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Annual Report

This report presents an overview of RAND's accomplishments during 2002. To view, please be sure to have Adobe Acrobat Reader version 5.0 or higher.

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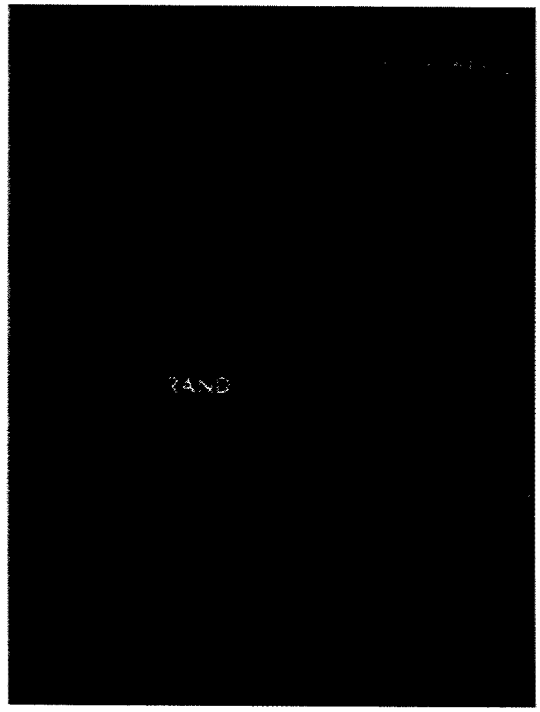

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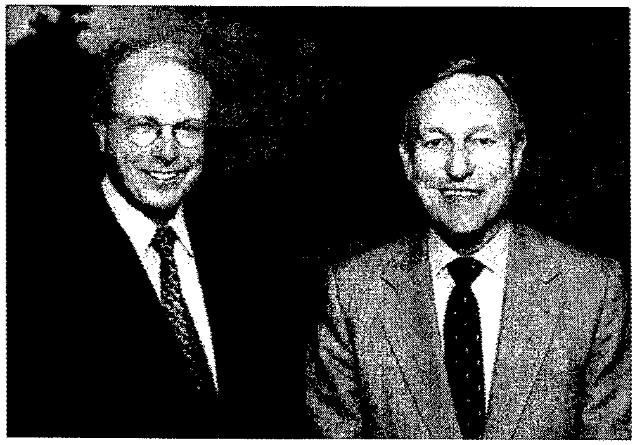
Message from the Chairman and the President

Two new initiatives, both extraordinarily ambitious, best exemplify our evolving international role.



James A. Thomson (left), with Ronald L. Olson

In 2002, RAND made great strides toward fulfilling its goal of becoming the world's most effective and trusted policy research institution. We have always been dedicated to enhancing the welfare and security of the United States, and in the last year we continued and expanded our policy research on U.S. topics, as described throughout this annual report. But in 2002 we were also more active than ever before in improving the domestic and defense policies of other nations and regions as well.

Two new initiatives, both extraordinarily ambitious, best exemplify our evolving international role. The first aims to help the Persian Gulf nation of Qatar to reform its educational system. The second is our new Center for Domestic and International Health Security. The center aims, among other things, to make the promotion of global health a key component of U.S. foreign policy. We view the enhancement of education and health at the global level as important components of our efforts to strengthen both U.S. and global security.

Our expanding global reach is evident in many additional areas. RAND analysts from America and Europe are working ever more closely alongside policymakers in their countries and beyond, especially in Asia, the Middle East, Russia, and Eurasia. The RAND Graduate

Message from the Chairman and the President

School is dedicated to preparing international policymakers for a globalized 21st century. And even the RAND Board of Trustees became a global body in 2002 when it welcomed, for the very first time, a member from outside the United States: Carl Bildt, the former prime minister of Sweden.

Over the course of five decades, we have evolved steadily from studying places around the world *on behalf of U.S. welfare and security* to studying places around the world *on behalf of their welfare and security as well*. This shift began in earnest with the establishment of RAND Europe in The Netherlands in 1992 and later in the United Kingdom and Germany.

Here are examples of our efforts in 2002 to help policymakers around the globe:

- **School Reform in Qatar.** A RAND team analyzed the primary and secondary school system in Qatar and recommended options for a complete overhaul. The Emir accepted the reform plan, and we are now working closely with the Qataris to help them implement it. The plan calls for a new independent government agency to assess student outcomes and evaluate school effectiveness. RAND will be overseeing the development process for these assessments. The plan also calls for the creation of new innovative schools to provide more options for parents and competition for existing public and private schools. RAND is helping to make these reforms possible through the design of suitable financial incentives for school operators, a process for developing new curriculum standards, and a plan to upgrade the professional development of administrators and teachers. Our current work promises to be the beginning of a long-term endeavor to improve schools in Qatar and could become a model for education reform throughout the Middle East. In addition, it is possible that RAND may be called upon to assist the nation of Qatar in additional areas of domestic and defense policy.
- **Center for Domestic and International Health Security.** This new center is dedicated to the proposition that better health care is a vital seed of global security. Better health care leads to better-nourished mothers and children, thus lowering infant and child mortality rates. Lower mortality rates then reduce fertility, limit population growth, and raise per capita income. Rising incomes further improve health status, as individuals are better fed, housed, and educated. Better health, stable population growth, higher incomes, and more education produce societies more likely to be democratic, peaceful, socially tolerant, and valued partners in the world community. Such developments would certainly enhance our security and that of other countries. One goal of the center is to make health an important element in U.S. foreign policy. Another goal is to encourage the United States and other advanced nations to share their capabilities in health care with millions of people around the world, especially in poorer countries.

We view the enhancement of education and health at the global level as important components of our efforts to strengthen both U.S. and global security.

- **Public Research and Development (R&D) in the United Kingdom (UK).** Assessing the productivity of R&D in the private sector is a relatively straightforward matter of measuring future earnings relative to an initial investment. Not so in the public sector, where the real costs of R&D are not as easily calculated and the value cannot be translated from profits. Nonetheless, the UK's National Audit Office commissioned RAND Europe to evaluate "value for money" in public-sector R&D. The work—carried out by British, Dutch, and American researchers—has focused on the processes whereby UK R&D is managed, on the belief that clear and strong management practices can increase the confidence of good value for money.
- **German Health System Reform.** Like many other European health care systems, Germany is committed to achieving a single level of high-quality health care for all. But in Germany, as elsewhere, this ideal is becoming increasingly hard to achieve—or to afford. With insurance premiums skyrocketing, a consensus is forming in Germany that reform is unavoidable. With the help of the Bertelsmann Foundation, RAND Europe is analyzing a range of significant departures from the German tradition of the state, not the individual, being responsible for the health of Germans. The work draws heavily on RAND's experience and data on health and health financing in the United States. The RAND Europe team includes Germans, Dutch, and Americans.
- **Center for Asia Pacific Policy.** From India to Indonesia and from economic planning to nuclear policy, RAND analysts have offered U.S. and Asian policymakers research-based advice. RAND research has recently helped policymakers respond to the following: China's economic transformation; the debate in South Korea over reunification with the North; terrorist networks in Southeast Asia; information technology's effects in Asia; military competition between India and Pakistan; banking reform in Japan; and socioeconomic trends in Bangladesh, Indonesia, and Malaysia.
- **Center for Middle East Public Policy.** RAND research is helping to shape a better understanding of issues ranging from Palestinian nationalism to Mediterranean security. In addition to our work in Qatar, our recent and ongoing studies include the following: the impact of Internet growth in the region; immigration patterns in Israel; links between human capital issues and political stability; and definitive analyses of the Persian Gulf War. This past year, the center was also able to initiate, with the help of two generous gifts, a research stream focused on the problems and challenges of youth in the Middle East.
- **Center for Russia and Eurasia.** RAND research is contributing to a fuller understanding of the opportunities and challenges presented by Russia's recent outreach to the United States and by the growing involvement of the United States in the affairs of Russia's

Message from the Chairman and the President

immediate neighbors. For the last five years, RAND has also facilitated discussions among U.S. and Russian business leaders to develop strategies for the Russian economy and for U.S.–Russian business relations. Russian officials credit this forum with paving the way for improved relations between the Russian government and business community.

- **RAND Graduate School (RGS).** From its inception in 1972, RGS has been an international institution. Of the 159 Ph.D.'s that it has granted since then, 26 of them have been awarded to non-Americans. Most of these individuals are now helping shape policy in their home countries. The globalization of our graduate school has continued apace. Of the 74 graduate fellows now enrolled, 36—or nearly half—are non-Americans. The RGS is also developing an international network of research institutes, with RGS at the center.

All of these developments represent our response to the ineluctable reality of a swiftly globalizing world. Old patterns of state-to-state and bloc-to-bloc relations have become eclipsed by global concerns that cut across national and regional boundaries. These cross-border concerns—education, health care, migration, crime, trade, information technology, energy, the environment, and social and economic development—have all risen in significance and should now be integrated into the broad structures of national and international security. Thus, our ability to serve our traditional clients in the United States is enhanced as our global reach lengthens.

To become a truly global institution will require us to go further. Global institutions not only operate in different regions of the world but also draw from the distinct capacities of those regions. Each part of an institution can then benefit from the hallmark of globalization: the global exchange, application, and cross-fertilization of resources—in our case, talent, knowledge, and methods. We do some of this kind of work already. We are committed to doing much more of it in the future in our continuing efforts to become the world's most effective and trusted policy research institution.

Global institutions not only operate in different regions of the world but also draw from the distinct capacities of those regions.

RESEARCH 2002

- Arroyo Center
- Council for Aid to Education
- Labor and Population Program
- National Security Research Division
- Project AIR FORCE
- RAND Education
- RAND Enterprise Analysis
- RAND Europe
- RAND Health
- RAND Institute for Civil Justice
- RAND Public Safety and Justice
- RAND Science and Technology

Arroyo Center

Thomas L. McNaugher, RAND vice president and director of the Arroyo Center

More than a year after the September 11 attacks rocked the country, the shock waves of that event are still being felt across the nation, particularly in the armed forces. The Arroyo Center launched a short-term study shortly after the attacks to help the Army identify how the global war on terrorism would affect it. Completed in months and briefed to the full Arroyo Center Policy Committee, the study concluded that repetitive deployments for the Army would continue, that the service would need a full range of capabilities flexibly organized, that at least small elements of these units would have to be ready for almost immediate deployment, and that, consequently, the Army has a vested interest in global basing for both combat and support troops. None of this is new. Indeed, the trends reflected in the study findings have been present since the end of the Gulf War. But the September 11 attacks lent them powerful emphasis.

The Arroyo Center was able to respond quickly to the events of September 11, 2001, because it had been researching issues relevant to the war on terrorism for years. Arroyo's work on transformation, for example, was aimed at, among other things, helping the Army deploy its forces faster. *Exploring Advanced Technologies for the Future Combat Systems Program* (RAND MR-1332) assesses the technologies, tactics, and operational concepts being considered for the rapid-reaction role. Using high-resolution simulation, the study suggests that remote reconnaissance assets such as unmanned drones will not make the battlefield completely transparent. Although fires from afar can whittle away at enemy forces, their use carries the risk of substantial collateral damage. Ground forces can help get the job done, but probably not without taking casualties. Finally, vertical envelopment can tip the scales in the favor of U.S. forces, but significant improvements in the aircraft defense must occur before such a tactic becomes feasible.

Indeed, another study—*Analysis of Air-Based Mechanization and Vertical Envelopment Concepts and Technologies* (RAND DB-321)—questioned the survivability of aircraft the Army envisions using for vertical envelopment. Again using RAND's high-resolution simulation capability to test various tactics, technologies, and levels of air defense, the analysts found that the large size and slow speed of the proposed aircraft make it vulnerable to optically guided weapons

About the Arroyo Center

The Arroyo Center is the Department of the Army's federally funded research and development center for studies and analysis. Established in 1982 at the Jet Propulsion Laboratory in Pasadena, California, the Arroyo Center officially became part of RAND in 1985.

Although it provides short-term assistance on issues of urgent concern to the Army, the Arroyo Center focuses on mid- to long-range policy problems. Its primary mission is to help the Army improve its efficiency and effectiveness in such areas as

- projecting power in support of the war on terrorism
- assessing advanced technologies
- acquiring and maintaining advanced weapons systems
- recruiting, training, and retaining high-quality personnel
- redesigning the logistics system

and those with infrared seekers, even when flying low. Combinations of suppression, stealth technology, low flying, and superb intelligence can yield good survivability, but no single approach guarantees survivability. Vertical envelopment remains a promising concept, but can be realized in practice only if the Army can solve this problem.

Arroyo's work on the Kosovo conflict—*Disjointed War* (RAND MR-1406)—also contains insights directly relevant to the war on terrorism. While its authors recognize that the war was won by a single military component—strike aircraft—and without casualties, they argue that the overall campaign could have benefited from more jointness. The absence of NATO ground forces in Kosovo itself allowed Yugoslav forces to tailor their operations so as to minimize the allied air threat. They dispersed their troops and hid them in the forests and villages of Kosovo. Their air defenses forced allied aircraft to fly high, sharply curbing their effectiveness against Yugoslav ground troops. The upshot was that the allies lost almost no aircraft but neither did they inflict any damage on Yugoslav troops in Kosovo. The report also examines the deployment of Task Force Hawk, the Army attack helicopter unit that went to Albania. This proves to be a case study of the problems that the Army will face (and has already faced) in carrying out the war on terrorism: forces deploying to a remote location that lacks modern airfields and ports.

