disaster, terrorist attack, or major transportation accident will be adequate. Despite substantial efforts devoted to developing measures of emergency preparedness, good ones have been elusive.

As a step toward breaking this impasse, an NDRI research team took a different approach, treating emergency response as a system and applying the concept of system reliability to the evaluation of emergency responses. The team developed a method for modeling an emergency response system and, in a crucial departure from past practice, for identifying how individual parts of the system might fail. That included assessing the likelihood of each failure and the severity of its effects on the overall response effort. The researchers applied this method to two cases: a simplified example in which responders must deliver medical treatment to a certain number of people in a specified time window and a more complex scenario involving the release of chlorine gas. The research team also presented an exploratory analysis in which they parsed a set of after-action reports describing real-world incidents to demonstrate how this method can be used to quantitatively analyze data on past response performance. Finally, the study showed how the new method of measuring emergency response system reliability could inform policy discussion of emergency preparedness, along with ways to improve system reliability and reduce the costs of doing so.¹⁰

Sponsor: *Federal Emergency Management Agency*

Project Leaders: *Brian A. Jackson and Henry H. Willis*

DoD Support for Civil Authorities in Selected Emergencies

NSRD recently completed its support to the congressionally mandated Advisory Panel on DoD Capabilities for Support of Civil Authorities After Certain Incidents, established by the National Defense Authorization Act for FY08. The purpose of the panel was to assess DoD capabilities to support U.S. civil authorities in the event of a chemical, biological, radiological, nuclear, or high-yield explosive (CBRNE) incident.

This research support consisted of furnishing analytical products on issues that were considered by the panel, as well as facilitating discussions at the five meetings of the full panel and in numerous subcommittee meetings that were held during the panel's yearlong tenure. The analysis covered a range of specific topics related to defense support of civil authorities in such areas as DoD legal and regulatory authority for CBRNE activities; CBRNE training, exercises, and professional development; operational plans, structures, and resources for defense support in CBRNE incidents; and coordination, communication, and information availability.

After reviewing specific input and suggestions from the research staff, the panel made 49 substantive policy recommendations to the President, Congress, the Secretary of Defense, other federal cabinet officials, and the state governors. The advisory panel was chaired by Steve Abbot, former Navy admiral and former Deputy Assistant to the President for Homeland Security. The panel's vice chair was former governor of Oklahoma Frank Keating. The panel included former members of Congress, retired general and flag officers from all services, current and former senior National Guard officers, and representatives from academia.¹¹

Sponsor: *Office of the Undersecretary of Defense for Policy*

Project Leaders: *Gary Cecchine and Michael Wermuth*

10 For more information, see *Evaluating the Reliability of Emergency Response Systems for Large-Scale Incident Operations*, Brian A. Jackson, Kay Sullivan Faith, and Henry H. Willis, MG-994-FEMA, 2010. Online at <http://www.rand.org/pubs/monographs/MG994.html>

11 For more information, see *Before Disaster Strikes: Imperatives for Enhancing Defense Support of Civil Authorities*, Advisory Panel on Department of Defense Capabilities for Support of Civil Authorities After Certain Incidents, 2010. Online at <http://www.rand.org/nsrd/DoD-CBRNE-Panel.html>

International Programs



**Robin C. Meili, Director
International Programs**

In addition to the five policy research centers described earlier, NSRD houses RAND's International Programs, which facilitates the growth and understanding of RAND's internationally focused research, particularly that funded by sponsors outside DoD and the IC (and often outside the U.S. government). Because this research lies at the intersection of international policy with issues such as transnational trade and investment, education, health care, information technology, and energy and the environment, it often involves multiple research units, and International Programs plays a coordinating role. International Programs includes five centers that promote understanding of RAND's work in their areas of concern:

- The RAND Center for Middle East Public Policy, which supports RAND's research efforts on political, social, economic, and technological developments in and around the Middle East, with an eye toward helping advance the domestic research agenda in those countries. Projects have included analyses of economic development and foreign aid, as well as assistance to governance, in locations such as Palestine, Qatar, and Saudi Arabia.
- The RAND Center for Asia Pacific Policy, which has helped researchers address such issues as China's economic transformation, modernizing the North Korean system, the defense sector as an engine of economic growth in South Korea, and terrorist networks in Southeast Asia.
- The RAND Center for Russia and Eurasia, which facilitates dialogue on political and economic change in that region, particularly through the RAND Business Leaders Forum, an organization of top corporate executives from Russia, the United States, and Western Europe.
- The RAND Frederick S. Pardee Center for Longer Range Global Policy and the Future Human Condition, whose goals are to improve our ability to think about the future from 35 to 200 years out and to develop new methods for analyzing potential long-range, global effects of today's policy options.
- The RAND Center for Global Risk and Security, whose goal is to assist researchers in working toward a better understanding of such issues as the security risks of climate change, the challenges of fragile states, and the security implications of the global economic crisis.