Agile forces require equally agile logistics. It took six months to amass the supplies thought necessary to fight the Gulf War. Much Arroyo Center analysis since then has focused on helping the Army shrink the logistical tail that follows its combat forces, largely by improving efficiency. Representative of this stream of research is *Diagnosing the Army's Equipment Readiness: The Equipment Downtime Analyzer* (RAND MR-1481). Knowing why a piece of equipment breaks, how long it stays broken, and why is critical not only to the Army's ability to improve the readiness of its equipment but also to its ability to design better equipment. Knowing which things break and why will help the Army buy equipment that runs longer and takes less care, with obvious beneficial consequences for the size of the logistics tail. Better information can also help identify problems not related to the logistics system. For example, it can uncover problems with fault diagnosis—a training rather than a supply problem. The equipment downtime analyzer provides the Army a way to do that using information it already collects.

While the Arroyo Center has sought to help the Army with the immediate and urgent challenges stemming from the war on terrorism, it has not lost sight of the long-term challenges facing the service. The Army of course wishes to make its business practices more efficient, and two recent Arroyo studies address this issue. One, *Seeking Nontraditional Approaches to Collaborating and Partnering with Industry* (RAND MR-1401), looks for ways to take advantage of innovation in American industry by finding ways to make it easier to do business

Arroyo Center

The 2002–2003 Army Fellows in Santa Monica are (left to right) MAJ Gary Quintero, LTC Steve Hartman, MAJ Jerome Campbell, and MAJ Caron Wilbur.

The 2002–2003 Army Fellows in Washington are (left to right) LTC Scott O'Neil, LTC Steve Dalzell, MAJ Chad Luebbert, and MAJ Lincoln Leibner.

with the Army. Many commercial firms shy away from contracting with the Army because of the burdensome government regulations. This report describes nontraditional ways for the Army to work with industry using public–private partnerships, venture capital funds, and federal government corporation concepts. While promising, each approach requires resolution of key issues before it is feasible. Once resolved, the Army should run a pilot program to test each approach. In the logistics area, *Right Price, Fair Credit* (RAND MR-1150) provides the Army some criteria against which to assess its pricing and credit policies for its single stock fund, the mechanism the Army uses to pay for repairs and replenish spare parts. Unless the incentives are set properly, customer behavior may minimize costs at the unit level but drive up expenses for the Army overall. The Arroyo-supplied criteria give the Army a way to define an optimal price and credit policy.

Another issue of enduring significance is the tactical skill of Army leaders. *Keeping the Warfighting Edge* (RAND MR-1378) examines the troubling question of whether key developmental assignments for infantry and armor officers got shorter between 1990 and 1998 and whether those assignments involved less tactical training. It concludes that while some assignments did get shorter, particularly for platoon leaders, on average tenure in these key assignments was about the same. However, the training *content* declined, particularly for armor officers, raising the possibility of a weaker tactical foundation as officers move into more senior positions.

Finally, *The Emergence of Peer Competitors* (RAND MR-1346) takes on a key long-term planning challenge for the Department of Defense (DoD): identifying the next peer competitor. The report provides a conceptual framework for judging how a potential peer might interact with the dominant global power. Using exploratory modeling, the authors examine various interactions to identify the patterns and combination of actions that could lead to open rivalry.

Selected Publications

Analysis of Air-Based Mechanization and Vertical Envelopment Concepts and Technologies, Jon Grossman, John Matsumura, Randall Steeb, John Gordon, Tom Herbert, William Sollfrey, RAND DB-321-A.

Army Air and Missile Defense: Future Challenges, Frances M. Lussier, Michael D. Miller, Brian Nichiporuk, David C. McGarvey, Lowell Schwartz, David Vaughan, RAND DB-335-A.

Assumption-Based Planning: A Tool for Reducing Avoidable Surprises, James A. Dewar, Cambridge, Mass.: Cambridge University Press.

Diagnosing the Army's Equipment Readiness: The Equipment Downtime Analyzer, Eric Peltz, Marc Robbins, Patricia Boren, Melvin Wolff, RAND MR-1481-A.

Disjointed War: Military Operations in Kosovo, 1999, Bruce R. Nardulli, Walter L. Perry, Bruce Pirnie, John Gordon IV, John G. McGinn, RAND MR-1406-A.

Exploring Advanced Technologies for the Future Combat Systems Program, John Matsumura, Randall Steeb, Tom Herbert, John Gordon, Carl Rhodes, Russell Glenn, Michael Barbero, Fred Gellert, Phyllis Kantar, Gail Halverson, Robert Cochran, Paul Steinberg, RAND MR-1332-A.

Implementing the Post-Deployment Health Practice Guideline: Lessons from the Field Demonstration, Donna O. Farley, Georges Vernez, Suzanne Pieklik, Sherilyn Curry, RAND DB-383-A.

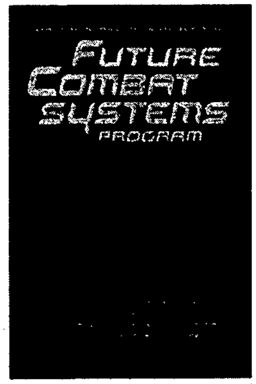
Keeping the Warfighting Edge: An Empirical Analysis of Army Officers' Tactical Expertise, Maren Leed, RAND MR-1378-A.

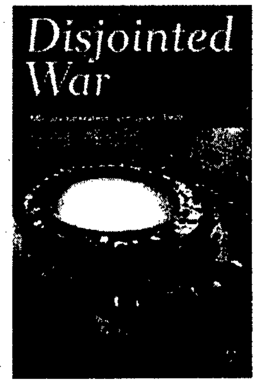
Protecting the Homeland: Insights from Army Wargames, Richard Brennan, RAND MR-1490-A.

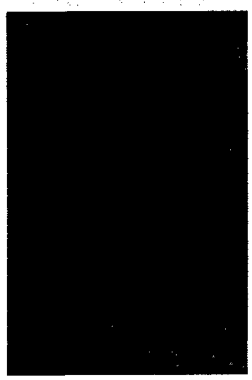
Ready for Armageddon: Proceedings of the 2001 RAND Arroyo-Joint ACTD-CETO-USMC Nonlethal and Urban Operations Program Urban Operations Conference, Russell W. Glenn, Sidney W. Atkinson, Michael P. Barbero, Frederick J. Gellert, Scott Gerwehr, Steven L. Hartman, Jamison Jo Medby, Andrew W. O'Donnell, David Owen, Suzanne Pieklik, RAND CF-179-A.

Right Price, Fair Credit: Criteria to Improve Financial Incentives for Army Logistics Decisions, Ellen M. Pint, Marygail K. Brauner, John R. Bondanella, Daniel A. Relles, Paul Steinberg, RAND MR-1150-A.

Seeking Nontraditional Approaches to Collaborating and Partnering with Industry, Bruce Held, Kenneth P. Horn, Michael Hynes, Christopher Hanks, Paul Steinberg, Christopher Pernin, Jamison Jo Medby, Jeff Brown, RAND MR-1401-A.







The events of the past year have proven the worth of the Arroyo Center's long-term research agenda. Much of the agenda adapted well to the current challenge of fighting the war on terrorism. We will ensure that our research serves the Army's most pressing needs, yet we will not abandon our long-term view. We are proud to be the Army's partner as it again answers the nation's call.

Council for Aid to Education

Roger Benjamin,
president of the Council
for Aid to Education

The Council for Aid to Education (CAE), a part of RAND since 1996, conducts and disseminates research on higher education policy and private giving to education, and develops assessment and planning tools for colleges and universities. CAE celebrated its 50th anniversary this year.

Measurement of Quality in Undergraduate Education

The American system of higher education is a huge enterprise: $289.1 billion total expenditures in 2001–2002, with 14.5 million students enrolled at 4,096 institutions in 2000. While the system is diverse and decentralized, all institutions have undergraduate education as a central goal (technical community colleges, Ivy League schools, historically black colleges, large land-grant universities, online proprietary programs, and women's colleges). It seems reasonable to assume that colleges and universities would measure what they value, and that collectively institutions would create mechanisms to benchmark their progress in educating students with respect to that of other institutions. Nonetheless, no systematic approach currently exists to measure student learning.

In the fall of 2000, CAE launched a national program to assess the quality of undergraduate education in the United States by directly measuring its impact on students. The objectives are to create a performance-based assessment model and incentive system for continuous improvement, and to develop direct measures of quality that all the major stakeholders—university administrators, faculty, students, parents, employers, and policymakers—can use as part of their evaluation of academic programs nationwide.

Most attempts to measure quality are based solely on student and alumni surveys, tabulations of actuarial data such as graduation rates, peer review accreditation, "reputation" rankings, institutional resources, and the admissions selectivity of the student body. CAE, on the other hand, is developing measures designed to assess student ability in critical thinking, writing, and synthesizing quantitative and qualitative data. The measures are

- focused on skill sets that students will need as they graduate and enter the workforce

Michael D. Rich
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Benno C. Schmidt, Jr.
Chairman, Edison Schools

John Brooks Slaughter
President and CEO, National Action Council for Minorities in Engineering

Sara Martinez Tucker
President and CEO, Hispanic Scholarship Fund

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The McGraw-Hill Companies
Metropolitan Life Foundation
The Proctor & Gamble Fund
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State Farm Companies Foundation
The UPS Foundation

- performance based (rather than aptitude based)
- based on appropriate psychometric standards that require minimum levels of reliability and validity
- designed to elicit the value added by the institution to the students' growth in learning
- organized to provide clear signals to students, parents, and teachers about college preparation and graduation requirements at much earlier points in the K–16 education system
- used for diagnostic and monitoring purposes that can be a critical component of an integrated strategy to improve curriculum and pedagogy

CAE raised more than $2 million for a feasibility study, which was recently completed. Working with nearly 1,400 students at 14 colleges and universities, researchers developed performance-based measures and then administered them to the students. According to focus groups, students found the tasks "interesting," "engaging," "fun," "challenging," and "fair." There was consensus that college students should be able to complete the tasks successfully.

The longitudinal, scale-up phase of the project will track students at 30–50 institutions from their freshman through senior years, measuring the growth in their learning over the four-year period. The institutions chosen for the study will represent the continuum of higher education, from community colleges to private and state colleges and universities that grant doctoral degrees.

CAE will construct a Collegiate Learning Assessment Database (CLAD), an indicator system designed to measure and assess the value-added of institutions of higher education. The database will combine the scores from the new CAE measures and other measures, including transcript data, SAT and ACT scores, and surveys (e.g., the National Survey of Student Engagement).

Peer Review, the journal of the Association of American Colleges and Universities, devoted its Winter/Spring 2002 issue entirely to CAE's higher education assessment program.

With support from a Leadership Committee of U.S. companies, CAE is experimenting with using the measures to improve minority student learning, especially at historically black colleges and universities and predominantly Latino-serving institutions. CAE is also planning two national meetings on closing postsecondary attainment gaps.

SURVEY OF EDUCATIONAL PHILANTHROPY

CAE's Voluntary Support of Education (VSE) survey is the authoritative national source of information on private giving to higher education and private K–12, consistently capturing about 85 percent of the total voluntary support to colleges and universities in the United

Council for Aid to Education

Roger Benjamin (left) presents a 2002 Leaders for Change Award to Ed Ahnert, president of the ExxonMobil Foundation, for ExxonMobil's Pre-College and Higher Education Science and Mathematics Program.

States. CAE has managed the survey—now conducted entirely online—as a public service for more than 40 years.

The most recent report (*VSE 2001*) demonstrated that private contributions to America's higher education institutions rose in FY2001 despite the sharp decline in stock market values over the period. The total amount of private giving to U.S. colleges and universities in 2001—$24.2 billion —is a $1 billion (or 4.3 percent) increase over the previous year. The results of the survey are published online (www.cae.org) and in book form each year.

The VSE Data Miner is an Internet survey tool that provides historical and comparative data on private support of education. Educational institutions use the VSE Data Miner to benchmark their performance against that of peer institutions and analyze the results of their fund-raising efforts among alumni, foundations, corporations, and others.

LEADERS FOR CHANGE

Leaders for Change, now in its ninth year, is a CAE program designed to advance corporate philanthropic support of K–16 education reform initiatives. In June 2002, CAE honored ExxonMobil's Pre-College and Higher Education Science and Mathematics Program, IBM's Reinventing Education, and State Farm's Partners in a Learning Community with its annual Leaders for Change Awards. The awards luncheon held at the University Club in New York featured a discussion led by Matthew Goldstein, chancellor of the City University of New York.

SELECTED PUBLICATIONS

Intelligent Giving: Insights and Strategies for Higher Education Donors, Jonathan P. Caulkins, Jay Cole, Melissa Hardoby, Donna Keyser, MR-1427-CAE.

Voluntary Support of Education 2001, Council for Aid to Education.

Labor and Population Program

About the L&P Program

RAND's L&P Program conducts research on a broad range of human resource issues. Established in 1967 to consolidate RAND's demographic studies in the United States and developing countries, the program has built an international reputation for high-quality empirical policy analysis.

Diversity of studies, common aim: To understand why people make the decisions they do and how markets, society, and policies affect them.

Methodology advancement: To design, field, and analyze large comprehensive microlevel surveys, with current and retrospective information at the individual, household, and community levels on a range of demographic, social, health, and economic topics. The resulting databases are widely used by the research community.

Interdisciplinary approach: To use the methodologies, concepts, and substance of many disciplines. The staff includes demographers, economists, epidemiologists, health scientists, policy analysts, psychologists, sociologists, and statisticians.

Beyond research: To work with public- and private-sector decisionmakers to implement, evaluate, and refine policies. To advance the study of human resources by offering postdoctoral fellowships to U.S. and international students and by organizing conferences where scholars may exchange research methods and findings.