Some Recent and Ongoing Projects

The Future of Policing

Police departments are naturally preoccupied with current needs and demands, but they cannot presume that the future will be much like the present. A globalizing information society will complicate the criminal threat environment at the same time that it makes new tools available to police. A study by the RAND Center for Global Risk and Security examined the new threat environment and technological trends and identified some steps that police departments can take to anticipate and plan for them. The study revealed three challenging trends. First, police are tied to geographic jurisdictions that criminals are not, and this mismatch will only intensify as criminals move more easily across international borders. Second, police can adapt technology to further their purposes, for tasks as disparate as intelligence-gathering and organizational change, but the new technologies will be useful to criminals as well. Third, the

Centralized data systems linked with mobile technologies improve police departments' crime-fighting capabilities.



nature of the criminal threat is changing, as the Internet makes it progressively easier for identity theft and other crimes to be committed by isolated, elusive actors. In response to these trends, the researchers made recommendations in five areas:

- Educate police personnel in the use of new technologies.
- Make hardware and software compatible across jurisdictions to allow exploitation of tools such as those used for identification.
- Exploit the particular value of technologies for collecting, sorting, storing, and recalling information.
- Draw on the value to police of private-sector information technology developments that can generate new tools.
- Take advantage of federal funding and leadership that are primarily intended to address terrorist threats but that may have utility for other purposes.

Sponsor: *Grant from a member of the RAND Center for Global Risk and Security Advisory Board*

Project Leader: *Gregory F. Treverton*

Making South Korea's Defense Sector an Engine for Growth in the Korean Economy

Although South Korea plans to reduce the size of its defense forces in the years ahead, its defense industry is growing as the country develops more of its own high-technology weapon systems. For an export-led economy, however, South Korea's defense sector fails to return much in the way of export earnings, leading the executive branch to question how the country's defense industrial sector is organized and how the military services define their weapon requirements. Hence the question: Can South Korea continue to meet tough threats from countries such as North Korea and, in the longer term, China while also designing weapons that are attractive to foreign buyers? Implicit in this question is the subsidiary question of what South Korea makes versus what it buys from overseas suppliers, including the United States.

An NSRD research team has undertaken a project for the Republic of Korea that is intended to answer these questions, with the goal of making South Korea's defense industry an engine for growth in the nation's economy as a whole while also satisfying serious military requirements. This will entail a look at key global and regional security trends, as well as the way South Korea has organized its defense sector. The goal is to identify alternative approaches to defense acquisition that would maximize the contribution that defense-sector research and development can make to economic growth.

Sponsor: *Presidential Council on Future and Vision, Republic of Korea*

Project Leader: *Thomas L. McNaugher*

People holding the flag of the Southern Sudan authority celebrate in Juba on January 30, 2011. A referendum commission announced later the same day that over 99 percent of voters in Southern Sudan had voted for secession from the north.



Issues for the Secession of Southern Sudan

Several years ago, before the 2011 referendum on whether Southern Sudan would become independent of the government in Khartoum, it appeared to Humanity United and other nongovernmental organizations that governments were immobilized by the African Union's injunction against changing borders. These organizations began a process of what is called "track II" diplomacy—that is, diplomatic initiatives that are unofficial but coordinated with governments. Humanity United, a new foundation, asked NSRD to examine some of these issues and how they were addressed in other instances of states seceding or fracturing, whether successfully or unsuccessfully.

In Sudan's case, the range of issues was wide—from security and assets to currency and water. Perhaps the three most important were (and are) oil, citizenship, and debt. Sudan's oil is mostly in the south, but pipelines taking it to market traverse the north. Critically, how will oil revenues be shared between north and south? And how will those arrangements be supervised? The critical citizenship issues were (1) determining who would qualify to vote as "southern" in the referendum and (2) what would happen to, especially, the several million southerners in the north. How could the right to vote not become the risk of statelessness? As to the financial issues, how would Sudan's debt be shared? What requirements, such as fiscal or monetary policies, would a new government have to meet to apply for debt restructuring through organizations such as the World Bank? Should the new government establish its own currency? More than 30 cases of relevant experience elsewhere, along with cross-cutting issue papers on a dozen topics, provided insight into some potential solutions. The goal of the research was less to make specific recommendations than to open discussion of options, as well as to demonstrate that the issues confronting Sudan have been dealt with elsewhere, though not always successfully.

Sponsor: *Humanity United*

Project Leader: *Gregory F. Treverton*

The Impact of Marijuana Legalization in California on Drug-Trafficking Revenues and Violence in Mexico

- Mexican drug-trafficking organizations' (DTOs') gross revenues from moving marijuana across the border into the United States and selling it to wholesalers are likely much lower than have been estimated.
- Preliminary analysis of the share of Mexican DTO drug export revenues attributable to marijuana is also less than often reported.
- If marijuana legalization in California affects only revenues from supplying marijuana to California, Mexican DTO drug export revenue losses would be very small, perhaps 2–4 percent.
- It is unclear whether reductions in Mexican DTOs' revenues from exporting marijuana would lead to corresponding decreases in violence.

There has been a dramatic surge in violence in Mexico, with the illegal drug trade being largely responsible. Such violence in Mexico has security implications for the United States, the biggest of which is having a close ally and large trading partner engulfed in such turmoil.

Part of what fosters the violence in Mexico is U.S. demand for illicit drugs, which creates markets for Mexican DTOs. Some government and media sources have reported that Mexican and Colombian DTOs earn a combined \$18–\$39 billion annually in wholesale drug proceeds and that 60 percent of all Mexican DTO drug export revenue comes from marijuana. These numbers were cited to argue that legalizing marijuana in California would reduce Mexican DTOs' revenues, thereby reducing violence.

To better understand this issue, RAND funded a study under the auspices of International Programs to assess how marijuana legalization in California might influence DTO revenues and the violence in Mexico.

How Much Drug Revenue Comes from Marijuana Sales?

The study found that Mexican DTOs' annual gross revenues from illegally exporting marijuana and selling it to wholesalers in the United States are likely lower than \$2 billion, with the best estimate being \$1.5 billion. This estimate does not include revenue from Mexican DTO production and distribution in the United States, which would be extremely difficult to determine with existing data.

The study also found that the claim that 60 percent of Mexican DTO gross drug export revenues comes from marijuana is not credible. There is no public documentation of how this figure was derived, and government analyses reveal great uncertainty. The study's exploratory analysis on this point suggests that 15–26 percent is a more credible range for the share of drug export revenues attributable to marijuana.

How Would Legalization in California Affect DTO Marijuana Revenues?

California accounts for about 14 percent of U.S. marijuana consumption, and domestic production is already widespread in state. Thus, if marijuana legalization in California affects *only* revenues from supplying marijuana to California, Mexican DTO drug export revenue losses would be very small, perhaps 2–4 percent.

Violence in Mexico has security implications for its close ally and largest trading partner, the United States.



A suspect crouches on his knees while Mexican Army officers look for drug smugglers next to the U.S.-Mexico border wall in Tijuana; U.S. law enforcement personnel gather on the other side.

The only way that legalizing marijuana in California could significantly influence DTO revenues and the related violence is if California-produced marijuana were smuggled to other states at prices that outcompeted current Mexican supplies. In this scenario, legalizing marijuana in California could undercut sales of Mexican marijuana in much of the nation, cutting DTOs' marijuana export revenues by more than 65 percent—and probably by 85 percent or more. As such, Mexican DTOs would lose approximately 20 percent of their total drug export revenues. But the extent of such smuggling would depend on many factors, including the response of the U.S. government, the actions of other states, and the taxes and other regulations imposed on marijuana sales in California.

What Effect Would Reductions in DTO Revenues Have on Violence in Mexico?

If legalizing marijuana in California does not have a large impact on revenues, it should not have a large impact on violence. But questions remain about how the DTOs would respond to a significant loss in revenues. Would they compensate for the loss by downsizing, or would they shift to other activities? How violent would such substitute activities be? In particular, will this increase or decrease the level of violence in DTO operations (i.e., against competitors, the government, and citizens)?

The study's findings argue that the short- and long-term outcomes of a substantial decline in the U.S. market for Mexican marijuana is a matter of conjecture. One view is that there could be more violence in the short term as the DTO leadership faces a disturbing change in circumstances. The fact that a decline in DTOs' share of the marijuana market would come after a period of rapid turnover at the top of these organizations and changes in their relationships with corrupt police could make it particularly hard for the DTOs to reach a cooperative adjustment to their shrunken market. But if the Mexican government lessens pressure and signals its willingness to adapt to a more collaborative set of DTOs, the result could be a reduction in violence.