The Labor and Population (L&P) Program's research focuses on five areas:

- U.S. labor markets
- changing U.S. demographic patterns
- social welfare policy and family and child well-being
- social and economic functioning of the elderly
- economic and social change in developing countries

Research Highlights

What Have We Learned from a Decade of Welfare Reform? The last decade has witnessed significant changes in welfare policy, culminating in the Temporary Assistance for Needy Families program in 1996. Over that same period, welfare-related outcomes have also changed (e.g., dramatic declines in the welfare caseload and substantial increases in employment rates and earnings of women—including single women with children—and family income).

Given that other factors can influence these outcomes, how much effect has welfare policy actually had? To find out, L&P staff synthesized the results of nearly 70 studies, looking for the *net effect* of welfare reform policies on outcomes of interest. As for economic outcomes, they find that welfare reform has had substantial effects on reducing the caseload and that it is responsible for a portion of the increase in work and earnings among single mothers during the last decade. While some welfare reform components can raise incomes and reduce poverty, some of the initially favorable effects are unlikely to persist over time as recipients reach federal limits on benefit receipt.

Although the evidence is limited, welfare reform has had both positive and negative effects on child well-being. The most favorable effects are associated with financial work incentives. But even for these programs there is evidence of unfavorable impacts for adolescent children and for younger children of parents who do not experience large income gains.

One overarching conclusion is that, despite the growing research base, we know very little about the effects of welfare reform on some critical outcomes—e.g., marriage and fertility—and even less about the effects of some key policies—e.g., sanctions and time limits. Also, while the findings we do have apply in the short run, understanding the longer-term impacts is crucial, especially for child outcomes that may not manifest themselves early on.

Changing the Retirement Age: How Does It Affect the Social Security Program? With Social Security benefits projected to exceed tax income by 2017, Congress is considering several proposals to restore solvency, including provisions to increase the normal retirement age (NRA) beyond the current target of 67 years and to raise the early entitlement age (EEA) beyond 62 years.

To assess the effects of the proposed changes, L&P researchers used the Health and Retirement Study (HRS), a national panel survey of individuals age 51–61 at baseline (1992) that provides extensive information about work, financial resources (including Social Security and private pensions), and health. Using survey data, they estimated formal models of retirement and disability insurance (DI) claiming and simulated the financial consequences of the proposed policy changes.

What they find is that about 5 percent of early-claimants for Social Security benefits would be very vulnerable to an increase in the EEA, because they are working with a health-limiting condition, have a physically demanding job, and have no private pension. As for raising the EEA, they find it will not generate any savings for the Social Security program and, in fact, may cost more if individuals shift onto the DI program. Increasing the NRA, however, is likely to substantially lower Social Security liabilities, because doing so amounts to reducing recipient benefits. Finally, they show that the estimated effects of implementing an increase in the NRA may be slightly overstated because employers are likely to counteract any proposals for extending the time to retirement with stronger incentives for early retirement.

How Population Dynamics Can Affect Economic Growth. For decades, experts have debated whether population growth hinders, helps, or is irrelevant to national economies. However, the debate has focused almost exclusively on high birth rates and has ignored the importance of age structure—that is, how the population is distributed across different age groups. Having a high proportion of young or old dependents can act as a "drag" on the economy; conversely, having a high proportion of working-age people can boost economic growth. Reducing fertility rates can help bring about these economically beneficial changes in age structure. When a nation's fertility rate falls, so does the number of young dependents. Eventually the proportion of people of prime working age increases. With a larger share of working-age population, nations may see a substantial boost in income growth and savings. This phenomenon is known as "the demographic dividend." Research sponsored by *Population Matters* used a series of case studies to examine how demographic conditions have contributed to economic growth at different times in different regions.

East Asia and sub-Saharan Africa represent two ends of the spectrum in terms of benefiting from the "demographic dividend." As shown in the figure on the next page, the working-age share of the population in East Asia has risen sharply since the 1970s, corresponding with the period of robust growth known as the "East Asian economic

L&P Centers

Many of L&P's studies are carried out in one of four centers.

The Center for the Study of Aging, established in 1989 and renewed in 1999, houses an NIA-funded program project—Health and Economic Status in Older Populations—and an array of individual research projects. Directed by Michael Hurd, the center focuses on the interrelationships among health, financial resources, and the role of the family.

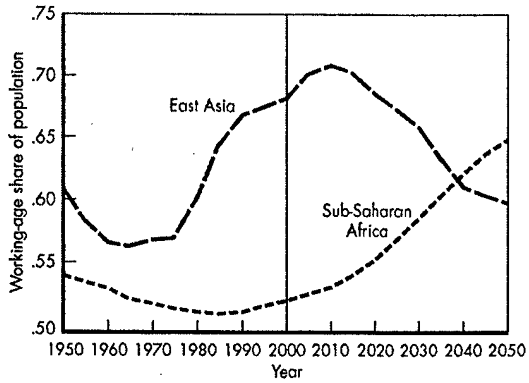
The Center for the Study of Social Welfare Policy, established in 2000 and directed by Jacob Alex Klerman, houses RAND's national research on social welfare policy, as well as its research for the State of California and for California counties in this area.

The Center for the Study of the Family in Economic Development, originally established in 1991, is under the direction of Julie S. DaVanzo. The center uses a number of rich microdatasets to examine relationships among development, fertility, migration, and the changing roles of the family and community.

The Population Research Center was established in 1979. Directed by Arie Kapteyn, it is one of ten population centers supported by NICHD and the only one outside a university setting. Four themes unify the center's work: marriage and family, child health and well-being, the demography of labor force participation, and the effects of public policy.

Sampler of Current Projects

- Back to Work: Trends in Postretirement Employment
- Comparison of Survey and Register Data: The Swedish Case
- Consumption and Time Use Before and After Retirement
- Demographic Challenges in Pittsburgh's Future
- Developing a Definition of Disability
- Employed Former Recipients Use of Income Support Programs
- Family Transfer Behavior in the United States
- Highlighting Scientific Discoveries That Benefit the Elderly
- How Policies Interact with Demographic Trends to Influence Social and Economic Outcomes
- Impact of the 1996 SSI Childhood Disability Reforms on Affected Children and Families
- Impact of the WIC Program on Pregnancy, Infant, and Child Outcomes
- Internet Interviewing
- Long-Term Consequences of Pension Trends for the Economic Security of Widows
- Neighborhood Effects on Children's Well-Being
- Promoting Effective Informal Learning
- Research on Welfare Reform Outcomes and Low-Income Populations
- Residential Mobility and Tracking of Adults
- Retention and Turnover in the IT Workplace
- Retirement Expectations and Realizations
- Saving for Retirement: Wage Growth and Unexpected Events
- Self-Employment and the 50+ Population
- What Would It Cost to Implement Policies for All Youth Who Need Them?



SOURCE: United Nations, "World Population Prospects: The 2000 Revision," CD-ROM, 2001. NOTE: Post-2000 data are UN projections.

miracle." During the same period, high fertility rates have kept the share of the working-age population low in sub-Saharan Africa, helping to explain why there has been no demographic dividend there to help catalyze sustained economic growth. However, the figure also shows cause for optimism in sub-Saharan Africa, with an expected rise in the share of the working-age population over the next 25 years, corresponding to expected declines in fertility. Still, the demographic dividend is not automatic: Effective policies are required to help realize its benefits. Improvements in public health can trigger the transition to lower fertility rates; effective family planning programs can accelerate it; and improvements in education, economic policy, and governance can help exploit it.

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Department of Health and Human Services
- Administration for Children and Families
- National Institute on Aging
- National Institute of Child Health and Human Development
- Office of the Assistant Secretary for Planning and Evaluation

Department of Labor
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Social Security Administration

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Los Angeles County Proposition 10 Commission, California
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- Department of Social Services
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Other

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OTHER AREAS OF INFLUENCE

With support from the National Institute of Child and Human Development (NICHD), the National Institutes of Health (NIH) Office of Behavioral and Social Sciences Research (OBSSR), Los Angeles County, the Russell Sage Foundation, and the Department of Health and Human Services, Administration for Children and Families (DHHS-ACF), L&P has released data from the first wave of its Los Angeles Family and Neighborbood Survey (L.A. FANS) for use by researchers. This unique data set will support research on the effects of neighborhoods on children's growth and development; the determinants and consequences of residential mobility; the local consequences of social programs; health disparities; immigrant adaptation and second-generation immigrants; the determinants of health insurance coverage; and many other issues.

This year, L&P continues to disseminate the results of its research projects. For example, based on research on after-school care programs, L&P staff extensively briefed on the broader question of what we know about the effectiveness of after-school care, an issue of growing importance in light of the debate in California over Proposition 49—the After School Education and Safety Program Act of 2002. In particular, staff briefed the California Congressional Delegation, the Los Angeles County Policy Roundtable on Child Care, the Child Policy Deputy for Los Angeles County Supervisor Yvonne Burke, and the California President of the League of Women Voters.

Two staff members working in the L&P Program also received an award from the National Institute for Health Care Management for the best research article of the year. Based on an examination of two illnesses—diabetes and HIV—the article determined that better self-management of disease by the more educated can help better explain why there are such large differences in health outcomes by socioeconomic status (SES).

With funding from the National Institute on Aging (NIA) and NIH/OBSSR, L&P sponsored the Ninth Annual RAND Summer Institute (RSI), consisting of both a Mini-Medical School for Social Scientists and a Program on the Demography, Economics, and Epidemiology of Aging. The conference—attended by more than 60 participants from the United States and abroad—addressed critical

Labor and Population Program

Evolutionary geneticist and theorist Michael Haig addressed participants at the Ninth Annual RAND Summer Institute.

issues facing the aging population and shared the latest knowledge and state-of-the-art research in the aging field. Speakers included Michael Haig, an evolutionary geneticist, theorist, and an associate professor at Harvard's Department of Evolutionary Biology, whose primary research is on genomic imprinting and relations between parents and offspring.

New Directions for Research

During the past year, L&P and RAND Health renewed their contract with the U.S. Department of Labor (DOL), Pension and Welfare Benefits Administration (PWBA) for the fourth time. Established in 1988 as the Center for the Study of Employee Health Benefits and now known as the Center for Employer-Sponsored Health and Pension Benefits, the center has performed a variety of research on employee health and pension benefits–related issues over the past 15 years. As part of the renewal of the center, L&P was awarded a new project that will investigate the long-term consequences of pension trends for the economic security of widows.

Other new directions in research include a project that is trying to provide a practical understanding of how community institutions, families, and decisionmakers can increase youth participation in informal (or out-of-school) learning opportunities, such as museums, zoos, science centers, libraries, and community-based youth-serving organizations. Another new project involves conducting Internet interviews with a subset of the respondents of the HRS and setting up a separate Internet panel of non-HRS respondents and a control group panel interviewed by telephone. The study includes a methodological evaluation of the use of the Internet as another mode of data collection.

Finally, *Population Matters* was renewed for its third cycle this year, with funding from the William and Flora Hewlett Foundation. *Population Matters* is preparing papers on a number of topics, including population and water (with funding from the Compton Foundation), the effects of family planning programs on abortion, the security implications of demographic factors in a number of regions (Middle East, Central Asia, South Asia, and Southeast Asia—a different paper on each of these), and the implications of worldwide urbanization.

Selected Publications

"Banking the 'Demographic Dividend': How Population Dynamics Can Affect Economic Growth," RAND RB-5065.

"Can Patient Self-Management Help Explain the SES Health Gradient?" *Proceedings of the National Academy of Sciences*, Vol. 99, No. 16, pp. 10929–10934, Dana Goldman, James P. Smith.

Consequences of Welfare Reform: A Research Synthesis, Jeffrey Grogger, Lynn A. Karoly, Jacob A. Klerman, RAND DRU-2676-DHHS.

"A Decade of Welfare Reform: What We've Learned About Child Well-Being," RAND RB-5068-DHHS.

"A Decade of Welfare Reform: What We've Learned About Welfare Usage and Economic Outcomes," RAND RB-5067-DHHS.

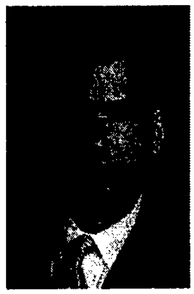
The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change, David E. Bloom, David Canning, Jaypee Sevilla, RAND MR-1274-WFHF/DLPF/RF/UNPF.

The Effects of Changing Social Security Administration's Early Entitlement Age and the Normal Retirement Age, Constantijn Panis, Michael Hurd, David Loughran, Julie Zissimopoulos, Steven Haider, Patricia St. Clair, RAND DRU-2903-SSA.

"International Family Planning Programs: Criticisms and Responses," RAND RB-5063-WFHF/DLPF/RF.

The Origins and Evolution of Family Planning Programs in Developing Countries, Judith R. Seltzer, RAND MR-1276-WFHF/DLPF/RF.

National Security Research Division



Jeffrey A. Isaacson, RAND vice president, director of the National Security Research Division, and director of the National Defense Research Institute

About the NSRD

The National Security Research Division (NSRD) conducts research for every RAND national security client other than the U.S. Air Force and Army. The division helps policymakers confront national security decisions that require disciplined inquiry, bringing rigorous analytical methods of the social and physical sciences and an understanding of world and national affairs to the study and choice of policy.

Roughly 80 percent of the division's revenues derive from the National Defense Research Institute (NDRI), a federally funded research and development center (FFRDC) that supports the Office of the Secretary of Defense (OSD), the Joint Staff, the Unified Combatant Commands, and the defense agencies. The division's non-DoD clients include agencies within the U.S. intelligence community, the Office of Homeland Security, ministries of defense of several allied countries, and private foundations. Research for both DoD and non-DoD clients is conducted in the division's four research centers:

- The International Security and Defense Policy Center
- The Acquisition and Technology Policy Center
- The Forces and Resources Policy Center
- The Intelligence Policy Center

Other non-DoD work in NSRD is overseen by International Programs, which houses RAND's three regional policy centers—the Center for Middle East Public Policy, the Center for Asia Pacific Policy, and the Center for Russia and Eurasia. International Programs also directs RAND's research on Latin American policy issues. Funded largely through contributions, International Programs and its constituent parts sustain RAND's research focus and capability in key regions of the world and serve to extend RAND's outreach internationally.

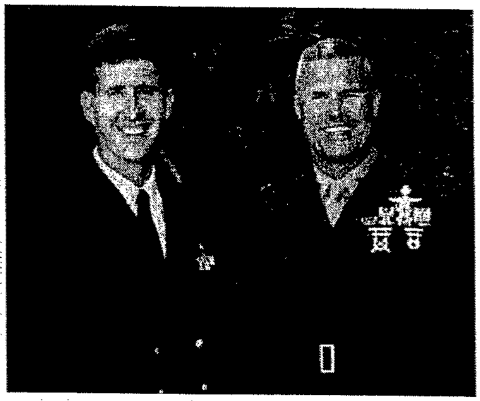
Through these national security research centers and regional policy centers, NSRD produces an integrated body of independent research that looks at ways the United States can take advantage of its pivotal role in critical regions of the world, exploit its strong edge in many leading technologies, capitalize on the high caliber of its military personnel, and harness its intelligence capacities and apparatus to advance U.S. interests in a changing world and an uncertain future.

The National Security Research Division (NSRD) provides high-quality, independent policy studies and analytical assistance to the Department of Defense (DoD), other U.S. government agencies, allied governments, and private foundations.

NSRD's **International Security and Defense Policy Center** explores the implications of change—political, strategic, economic, and technological—on the international scene and assists U.S. national security decisionmakers with developing strategies and policies to manage and adapt to such transformations. Such themes were the focus of two noteworthy research efforts the center pursued in 2002:

- **The Military and Democracy in Indonesia: Challenges, Politics, and Power.** The Indonesian military, with its tradition of secular nationalism, is one of the few institutions that cuts across the divides of Indonesian society. But the military, like other institutions in Indonesia, is undergoing profound change. Indonesia's internal security situation has driven and likely will drive much of this change and will be a critical factor in determining the military's future political orientation. Indonesia confronts multiple security threats: armed separatists, radical Islamists, and factions engaged in intercommunal conflicts and religious wars. This study examined what role the military will play in influencing Indonesia's political evolution, what are realistic goals for further progress in military reform, and how the United States can engage the Indonesian military most effectively to help bring about positive change. The study concluded that a U.S. engagement program should focus on providing the Indonesian military with the doctrines, training, and resources to implement its reform program and to develop the capability to defend the country's unity and territorial integrity. The United States can help in this process by restoring International Military Education and Training funding for Indonesia; by inviting Indonesian military personnel to participate in the next annual, multilateral Cobra Gold exercise involving the United States, Thailand, and Singapore; and by bolstering Indonesia's air transport, peacemaking, counterterrorist, and intelligence capabilities.
- **You've Got Dissent! Chinese Dissident Use of the Internet and Beijing's Counter-Strategies.** This project analyzed the political use of the Internet by Chinese dissidents, Falungong practitioners, Tibetan

National Security Research Division



(Above, left) Navy and Marine Corps officers add invaluable perspective to NSRD studies and analyses. Officers in yearlong fellowships at RAND in 2002–2003 are LCDR Nicholas J. Dienna, USN (left) and LtCol. William "Blake" Crowe, USMC.

(Above) Jeff Isaacson (right) welcomed CAPT Robert Harward, USN (left) back to RAND in August. Harward, a 1998–1999 NSRD military fellow, briefed RAND staff regarding his stint as Commander, Combined Joint Special Operations Task Force-South (Task Force K-Bar), a multinational detachment that conducted missions in southern Afghanistan against al Qaeda and Taliban fighters in late 2001 and early 2002.

(Left) NSRD researchers Robert Hunter (left) and Stephen Larrabee (right) met with Eduard Shevardnadze, president of Georgia, while on a fact-finding trip to Tiblisi in late June. The meeting occurred in conjunction with a project sponsored by the U.S. Department of State to help Georgia undertake a fundamental reform of its National Security Council.

activists, and other groups and individuals in the People's Republic of China (PRC) and abroad who are regarded as subversive by the authorities in China. It also examined the counterstrategies that Beijing has employed to prevent or minimize the political impact of such use of the Internet. By facilitating the global dissemination of information with greater ease and rapidity than ever before, the Internet enables small groups of activists, and even individuals, to exercise influence disproportionate to their limited manpower and financial resources. In its counterstrategies, the PRC regime has made some use of high-tech solutions, and there is some evidence that Beijing's technical countermeasures are becoming increasingly sophisticated. Its approach, however, is predominantly "low-tech Leninist," employing traditional measures such as surveillance, informants, searches, and confiscation of computer equipment. Beijing's countermeasures have been relatively successful to date. No credible challenges to the regime exist despite the introduction of massive amounts of modern telecommunications infrastructure. However, the scale of China's information-technology modernization suggests that time may be on the side of the regime's opponents.

NSRD's **Acquisition and Technology Policy Center** addresses opportunities and challenges presented by the technological revolution and ways to preserve clear superiority. The following are two examples of high-profile research that the center pursued in 2002:

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Department of Veterans Affairs
Deputy Secretary of Defense
DoD Counterdrug Technology Development Program Office
Joint Staff
Office of Homeland Security
Under Secretary of Defense for Acquisition, Technology, and Logistics
Defense Advanced Research Projects Agency
Defense Threat Reduction Agency
Missile Defense Agency
Under Secretary of Defense (Comptroller)
Director, Program Analysis and Evaluation
Defense Finance and Accounting Service
Under Secretary of Defense for Personnel and Readiness
TRICARE Management Agency
Under Secretary of Defense for Policy
Director, Net Assessment
Unified Combatant Commands
U.S. Intelligence Community
U.S. Marine Corps
U.S. Navy
U.S. Coast Guard

Other

American Physical Society
Australian Ministry of Defense
The Better World Fund
Carnegie Corporation of New York
Dartmouth Institute for Security Technology Studies
Ford Foundation
German Ministry of Defense
Italian Ministry of Defense
Japan Foundation Center for Global Partnership
Kokkalis Foundation
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Korean Ministry of National Defense
Lithuanian Ministry of Defense
The John D. and Catherine T. MacArthur Foundation
Nuclear Threat Initiative
Rockefeller Brothers Foundation
Smith Richardson Foundation
Soros Foundation
Starr Foundation
State of Qatar
United Kingdom Ministry of Defence
U.S.–China Legal Cooperation Foundation

- **Deterrence and Influence in Counterterrorism: A Component in the War on al Qaeda.** Historical experience has shown that successful strategies to combat terrorism that is spawned by serious, deep-rooted problems have involved first crushing the current threat and then bringing about changes to make terrorism's reemergence less likely. While deterrence of terrorism may at first glance seem to be an unrealistic goal—concepts such as *co-optation* and *inducement* cannot be expected to be effective for dealing with terrorists who have the unshakable commitment of an Osama bin Laden—it may be possible to influence some members of terrorist groups. Such groups are not simply single entities; rather, they are *systems*, with diverse elements, many of which could be amenable to influence. Thus, to sustain its counterterrorism efforts for the long term, the United States must develop a multifaceted strategy that includes attempting to influence those elements of terrorist systems that may be deterrable, such as state supporters or wealthy financiers living the good life while supporting terrorists in the shadows. The U.S. strategy should comprise not only military attacks, but also political warfare; placing at risk the things that terrorists hold dear; a credible threat of force against any state or group that supports the acquisition of weapons of mass destruction for terrorist uses; and maintaining cooperation with other nations that are also engaged in the war on terror. At the same time, the strategy must preserve core American values, including discriminate use of force.
- **Final Assembly and Checkout Alternatives for the Joint Strike Fighter.** The DoD's choice in October 2001 of the Lockheed Martin Corporation to be the prime contractor to develop and produce the Joint Strike Fighter (JSF)—the only new manned fighter aircraft currently planned for the next 30 years—left several open questions. What exact production locations might the company use to produce the fighter? What production strategies might it employ? In hopes of finding answers to these questions, Congress directed that the DoD examine alternatives to Lockheed Martin's current plan of performing all JSF final assembly and checkout (FACO) at its Fort Worth, Texas, plant. The DoD turned to NSRD to consider single- and multiple-site options for carrying out FACO there or at three other U.S. plants controlled by Lockheed Martin or its JSF teammate Northrop Grumman. NSRD found no efficiency, effectiveness, or cost reasons to split FACO operations between two sites or across multiple sites. Moving some or all of JSF FACO from Fort Worth to another location would increase costs to DoD. In addition, NSRD concluded that other potential benefits from splitting FACO—distributing economic benefits to more than one region or generating competition among alternative sites, for example—were not compelling.

NSRD's **Forces and Resources Policy Center** concentrates on issues affecting U.S. uniformed personnel, on forces needed to execute U.S. military strategies, and on ways the DoD can optimally use resources. Among the center's many efforts in 2002, two were especially influential:

- **Recruiting College-Bound Youth into the Military.** The armed services prefer to recruit high-quality youth because of their better performance and lower attrition. But high-quality youth are increasingly interested in attending college. This study explored how military service can be made more compatible with college plans instead of being perceived as an alternative to attending college. After presenting an overview of recent demographic trends and theoretical reasons for recruiting college-bound youth, it examined trends in intentions to enlist and to attend college among American high school seniors and the relationship between these trends. The study then compared civilian financial aid programs, military educational programs, and college costs to assess the relative attractiveness of current educational recruiting incentives. Finally, it analyzed the enlistment potential of different segments of the college market (two-year and four-year students and college dropouts). Youth with some interest in the military see themselves as two-year college material. Students attending two-year colleges often receive considerably less financial aid than those at four-year colleges, and the cost of attending such institutions is higher than their low tuition would indicate if the opportunity costs of foregone income are taken into account. Therefore, offering a stipend, higher pay, or other means of offsetting the cost of attending school may be an effective recruiting strategy with this group. The study concluded that if the military wants to successfully compete with the private sector, the relative amount it pays those with some college must be substantially greater than current policies provide.

- **Finding the Right Balance: Simulator and Live Training for Navy Units.** How does the U.S. Navy currently employ simulators as opposed to live training? This study looked at the use of simulators in the Air Force, the Marines, and French and British forces to see if the Navy's current mix of simulator and live training should be changed substantially for the first time since the 1970s. The study found a mixed reliance on simulators today. Simulators play a minor role in training allied and Navy F/A-18 fighter pilots—Navy pilots average only about one hour a month in this system's simulators, which tend to be inaccessible and have not kept pace with changes in the aircraft. However, simulators are used extensively to train flight crews for PC-3 aircraft employed in antisubmarine warfare; they tend to be more realistic than fighter simulators, and Navy personnel average more than 20 hours a month in them. Simulators also are relied upon to train crewmen on DDG-51 class destroyers. This mixed pattern of simulator usage suggests that before the Navy decides to increase its use of simulators, it should first establish readiness measures and carefully evaluate the benefits of simulators versus live training based on those measures.

In addition, FRP researchers worked on a project funded by RAND that examined how the Office of Homeland Security (OHS)—newly established in the wake of the September 11 attacks and preceding the Department of Homeland Security by more than a year—could most effectively participate in the federal budget process.

- **The Role of the Office of Homeland Security in the Federal Budget Process: Recommendations for Effective Long-Term Engagement.** This research project found that OHS is uniquely poised to bring

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An advisory board of key DoD sponsors provides critical guidance to the National Defense Research Institute. Attending the board's meeting in December were (left) Jeanne Fites, Deputy Under Secretary of Defense for Program Integration, Office of the Under Secretary of Defense (Personnel and Readiness), and (right) Susan Everingham, director of NSRD's Forces and Resources Policy Center.

strategy and funding decisions together across departments and agencies; however, it must build on the foundation of its presidential imprimatur to do so. With the president's support, OHS can leverage its position in the administration by cultivating and managing its relationships with other homeland security institutions and their proponents. This analysis addressed key relationships within the executive branch and proposed a strategy for congressional outreach that identifies a core group of active committees. It also developed a road map with specific recommendations for OHS's budgetary role, highlighting the importance of establishing policy priorities and objectives early and formulating strategy and developing funding requests through a tightly coordinated interagency process. The analysis suggested that OHS focus on issues along the "seams" of homeland security policy, where departments' and agencies' jurisdictions gap or overlap. These findings were based on an analysis of expert opinion, institutional analogy, and congressional interest and involvement, as reflected in funding streams, committee hearings, and other legislative activity prior to and following September 11, 2001.