In the long run, the analysis is different. If there are significant revenue losses, DTO participation should become less attractive over the long run. Fewer young men will enter the drug trade, and the incentives for violence will decline as the economic returns to DTO leadership fall. But the long run is indeterminably

If legalizing marijuana in California does not have a large impact on revenues, it should not have a large impact on violence.

measured—probably years, and perhaps many years. Moreover, government actions could reverse this. The government might take advantage of the weakened state of its adversary to break up the larger DTOs; but a reconfiguration to an industry comprising many smaller organizations could lead to greater competitive violence.

There is no quick, politically feasible fix to reducing DTO violence in Mexico. As a number of other researchers have noted, there are fundamental issues related to the justice system that need to be addressed before anyone can expect significant improvements in the security situation in Mexico.

Implications

This study provides some insights about the effect that legalizing marijuana in California might have on drug-trafficking revenues and violence in Mexico. While California's ballot initiative to legalize marijuana was defeated in November 2010, there are serious discussions about putting it back on the California ballot in 2012 and about putting similar initiatives on other states' ballots.

This argues for improvements in the quality of the analysis typically conducted in this area, which has generated numbers that simply do not stand up to scrutiny. This study contributes to improving analysis by putting forward a transparent and, hence, auditable and replicable method of estimating the revenues that international drug traffickers derive from U.S. sales.

But the estimates themselves are limited by the underlying data on consumption and demand. One obvious recommendation for data collection efforts is to start including in surveys questions about amounts of marijuana consumed per day of use and the method of consumption. Further, demand-side estimates could be dramatically improved if analysts were better able to assess and understand the variation in marijuana markets across subnational jurisdictions.

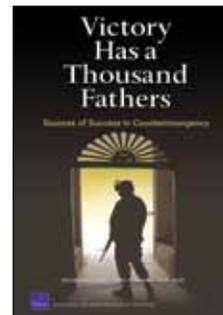
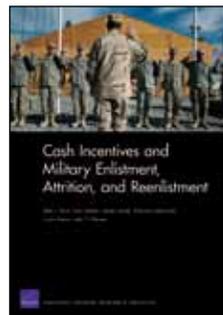
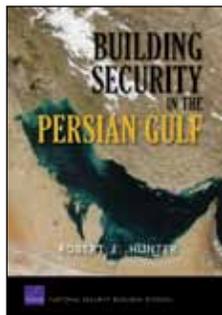
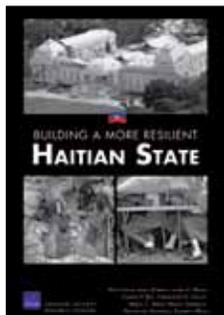
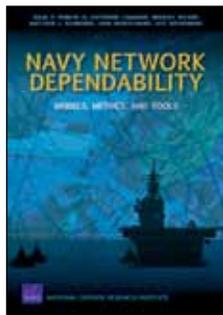


Beau Kilmer

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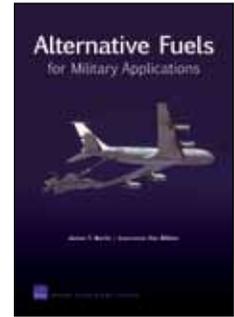
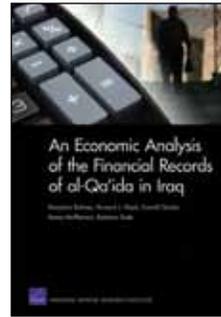
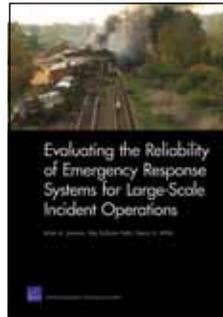
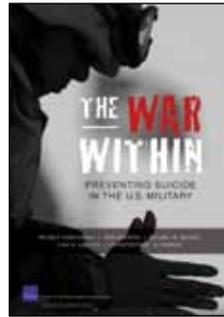
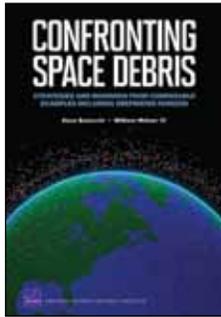
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