NSRD's **Intelligence Policy Center** maintains a broad, substantive focus that spans international security, acquisition, and manpower issues. It helps clients recognize new security threats and risks, identify new intelligence sources and methods, provide better intelligence support to warfighters, and improve strategic decision processes. The following research effort was particularly helpful to policymakers in 2002:

- **Limited Conflicts Under the Nuclear Umbrella: Indian and Pakistani Lessons from the Kargil Crisis.** This study examined the views of India and Pakistan on the significance of Pakistan's foray in 1999 into the Kargil-Dras sector in a limited war that has come to be known as the "Kargil conflict." Relying almost exclusively on Indian and Pakistani source materials, the analysis assessed both combatants' perceptions of the crisis, with a view to evaluating the possibilities of future Kargil-like events and the implications of the lessons each country learned for stability in South Asia. The Kargil crisis demonstrated that even the presence of nuclear weapons might not appreciably dampen security competition between the region's largest states. However, the question remains of whether or not the Kargil war represents a foretaste of future episodes of attempted nuclear coercion if India and Pakistan believe that their nuclear capabilities provide them the immunity required to prosecute a range of military operations short of all-out war.

In addition, NSRD continued to expand its relationships with other U.S. government agencies and key allies in 2002. The division broadened its research agenda with the Department of State, working on a project that is assisting Georgia to adopt a new National Security Council system by providing it with strategic advice and helping it create viable institutions prior to the next presidential elections in 2005. And it collaborated with RAND Europe in continuing to assist defense planners in Germany, the United Kingdom, Sweden, Italy, Lithuania, and other key allied states.

NSRD also began a project to help the U.S. Coast Guard (USCG) assess its Deepwater program, an undertaking to replace or modernize nearly 100 aging ships and more than 200 aircraft over the next 20 years. NSRD's research will help USCG decisionmakers gauge whether Deepwater—which was put in motion before the September 11, 2001, terror attacks and the USCG's subsequent transfer into the Department of Homeland Security—should be accelerated to accommodate the USCG's new and evolving responsibilities.

International Programs in 2002 concluded a study funded by the Starr Foundation, the Rockefeller Brothers Fund, and the Better World Foundation on ways to attract qualified individuals into careers in international affairs. RAND took the lead in this effort in collaboration with other institutions including the United States Institute of Peace, the Brookings Institution, the Council on Foreign Relations, and others. Among this project's published products in 2002 was the following:

- **New Challenges for International Leadership: Lessons from Organizations with Global Missions.** This study examined ways America's public, private, and nonprofit sectors can more effectively prepare individuals for leadership positions in the increasingly globalized environment of the 21st century. Using both structured and unstructured interviews of more than 225 managers in organizations that are engaged internationally, the study identified emerging competencies that globalization will demand in all three sectors and assessed the level of those skills in today's potential leaders. What the study found lacking in U.S. organizations today was not technical skills but rather the combination of such skills with leadership potential and the ability to work across cultures. Moreover, neither existing career paths nor mid-career training programs correct that deficiency. Lateral hiring remains rare, especially in the public sector; most mid-career opportunities are ad hoc and initiated by employees. The study recommended that U.S. organizations would better prepare individuals for international leadership by developing "portfolio" careers and personnel policies to support them. Such careers would encourage people to gain experience in several areas of expertise and in multiple organizational settings. These initiatives would take off from existing programs like the Intergovernmental Personnel Act to allow public-sector managers to move across agencies, but then engage the public, private, and nonprofit sectors in supporting career exchanges across the three sectors. At the same time, U.S. universities need to internationalize their curricula by devising new ways to give students a grounding in thinking and acting across cultures.

In addition, International Programs continues through its regional centers to disseminate RAND research results broadly and to develop new RAND markets.

- **The Center for Middle East Public Policy (CMEPP)** was created in 1994 to identify practical steps that would encourage material well-being,

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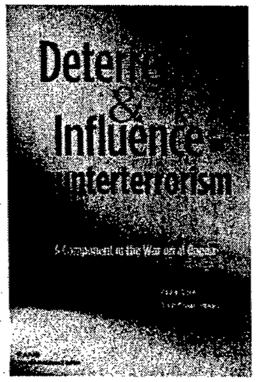

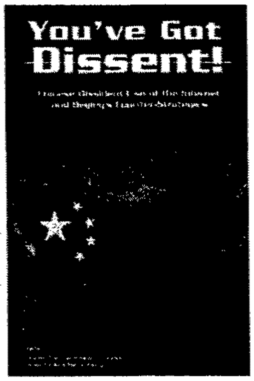

political stability, and lasting peace in the region. CMEPP has been engaged in developing several projects in Qatar in a variety of public policy–related areas, conducted a project on Gulf stability for the Government of Japan, and is currently exploring research possibilities in several Middle Eastern countries. CMEPP also convened international meetings about the Middle East in Switzerland and France and was represented at meetings in the United Kingdom and in several countries of the Middle East.

- **The Center for Asia Pacific Policy (CAPP)** was founded in 1993 to provide policymakers, business leaders, and the public with objective, cutting-edge analysis of critical public policy issues in the Asia Pacific region. CAPP focuses on questions related to international security, economics, technology, and development, including health and education. Among other accomplishments in 2002, CAPP produced studies on radical Islam in Southeast Asia and on the debate in South Korea over the government's approach to North Korea. CAPP also supported research on the use of China's Internet by dissident groups. In 2002, CAPP hosted dozens of Asian visitors, including representatives of China's State Council. RAND researchers published commentaries on Asia in *Foreign Affairs*, the *Wall Street Journal*, the *New York Times*, the *Los Angeles Times*, the *South China Morning Post*, and other journals in Asia and the United States.
- **The Center for Russia and Eurasia (CRE)** provides scholars, policymakers, and citizens with an in-depth understanding of developmental processes in Russia, Eastern Europe, and Eurasia. The CRE-sponsored RAND Business Leaders Forum provides Russian, European, and North American corporate leaders with regular opportunities for informal, in-depth discussions of key issues of mutual interest. (The list of Forum participants is available at www.rand.org/nsrd/cre/blf/list.html.) In 2002, CRE sponsored studies on challenges and opportunities in U.S.–Russian relations, Russia's role in the global information revolution, the changing role of the business elite in Russia's political and economic development, the role of the post-Soviet states of Central Asia in international drug trafficking, and a range of other policy-relevant topics.

SELECTED PUBLICATIONS

Deterrence and Influence in Counterterrorism: A Component in the War on al Qaeda, Paul K. Davis, Brian Michael Jenkins, RAND MR-1619-DARPA.

Final Assembly and Checkout Alternatives for the Joint Strike Fighter, Cynthia R. Cook, Mark V. Arena, John C. Graser, John A. Ausink, Lloyd S. Dixon, Timothy E. Liston, Sheila E. Murray, Susan A. Resetar, Chad Shirley, Jerry Sollinger, Obaid Younossi, RAND MR-1559-OSD.

Finding the Right Balance: Simulator and Live Training for Navy Units, John F. Schank, Harry J. Thie, Clifford M. Graf II, Joseph Beel, Jerry Sollinger, RAND MR-1441-NAVY.

A Framework for Strategy Development, John G. McGinn, Gregory F. Treverton, Jeffrey A. Isaacson, David C. Gompert, M. Elaine Bunn, RAND MR-1392-OSD.

Limited Conflicts Under the Nuclear Umbrella: Indian and Pakistani Lessons from the Kargil Crisis, Ashley J. Tellis, C. Christine Fair, Jamison Jo Medby, RAND MR-1450-USCA.

Measuring and Evaluating Local Preparedness for a Chemical or Biological Terrorist Attack, Ronald D. Fricker, Jr., Jerry O. Jacobson, Lois M. Davis, RAND IP-217-OSD.

The Military and Democracy in Indonesia: Challenges, Politics, and Power, Angel Rabasa, John Haseman, RAND MR-1599-SRF.

Options for Funding Aircraft Carriers, John Birkler, John F. Schank, James Chiesa, Giles Smith, Irv Blickstein, Ronald D. Fricker, Jr., Denis Rushworth, RAND MR-1526-NAVY.

The Role of the Office of Homeland Security in the Federal Budget Process: Recommendations for Effective Long-Term Engagement, Victoria A. Greenfield, RAND MR-1573-RC/NSRD.

The Status of Gender Integration in the Military: Analysis of Selected Occupations, Margaret C. Harrell, Megan K. Beckett, Chiaying Sandy Chien, Jerry M. Sollinger, RAND MR-1380-OSD.

Sunshine in Korea: The South Korean Debate over Policies Toward North Korea, Norman D. Levin, Yong-Sup Han, RAND MR-1555-CAPP.

Transitioning NAVSEA to the Future: Strategy, Business, Organization, Michael V. Hynes, Harry J. Thie, John E. Peters, Elwyn D. Harris, Robert M. Emmerichs, Brian Nichiporuk, Malcolm MacKinnon, Denis Rushworth, Maurice Eisenstein, Jennifer Sloan, Charles Lindenblatt, Charles Cannon, RAND MR-1303-NAVY.

You've Got Dissent! Chinese Dissident Use of the Internet and Beijing's Counter-Strategies, Michael Chase, James Mulvenon, RAND MR-1543.

Project AIR FORCE

Natalie W. Crawford,
RAND vice president
and director of
Project AIR FORCE

About Project AIR FORCE

The mission of Project AIR FORCE (PAF) is to conduct an integrated program of objective analysis on issues of enduring concern to the leaders of the U.S. Air Force. Having served the Air Force in this role since 1946, PAF has developed a broad understanding of the institution and the challenges it faces.

PAF addresses four far-reaching and interrelated questions:

- What will be the role of air and space power in the future security environment?
- How should the force be modernized to meet changing operational demands?
- What manpower, personnel, and training policies best match Air Force operational needs to national security, domestic, and fiscal realities?
- How should sustainment, acquisition, and infrastructure be streamlined to control costs while enabling the Air Force to perform necessary missions?

PAF's research is carried out in four programs:

Strategy and Doctrine. U.S. defense strategy both anticipates and responds to changes in the international security environment. PAF supports the long-range planning activities of the U.S. Air Force by providing analyses of evolving military capabilities and emerging regional and worldwide threats.

Aerospace Force Development. Strategies for modernizing the aerospace force must emphasize robust capabilities, efficient operations, and affordability. Taking into account an increasing range of technological opportunities, PAF helps the Air Force evaluate the operational risks and cost-effectiveness of force structure options.

Manpower, Personnel, and Training. Today's Air Force must cope with changing missions, technologies, demographics, and economic conditions. PAF collaborates with the Air Force to enhance its organizational design and to develop policies that guide the training, support, and management of its personnel.

Resource Management. In the face of a constrained U.S. defense budget and uncertainties about future defense needs, PAF helps the Air Force develop logistics and acquisition policies to maximize the combat effectiveness of weapon systems and to renew the force. Research areas include resource allocation, cost estimation, and best business practices.

The following are highlights of research conducted by Project AIR FORCE (PAF) during 2002.

Integrating Space Capabilities into Theater Air Operations

U.S. space systems have gradually evolved into sets of satellites that primarily support the agencies and/or military services responsible for their development. These satellites supply data about weather conditions, enable precision navigation, warn of missile attacks, and enhance general communication. They also provide intelligence, surveillance, and reconnaissance (ISR) information to national users.

If space assets are to be useful to theater commanders, the command, control, and battle management (C2BM) of the various satellites must be integrated, first among themselves and then into the overall C2BM of the theater military forces assigned to accomplish a particular mission. And all of this must be done without compromising any of the nonmilitary missions that the space systems support. Thus, collaboration among multiple agencies with different areas of expertise is necessary.

PAF reviewed recent air operations to determine how effectively space systems had been integrated into them. We also conducted a detailed examination of the characteristics of current and planned systems, and we applied mission-level analysis to assess the effects of improved integration.

The following are among the recommendations we made to the U.S. Air Force (USAF):

- Develop and implement the requisite elements of a common operational picture (COP) for space assets. This would provide information on the status of space systems, particularly regarding their ability to support specific military missions. It would also account for threats, natural or manmade, that could interfere with mission support. The COP would cut across all space systems and mission areas.
- Develop C2BM concepts of operations; tactics, techniques, and procedures; and systems for taskable and multi-mission space systems. This would make those systems more responsive to dynamic military operations.

Project AIR FORCE

Oversight of PAF is provided by the Project AIR FORCE Steering Group (AFSG), which is chaired by the Air Force Vice Chief of Staff, Gen Robert H. Foglesong, and includes eight other Air Force general officers. The AFSG met in Santa Monica twice in 2002 to discuss the Air Force's research needs and to hear PAF briefings about recent work. Seated at the head table are (left to right), Michael Rich, Jim Thomson, Gen Foglesong, and Natalie Crawford.

- Develop a well-trained space cadre within the Air Force so that knowledgeable personnel are assigned to space-related positions.
- Consider organizational changes in theater that will facilitate use of space forces by theater commanders.

Strengthening the Air Force Compensation System

During the 1990s, the Air Force personnel system was under considerable stress. Low unemployment rates meant plentiful civilian job opportunities, and civilian wages grew steadily, especially for persons with four or more years of college or with technical skills. PAF sought ways to strengthen the USAF compensation system as a way of improving personnel recruitment and retention. The USAF specifically asked us to consider whether skill pay and capability pay should be added to the compensation toolkit. Skill pay would provide higher pay for certain designated skills that are valuable for military capability and that might be costly and time-consuming to replace. Capability pay would aim to provide compensation and incentives for superior individual capability, especially current and prospective future leadership potential.

Unlike bonuses or many special pays, skill pay would be a permanent, predictable addition to the pay of qualifying airmen. Its stability would be attractive to airmen; but it would be less flexible for managing personnel than bonuses, which can change as private-sector demand varies. Capability pay holds promise for increasing the retention of future leaders, thereby assuring adequately large promotion pools. The challenge comes in defining "capability" and in applying the pay in ways perceived to be accurate and equitable. We found that skill pay and capability pay both had possible advantages over the current pay structure. However, further analysis is needed to address questions of implementation and to determine cost-effectiveness.

We also proposed four other changes in the current compensation system that we believe the Air Force should consider:

- Establish the capability to monitor civilian wages closely and with minimal lag as well as to monitor the civilian wages of personnel

Major Client of Project AIR FORCE

The research conducted by Project AIR FORCE is funded by the United States Department of the Air Force.

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Senior policy analyst Angel Rabasa (right) outlines the content of his book *Indonesia's Transformation and the Stability of Southeast Asia* for RAND trustee John Porter (left) and PAF program director Edward Harshberger (center). At the April meeting, Angel briefed the RAND Board of Trustees about possible strategic directions for Indonesia and the implications for U.S. security interests.

RAND trustee Frank Carlucci and management scientist Cynthia Cook discuss Cynthia's research on "lean manufacturing," which she briefed at the April meeting of the RAND Board of Trustees. Her work on the application of modern manufacturing technologies to the acquisition of defense systems has been well received by the Air Force.

who have left the Air Force. Such information would be useful in formulating budget requests, reprogramming existing funds, and developing reliable data about market forces that make recruiting and retention harder.

- Make basic pay grow increasingly rapidly with respect to rank.
- Increase bonus budgets—which the Air Force has already begun to do—and restructure selective reenlistment bonuses to make them worth more. Connect these rewards more closely to skill level and grade level.
- Revamp Hostile Fire Pay/Imminent Danger Pay so that, rather than being a flat rate (currently $150 per month) for any hostile duty or exposure to imminent danger during a month, it is also dependent on the number of recent hostile episodes.

Operations Against Enemy Leaders

Operations targeted against senior enemy leaders have long been viewed as a potential means of shaping the policy and behavior of enemy states. The United States has launched a variety of overt and covert operations to attack enemy leaders directly, facilitate their overthrow by coup or rebellion, or secure their ouster through external invasion. PAF examined two dozen leadership attacks from World War II to the present to offer insights into the comparative efficacy of various forms of such attacks, their potential coercive and deterrent value, and the possible unintended consequences of their ill-considered use.

We concluded that direct attacks, coups, and rebellions have met with only limited success and, even when successful, have sometimes been counterproductive. Moreover, neither direct attacks nor coups have been of significant coercive or deterrent value, although rebellions have at times provided some coercive leverage. The surest way to unseat a hostile regime is to oust it with external military force. Generally, U.S. decisionmakers are reluctant to sanction

Project AIR FORCE

Project AIR FORCE benefits from the participation of U.S. Air Force personnel who serve as research fellows at RAND. The 2002 Air Force Fellows are (left to right) Lt Col Igor Gardner, Lt Col Sid Banks, Lt Col Peter Ellis, Donna Kinlin (civilian fellow), Lt Col Ed Blasi, and Lt Col Peter Hirneise.

the invasion and occupation of enemy states because of the likely costs involved. However, there may be contingencies—such as an attack with weapons of mass destruction on the U.S. homeland—that would impel an order to take down an enemy state that possesses large and well-equipped military forces.

Meeting Manpower Requirements for Maintaining USAF Aircraft

Over the past decade, substantial numbers of Air Force personnel have engaged in contingency operations that, on occasion, included intensive combat operations. Moreover, it has often been necessary to support peacekeeping operations even after hostilities have ceased. As force size has declined, forward deployments have created an unplanned level of stress. Coupled with increases in deployments has been an economy beckoning with good jobs and benefits. Experienced people have been leaving the force in unexpected and unwelcome numbers. The result has been a mismatch between the jobs that need to be done and the personnel available to do them.

PAF assessed the approach the Air Force uses to determine its manpower needs in the pivotal area of aircraft maintenance. We concluded that maintenance manpower requirements are underestimated. Our key recommendations for improving the process were as follows:

- Make on-the-job training an explicit requirement.
- Improve the Logistics Composite Model (LCOM) that the Air Force uses to estimate monthly man-hours. High-quality data on break rates and fix times are currently insufficient, and the LCOM scenarios do not adequately represent the current environment under which maintainers must operate.
- Limit overtime. Excessive overtime hours over extended periods can increase stress and contribute to declining retention rates.

Toxic Warfare: A New Threat in the Making

Toxic warfare refers to the use of chemicals or industrial waste to harm or alter the behavior of an opponent during military operations.

Selected Publications

Absorbing Air Force Fighter Pilots: Parameters, Problems, and Policy Options, William W. Taylor, James H. Bigelow, S. Craig Moore, Leslie Wickman, Brent Thomas, Richard Marken, MR-1550-AF.

Air Force Compensation: Considering Some Options for Change, James Hosek, Beth Asch, MR-1566-1-AF.

Assessing Russia's Decline: Trends and Implications for the United States and the U.S. Air Force, Olga Oliker, Tanya Charlick-Paley, MR-1442-AF.

An Economic Framework for Evaluating Military Aircraft Replacement, Victoria A. Greenfield, David M. Persselin, MR-1489-AF.

Effects of the Coalition Air Campaign Against Iraqi Ground Forces in the Gulf War, Stephen T. Hosmer, MR-305/1-AF.

Enhancing Dynamic Command and Control of Air Operations Against Time Critical Targets, Myron Hura, Gary McLeod, Richard Mesic, Philip Sauer, Jody Jacobs, Daniel Norton, Thomas Hamilton, MR-1496-AF.

A Global Access Strategy for the U.S. Air Force, David A. Shlapak, John Stillion, Olga Oliker, Tanya Charlick-Paley, MR-1216-AF.

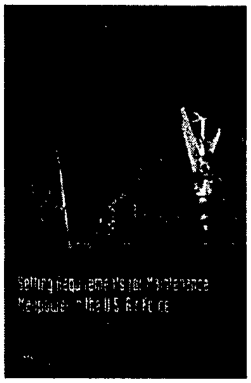
Innovative Development: Global Hawk and DarkStar—Their Advanced Concept Technology Demonstration Program Experience, Executive Summary, Jeffrey A. Drezner, Robert S. Leonard, MR-1473.

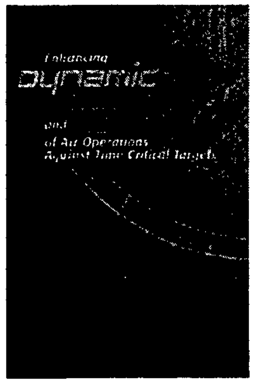
Innovative Development: Global Hawk and DarkStar — HAE UAV ACTD Program Description and Comparative Analysis, Robert S. Leonard, Jeffrey A. Drezner, MR-1474.

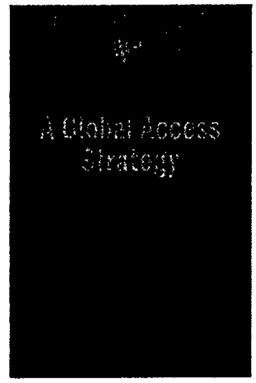
Innovative Development: Global Hawk and DarkStar — Flight Test in the HAE UAV ACTD Program, Jeffrey A. Drezner, Robert S. Leonard, MR-1475.

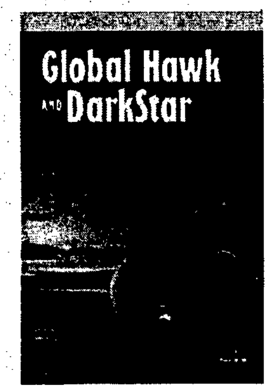
Innovative Development: Global Hawk and DarkStar —Transitions Within and Out of the HAE UAV ACTD Progam, Jeffrey A. Drezner, Robert S. Leonard, MR-1476.

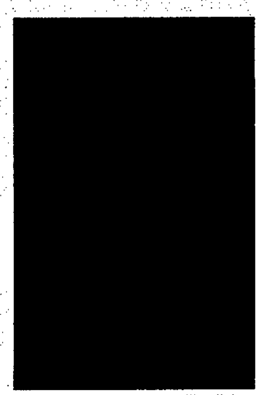
Integration of Air and Space: Focus on Command and Control, Myron Hura, Gary McLeod, Jody Jacobs, Richard Mesic, Manuel Cohen, Philip Sauer, MR-1521-AF.











Measuring Interdiction Capabilities in the Presence of Anti-Access Strategies: Exploratory Analysis to Inform Adaptive Strategy for the Persian Gulf, Paul K. Davis, Jimmie McEver, Barry Wilson, MR-1471-AF.

The Persian Gulf in the Coming Decade: Trends, Threats, and Opportunities, Daniel L. Byman, John R. Wise, MR-1528-AF.

Reconfiguring Footprint to Speed Expeditionary Aerospace Forces Deployment, Lionel A. Galway, Mahyar A. Amouzegar, Richard J. Hillestad, Don Snyder, MR-1625-AF.

Setting Requirements for Maintenance Manpower in the U.S. Air Force, Carl J. Dahlman, Robert Kerchner, David E. Thaler, MR-1436-AF.

Space Weapons, Earth Wars, Bob Preston, Dana J. Johnson, Sean J. A. Edwards, Michael Miller, Calvin Shipbaugh, MR-1209-AF.

Strategic Appraisal: United States Air and Space Power in the 21st Century, Zalmay Khalilzad, Jeremy Shapiro (eds.), MR-1314-AF.

The Stryker Brigade Combat Team: Rethinking Strategic Responsiveness and Assessing Deployment Options, Alan Vick, David Orletsky, Bruce Pirnie, Seth Jones, MR-1606-AF.

Supporting Expeditionary Aerospace Forces: Alternatives for Jet Engine Intermediate Maintenance, Mahyar A. Amouzegar, Lionel A. Galway, Amanda Geller, MR-1431-AF.

Supporting Expeditionary Aerospace Forces: An Operational Architecture for Combat Support Execution Planning and Control, James Leftwich, Robert Tripp, Amanda Geller, Patrick Mills, Tom LaTourrette, C. Robert Roll, Jr., Cauley Von Hoffman, David Johansen, MR-1536-AF.

Toxic Warfare, Theodore Karasik, MR-1572-AF.

In contrast to chemical weapons, which employ banned substances such as the nerve agents sarin and soman, toxic weapons are made from materials that generally are readily and legally available in connection with industrial operations—e.g., irritants, choking agents, flammable gases, pesticides, toxic wastes, etc. Toxic warfare can cause casualties among opposing militaries by incapacitating and, in some cases, killing the adversary. It can also delay military operations and disrupt the functioning of the urban infrastructure through contamination or corrosion.

PAF sought to qualitatively assess the threat such weapons represent and to identify key vulnerabilities confronting the United States. Our research suggests that toxic warfare merits serious consideration in future planning strategies because it puts at risk not only forces engaged in military operations but also the civilian population. Consequently, first responders (personnel from medical, law enforcement, security, fire and rescue, hazardous material, and explosive-ordnance-disposal organizations) should be better trained and equipped. Moreover, their ability to share information and coordinate their activities requires substantial improvement.

RAND Education

Dominic Brewer, director of RAND Education (on leave for special project until July 2003); Susan Bodilly became acting director in January 2003.

In 2002, RAND Education saw continued rapid growth in the number of its research and analysis projects and in the impact of these projects on decisionmaking at all levels within the government and the for-profit and not-for-profit sectors.

This year, states across the nation are taking steps to implement landmark federal legislation, the No Child Left Behind Act of 2001 (NCLB). NCLB requires states to establish rigorous content and performance standards along with accountability systems. Many important components of this legislation have been the subject of RAND Education's research, both past and current, including assessment and accountability systems, building school capacity to meet standards, and teacher quality. We are strongly positioned to provide empirical findings that will inform NCLB implementation and further the policy debate.

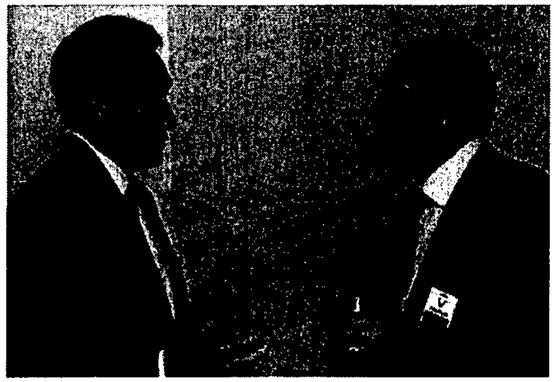
Assessment and Accountability

In a recent Department of Education–sponsored study of the implementation of the 1994 provisions in Title I schools, RAND found that among the schools identified as needing improvement under Title I, only about half understood what it meant to be identified. This was partly because, in some cases, some states had dual accountability systems. In addition, only half of the identified schools reported that they had been provided the additional technical assistance they needed to improve, as mandated by the 1994 legislation. Under NCLB, it is likely that many more schools will be identified as needing improvement. Districts and states need to establish a single accountability system and provide clearer guidance to failing schools regarding the school improvement process. In addition, they need to focus on capacity building to ensure that they can provide the mandated technical assistance to these schools.

In a second project, supported by the Hewlett Foundation, RAND is examining test-based accountability systems in an effort to provide states information on how to implement NCLB accountability provisions. RAND researchers outlined the theory of action underlying NCLB and used the paper to motivate discussion at a forum of practitioners, researchers, business people, and parents. We are now synthesizing what is known about accountability systems, what gaps remain, and how the gaps might be addressed.

Sampler of Current Projects

- Analytic Plan to Evaluate NLSS and Comprehensive School Reform Demonstration Program (CSRD) Survey Data
- Analytic Support for the DeWitt Wallace–Reader's Digest Leadership Initiative
- Analyzing State National Assessment of Educational Progress (NAEP) Data
- Assessing and Improving State Standards-Based Accountability Systems
- Assessing Cost-Effectiveness and Value Added by Educational Policies
- Assessment of Visual Arts in a New Era
- Developing a Conceptual Framework for Test-Based Accountability
- Education Reform Organizations in Southwestern Pennsylvania
- Educational Achievement of American Indian and Native Alaskan Children
- The Effects of Class Size Reduction on Students' Opportunities to Learn
- Effective Informal Learning: Evidence and Practical Knowledge
- Evaluation of California Charter Schools
- Evaluation of Comprehensive School Reforms
- Evaluation of Edison Schools Program
- Evaluation of Ford Foundation Initiative on Collaborating for Education Reform
- Evaluation of the Carnegie Corporation "Teachers for a New Era" Initiative
- Evaluation of the Educare Childcare Quality Improvement Initiative
- The Longitudinal Evaluation of School Change and Performance (LESCP) Analysis
- Mosaic II: A Longitudinal Investigation of the Effects of Systemic Reforms on Student Achievement
- Restructuring the K–12 School System in Qatar: Implementation and Evaluation
- Scaling up of Educational Reform at the District Level
- Scaling up Standards-Based Accountability
- The State of the American Middle School



RAND Education Advisory Board members in attendance at the spring meeting in Santa Monica included Henry Cisneros (left) and board chairman Bruce Karatz.

In the same vein, RAND won an award from the Interagency Education Research Initiative to study factors that enhance the implementation of standards-based accountability systems. The five-year study will help policymakers, educators, and researchers understand the ways that policies encouraged by NCLB are implemented at all levels of the system. It will also explain relationships among implementation, instructional practices, and student achievement and identify successful practices that help standards-based accountability function more effectively.

School-Level Capacity Building

RAND continues its efforts to evaluate interventions designed to help schools meet the new standards and accountability requirements, including comprehensive school reform. We are in year three of a five-year Department of Education–funded study to evaluate four comprehensive school designs adopted by schools in Texas and Florida. We are in the second year of an evaluation of the Edison Project—a private for-profit organization that attempts to improve public schools under contractual arrangements with districts. Both of these projects will help provide important lessons regarding the potential of comprehensive school reform to improve low-performing schools.

The nine-year program of studies to evaluate the impact of the New American Schools Initiative ended in 2002. While the implementation and associated attainment of improved student performance using New American Schools designs varied with characteristics of the school implementing the design, the district support provided, and the design itself, the study highlighted the role of school and district leadership in building the capacity of the schools to meet new standards and accountability laws.

Along with several partners, RAND has been evaluating California's Class Size Reduction (CSR) program for the California Department of Education. While achievement scores have risen significantly in California's elementary schools in the last six years—during the same period when the CSR program was implemented—the researchers found it difficult to determine if CSR played a significant role. The researchers did note that CSR remains highly popular among parents and teachers, and that it is likely to remain a state priority. The effectiveness of the CSR program might be improved by better integration of the reform with other statewide education reforms, providing school districts with more flexibility, and increasing the state's capacity to provide qualified teachers and facilities before expanding CSR to higher grades.

RAND Education

Although most of K–12 reform has focused on academics, federal legislation also provides for improvement in vocational education. RAND recently completed an evaluation of vocational and technical programs funded under the Perkins Act. The study concluded that Perkins policies were being enacted consistent with state structures, policies, and interests, but not necessarily consistent with federal intentions. Perkins implementation was overshadowed by local concerns over state standards, assessments, and accountability systems that often ignore vocational and technical learning.

RAND recently completed the National Science Foundation–sponsored Mosaic project, which revealed small but statistically significant positive correlations between student achievement in science and mathematics and teachers' use of instructional practices consistent with those promoted by the NSF's Systemic Initiatives programs. The Mosaic II project, currently under way, extends this research with a longitudinal analysis of these relationships, better measures of teaching practices, and a closer examination of student achievement.

Teacher and Administrator Quality

RAND is continuing to provide technical assistance to the Carnegie Corporation in its ambitious initiative to improve teacher preparation programs. RAND assisted the National Board for Professional Teaching Standards in running peer review panels for more than 100 proposals submitted in response to the Board's requests for proposals to evaluate its programs. We provided the Board with a consensus selection of the best proposals and suggested ways that the Board could improve its proposal process in the future.

As part of the work being done for the DeWitt Wallace–Reader's Digest Fund, RAND analyzed the career pathways of school principals and other school administrators. This work provides concrete information about the pathways into and out of the school administration professions and insight into whether a "crisis" in supply is real.

International Work

RAND is expanding its geographic reach. In our most ambitious effort yet at technical assistance and empirical analysis, we are working with the Persian Gulf nation of Qatar to improve its schools. Qatar has a relatively well developed system of public and private schools, but it is widely perceived as failing to produce the right kinds of graduates: those prepared to attend university, work in Qatar's industries, and support Qatar as it looks to the future and competes in the global marketplace.

A team from RAND Education and the Center for Middle East Public Policy evaluated the school system in Qatar and developed alternative designs for reforming the schools. Qatar's leadership selected RAND's proposed "Charter School Model," a partially decentralized system that encourages schools operated by nongovernment parties subject to a charter. We then fleshed out the selected model and developed a detailed plan for implementation. RAND work has been received enthusiastically in Qatar, and the team is now busy with the next phase of the reform: implementation. In November 2002, a formal decree was signed, establishing the new institutions proposed by RAND.

Major Clients and Sponsors of RAND Education

U.S. Government

National Science Foundation
Office of Educational Research and Improvement
U.S. Department of Education
  National Center for Education Statistics
  Planning and Evaluation Service
U.S. Department of Health and Human Services

State and Local Government

California Arts Council
California Department of Education
California Legislative Analyst's Office
Los Angeles Community College
Los Angeles Cultural Affairs Department
Los Angeles Unified School District
Ohio Department of Education
Pittsburgh Mayor's Commission on Public Education
Tennessee Department of Education

Foundations

The Atlantic Philanthropies
The Benendum Foundation
The Broad Foundation
Carnegie Corporation of New York
The Annie E. Casey Foundation
Edna McConnell Clark Foundation
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Other

Edison Schools, Inc.
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Education Commission of the States
Educational Testing Service
Kent School
National Board for Professional Teaching Standards
New American Schools Development Corporation
State of Qatar

Major Donors to RAND Education

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(Right) Dominic Brewer, team leader for the RAND Education project in Qatar, described the project at a "One RAND" Colloquium in October. (Left) Susan Bodilly spoke to the RAND Education Advisory Board about RAND's long relationship with, and contribution to, the New American Schools education reform initiative. Susan became RAND Education's acting director in January 2003 so that Dominic could devote most of his time to ensuring the successful launch of the Qatar project.

Research Partners

Center for Research on Educational Diversity and Excellence (CREDE), U.S. Department of Education

Center for Research on Evaluation, Standards, and Student Testing (CRESST)

Selected Publications

Alignment Among Secondary and Post-Secondary Assessments in Five Case Study States, Vi-Nhuan Le, RAND MR-1530.0-EDU.

Benefits of a Statewide Student Identifier System for California, Laura S. Hamilton, RAND CT-197.

Challenges of Conflicting School Reforms: Effects of New American Schools in a High-Poverty District, Mark Berends, JoAn Chun, Gina Schuyler, Sue Stockly, R. J. Briggs, RAND MR-1483-EDU.

A Decade of Whole-School Reform: The New American Schools Experience, RAND RB-8019-EDU.

Facing the Challenges of Whole-School Reform: New American Schools After a Decade, Mark Berends, Susan J. Bodilly, Sheila Nataraj Kirby, RAND MR-1498-EDU.

Making Sense of Test-Based Accountability in Education, Laura S. Hamilton, Brian M. Stecher, Stephen P. Klein (eds.), RAND MR-1554-EDU.

A "Noble Bet" in Early Care and Education: Lessons from One Community's Experience, Brian P. Gill, Jacob W. Dembosky, Jonathan P. Caulkins, RAND MR-1544-EDU.

Other Projects

RAND has participated in a variety of special projects. For example, we have encouraged better knowledge and understanding among those in education through the support of several conferences. At one conference funded by the Ford Foundation, RAND brought together whole-school reform designers to discuss the scale-up of their designs while maintaining quality. At another, RAND brought together several assessment experts to discuss the strengths and weaknesses of value-added modeling, now becoming popular as a means of evaluating schools and teachers.

In another special project, the Office of Education Research and Improvement (OERI) of the U.S. Department of Education asked RAND to investigate possible strategies for improving the quality and usefulness of education research. RAND convened two panels. The first focused on issues related to reading comprehension and described three specific domains where more research is needed: instruction, teacher preparation, and assessment. The second panel focused on mathematics education and proposed more study related to teachers' mathematical knowledge and its use in teaching, and teaching and learning mathematical practices and algebra. The panel also proposed activities that would provide empirical data to inform the now-contentious discussion concerning mathematics curriculum and standards.

RAND Education is also examining the current state of the arts in America. Two early studies examined the performing and media arts; a new study is examining the visual arts. Researchers sorted the performing and media arts along three dimensions: the different disciplines within the art form, the sector in which the art is produced (commercial, nonprofit, and volunteer), and the components of the art form (audiences, artists, organizations, and funding). Working within this framework, researchers described the current state of the arts, the major forces driving change and where they are likely to be headed, and what are likely to be the implications of these changes. The third study will identify how these dimensions are changing for the visual arts and compare these results with those in the performing and media arts.

RAND Enterprise Analysis

C. Richard Neu, James Quinlivan, and Richard Hillestad, codirectors of RAND Enterprise Analysis

The aim of RAND Enterprise Analysis (REA) is to bring the best analysis RAND has to offer—systematic, multidisciplinary, empirically rigorous, and trustworthy—to private-sector enterprises and a range of organizations in the nonprofit sector. Working side by side with their clients, REA analysts provide valuable strategic insights and advice as well as practical operational recommendations across diverse economic sectors. REA offers creative and innovative solutions in areas such as

- management of strategic uncertainty
- workforce planning and labor market analysis
- analysis of highly complex operations
- trends assessment

Highlights of work undertaken in 2002 are presented below. For more information please visit our Web site at www.rand.org/rea.

Management of Strategic Uncertainty

Analyzing and integrating factors such as the behavior of market players, changes in regulatory policy, and political/security trends, REA analysts aid clients in managing the uncertainty in their world.

Given the magnitude of seismic hazards throughout the state, California has enacted the strictest building codes in the nation to minimize injury and economic loss following an earthquake. Included among these is California Senate Bill 1953, which details a schedule of seismic planning and retrofits from 2001 to 2030 for all hospital buildings in California. The California Healthcare Foundation asked RAND to examine the costs and decisionmaking processes for these activities. In a report entitled *Estimating the Compliance Costs for California SB1953* published in April 2002, RAND analysts found that approximately 50 percent of California's hospital buildings will be retrofitted, reconstructed, or closed over the next 28 years to meet the requirements of the bill. Over the same period, approximately 75 percent of the buildings will undergo nonstructural renovations to improve operational capabilities following a large earthquake. The scale of this construction program will be unprecedented for California hospitals, with total expenditures estimated to be as large as $41.7 billion. Specific costs for seismic strengthening, viewed as a subset of the total construction expenditures, are estimated to be less than

Major Clients of RAND Enterprise Analysis

ABM Engineering
California Healthcare Foundation
Equitable Resources, Inc.
Institute on Money in State Politics
Lila Wallace–Reader's Digest Fund
The Nazarian Companies
The Rockefeller Foundation
Southern California Gas Co., a division of SEMPRA
State of California, Department of Transportation (CalTrans)

Major Donor to RAND Enterprise Analysis

Roy Doumani

$3 billion. Clearly, the policy debate surrounding implementation of seismic requirements will need to focus not only on improving the survival of hospitals in an earthquake, but also on what type of hospital infrastructure will best serve California's everyday health care needs while remaining profitable for the industry.

For a leading international manufacturer, REA continues to assess the major economic, political, cultural, and security issues in China that may impact the company's near-term business strategy. Over the past year, REA analysts have conducted a trends analysis of the Chinese automobile industry and the probable impact of legal and regulatory changes resulting from China's accession to the World Trade Organization (WTO) on foreign entities doing business in China. In addition, in the wake of the September 11 terrorist attacks, RAND convened an expert panel to discuss how global business corporations might best cope with the ongoing threat of terrorism.

Workforce Planning and Labor Market Analysis

Applying a powerful combination of computerized tools and analytic methodology, REA analysts create integrated, technologically advanced approaches to workforce management for complex organizations.

As part of a workforce management initiative, Southern California Gas Company (SoCalGas Co.) asked RAND to do an operations research study of the dispatch process for responding to calls for service from gas customers and contractors. RAND analysts developed a simulation model to predict near-term workload and its implications for workforce scheduling and dispatching in terms of cost and delay in response. The model also enables SoCalGas Co. to investigate a range of important "what ifs" regarding order demands, worker assignments, and the timing of order response.

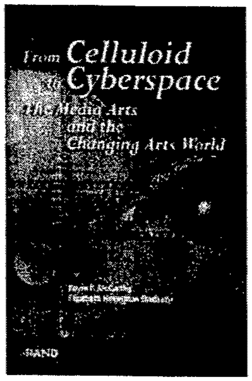
Analysis of Highly Complex Operations

Analyzing systems and operational data, REA helps clients to better understand the implications of their operational assumptions and constraints and to improve their utilization of resources and system performance.

The continued growth of the San Joaquin Valley has underscored the importance of regional planning actions for identifying land-use and transportation policy options that will enhance the quality of life in the Valley while accommodating the expected growth. Funded by the California Department of Transportation (District 6, Fresno), REA analysts are working with key Valley stakeholders to identify important issues related to integrated land use and transportation planning and to refine policy inputs to an iterative modeling process that seeks to inform this planning through consideration of regional scale growth-related issues. During the past year, a series of stakeholder workshops has provided an important forum for shared learning and information exchange regarding the development of the regional planning model, which will later be implemented as a demonstration project for the Fresno metropolitan area.

To help inform its plans for expanding drilling services in the Appalachian Basin, The Equitable Production Company contracted with RAND to analyze the risks associated with this strategy. These include the possibility of large price increases for drilling services resulting from the increased demand for new wells; unexpected high

RAND Enterprise Analysis



costs of logistical management; and substantial fluctuations in the price of natural gas that might undermine the original rationale for the drilling program. Drawing on a range of corporate data, as well as interviews with regional drillers, REA analysts have provided the company with a specific set of recommendations for contracting, bidding, and risk management that should result in significant cost savings for the new drilling program.

The Institute on Money in State Politics (IMSP), a nonpartisan, nonprofit program, has designed a Web site that provides a Web-searchable database on contributors to state government using state-mandated and collected political contribution data. IMSP then incorporates additional data, such as business categories of contributors, in a common Web-accessible format. Using techniques and procedures developed in past projects, REA is conducting a process evaluation and computer security review of the complicated procedures that underlay IMSP's acquisition, consolidation, and refinement of these data.

Trends Assessment

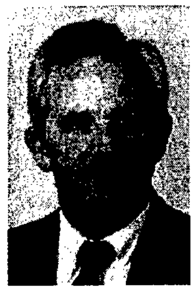
Using RAND's systems approach to the dynamics of change, REA provides useful strategic insights for clients facing future challenges in the arts world.

The second of a series of reports studying the state of the arts in America at the turn of the 21st century—*From Celluloid to Cyberspace: The Media Arts and the Changing Arts World* (RAND MR-1552)—examines the media arts in the context of the broader arts environment, and identifies specific challenges to be faced in the coming years. With funding from The Rockefeller Foundation, REA analysts show that media artists and arts organizations are struggling with many of the same challenges endemic to the arts world in general: adapting to changing patterns of demand; making an adequate living in an increasingly competitive employment environment; adjusting to changes in the system of distribution of the arts; and securing financial support in a more constrained funding environment. At the same time, the media arts bring a different set of assets and liabilities to bear in dealing with these challenges. While the media arts abound with artistic vitality, a strong spirit of innovation, a history of social activism, and a far more aggressive use of new technology, they continue to lack external visibility, a clear sense of self-identity, and an explicit understanding of their relationship to the wider arts society. The report offers a set of recommendations for how the media arts can build on their special assets to address these liabilities.

With support from the Wallace–Reader's Digest Funds (WRDF), REA analysts are also conducting a detailed assessment of the benefits of arts participation. Through the development of a conceptual framework that organizes the range of experiences according to the nature, size, and rationale for benefits of participation, REA analysts will examine how the benefits of arts participation are related to the nature of the arts participation experience and explore the implications of these relationships for arts policy, arts organizations, and the public.

In a related project, REA analysts are examining the participation concepts, measures, policies, and practices of 13 state arts agencies that are working to increase arts participation through the State Arts Partnerships for Cultural Participation (START) initiative launched by WRDF in 2001. With assistance from RMC Research Corporation and the National Assembly of State Arts Agencies (NASAA), RAND will document the efforts of grantees to increase local participation in, and support for, arts and culture; identify effective policies and practices given particular agency characteristics and constraints; and share promising methods for diffusing those policies and practices within and across all states and territories. A unique feature of this project is the engagement of arts agencies directly in the research process with the ultimate aim of diffusing knowledge about best practices, policies, and methods through the very process of discovering it.

RAND Europe



David C. Gompert, president of RAND Europe. Martin van der Mandele assumed the presidency on January 1, 2003.

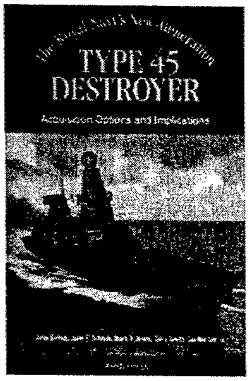
With offices in The Netherlands, Germany, and the United Kingdom, RAND Europe contributes to the economic vitality, security, and quality of life in Europe. Its research helps European governments and other clients manage sweeping changes such as those posed by European integration and restructuring, addressing European challenges in light of successes and shortcomings elsewhere, and includes work in areas where the problems, much less the solutions, are not well-defined.

RAND Europe serves clients throughout the continent. It has a substantial stream of work in its home countries and for the European Commission. It is expanding its work throughout the European Union and beyond in Western, Central, and Eastern Europe. It collaborates with other European organizations, including Solving International (France), Bohlin and Strömberg (Sweden), Abels and Grey (Germany), IABG (Germany), and leading universities, including Delft (The Netherlands), Warwick (United Kingdom), and Cambridge (United Kingdom).

Specific fields of research include

- **Surface Transport and Aviation.** Transport planning is focusing more on the increasing conflict between growing mobility and the environment. RAND Europe helps local, regional, national, and international planning agencies evaluate and determine effective policies for mitigating this conflict. It also conducts research for airlines and airports, public transport operators, and commercial transport firms and is known in particular for its state-of-the-art modeling of future transportation use and infrastructure needs.
- **Health and Society.** European social welfare systems face increasing tension between increasing demands for improved services and limited financial resources. RAND Europe is addressing this topic through research on defining and measuring quality of services as well as on how organization of services affects costs, quality, and access.
- **Information Society.** Governments need to revise their roles and policies to address the changes of rapid technological development. RAND Europe is examining how information and communications technologies drive and shape all areas of working and living. It is also addressing issues, including threats of cyberterrorism, regarding the security and compatibility of information networks and networked systems.

RAND Europe



- **Defense and Security.** As the security and defense policies and capabilities of European nations are being transformed to cope with a changing security environment, RAND Europe is assessing global and European security issues, how to exploit information technology for security, and means for improving resource management, personnel quality and procurement of military materiel.

Surface Transport and Aviation

EXPEDITE—Forecasting Transport in Europe. The European Union faces a conflict between improving transportation between Member States and the environmental effects of increased mobility. One way to mitigate the environmental effects would be to shift passenger and freight traffic from roads to modes such as trains and ships. RAND Europe is leading a consortium for forecasting transportation use and mode in coming years. We found the most effective policies for influencing freight transportation mode are those that increase costs and time for shipping by truck (e.g., rate and fuel price increases, speed limits). Policies that increase the costs of passenger travel tend to result in a switch to closer destinations rather than in mode of transportation.

Health and Society

The Portuguese National Drug Strategy. As part of its new strategy for addressing the problems associated with drug consumption, Portugal recently decriminalized the use and possession for personal use of all drugs, including marijuana, heroin, and cocaine, and introduced new treatment programs for users. We conducted a project to provide guidelines for implementing and evaluating the new strategy. We found the objectives of the strategy are abstract and subject to diverse interpretations and that their coherence will depend on implementation. Successful implementation will require public education and information, providing sufficient treatment capacity, training administrators who will take the place of the criminal justice system in dealing with drug users, and reallocating the budget for addressing drug consumption to spend more on harm reduction.

Student Support Policies. As part of its proposed reorganization of higher education, the Dutch Ministry of Education asked us to review higher education and student financing systems in four countries.

Major Clients of RAND Europe

Berlin-Brandenburg Flughafen Holding
Bertelsmann Foundation
Danish Aviation Authorities
Dutch Board of Insurers (CVZ)
Dutch Ministry of Education
Dutch Ministry of Transport, Aviation Directorate
Dutch Ministry of Transport, Freight Directorate
Dutch Ministry of Transport, Inspectorate of Transport and Water
Dutch Ministry of Transport, Research Directorate
Dutch Railways
European Commission, DG TREN
Flyland Projectbureau (the Netherlands)
Fraport AG (Germany)
French National Transport Research Programme
German Ministry of Transport

German Umweltbundesamt
IATA, London
Nederlands Spoorwegen
Stockholm Transport Commission
UK National Audit Office
UK NHS (National Health Service)
West Midlands Metropolitan County/Highways Agency
World Bank
World Business Council for Sustainable Development

MAJOR DONORS TO RAND EUROPE

Olivier Debouzy
K. Terry Dornbush
Cynthia and David C. Gompert
Lloyd N. Morrisett
Martin C. van Veen
Eberhard von Koerber

SELECTED PUBLICATIONS

The European Security and Defense Policy: NATO's Companion—or Competitor? Robert E. Hunter, MR-1463-NDRI/RE.

Guidelines for Implementing and Evaluating the Portuguese Drug Strategy, Ineke van Beusekom, Mirjam van het Loo, James P. Kahan, MR-1508-RE/AICE/FLA.

A Monitoring System for the Effects of Activities of Transport Inspectorate Netherlands on Traffic Safety, Han van der Loop, Paul Huijbregts, Govert Schermers, Gerard de Jong, Sjoerd Bakker, Rebecca Hamer, Eric Kroes, Marits Pieters, Dave Madsen, Don Wright, MR-1665-TIN.

Quick Scan of Post 9/11 National Counter-Terrorism Policymaking and Implementation in Selected European Countries, Erik van de Linde, Kevin O'Brien, Gustav Lindstrom, Stephan de Spiegeleire, Mikko Vayrynen, Han de Vries, MR-1590-RE/MVJ.

Re-Estimation of LMS Time-of-Day Module Project: Estimation Results, Gerard de Jong, Carine Vellay, Marits Pieters, Andrew Daly, MR-1662-AVV.

The Royal Navy's New-Generation Type 45 Destroyer: Acquisition Options and Implications, John Birkler, John F. Schank, Mark V. Arena, Giles Smith, Gordon Lee, MR-1486-MOD.

Shoulder to Shoulder: The Road to U.S.–European Military Cooperability, David Gompert, Uwe Nerlich, MR-1575-NSRD/RE.

Study on Ideas on a New National Freight Model System for Sweden, Gerard de Jong, Hugh Gunn, Warren Walker, Jenny Widell, MR-1663-SAMGODS.

Tools for 21st Century Diplomacy: An Approach to Improved Information and Communication Technology for Romania's Foreign Affairs Ministry, Tora Bikson, Robert Anderson, Robert Hunter, MR-1567-TDA.

Two of the four, Denmark and The Netherlands, have a system of primarily public support. Australia and the United Kingdom have shifted toward a more private system of choice and financing. The Dutch system has lower costs per student, while Danish students have higher educational attainment. The Australian and British systems have more efficient systems combining relatively low costs with high student access and attainment, although no direct causal link has been discovered between more private systems and educational accessibility, costs, or attainment. The study is being expanded to include the educational systems of other nations.

INFORMATION SOCIETY

Comparing Innovation Strategies. Innovation in goods, services, production, organization, and technology is key to increasing the productivity needed for noninflationary economic growth. TEKES, the Finnish national technology agency, therefore asked us to analyze government actions to encourage innovation in a number of countries. Government organizations fostering innovation have become decentralized to meet regional and smaller firm needs. Governments are placing greater importance on selective deregulation, sharing knowledge, and acting as a broker between innovators and their markets. All these developments demonstrate the pivotal role of intermediary organizations and how they can be used most effectively.

Dependability Development Support Initiative (DDSI). Cyberattacks cost European businesses billions of dollars every year. The threat of cyberterrorism could disrupt European infrastructure, while cybercrime more generally is deterring European businesses and citizens from going online. To address these issues, the European Commission asked RAND Europe to lead the DDSI consortium. The DDSI has conducted a global overview of approaches taken to ensure the dependability of information and computer networks in a number of nations and by international and intergovernmental organizations. The overview provides insight on creating more reliable information infrastructure as well as comparative lessons for the European Union in improving network dependability.

DEFENSE AND SECURITY

Counterterrorism in Europe. At the request of the Dutch Ministry of Justice, we analyzed counterterrorism policies in seven European nations, including The Netherlands, Belgium, Finland, France, Germany, Spain, and the United Kingdom. The governments that we studied reacted to the attacks in similar ways, with high-level ministerial steering committees and task forces quickly assembling to provide leadership and a focal point for counterterrorist activities, but they also recognized the need for still greater coordination. Very few nations have a centralized national body for counterterrorism, but all believe their existing framework and capabilities are adequate. All have taken some steps to mitigate the threat from terrorist use of weapons of mass destruction, while viewing the threat of attacks by such weapons to be less than that for attacks using conventional weapons. The information and transportation networks of some nations, particularly those in Belgium and The Netherlands, are more vulnerable to attack than those elsewhere and will therefore need more protection.

RAND Health

Robert H. Brook,
RAND vice president
and director
of RAND Health

This was another banner year for RAND Health in terms of revenue growth (10 percent), publications (more than 300), and media attention (16 press releases). However, our activities this year also highlight the degree to which our work is reaching, and being used by, policymakers. We profile those activities below.

Reaching Congress

This year, in collaboration with RAND's Office of External Affairs, we launched a congressional newsletter, which is sent electronically to a targeted list of more than 600 Hill staff. Five newsletters were published this year. The newsletters synthesize work of special salience for the congressional agenda. Below are examples of how we integrated findings from multiple studies to shed light on key topics.

Health Care Coverage for the Uninsured. The states that most need to expand public insurance coverage have the smallest capacity to do so. And it will take very large subsidies to get the uninsured to buy private coverage. Employer-sponsored insurance is the most common source of coverage for those under 65. But because employers are more likely to offer health care insurance when they are competing with other firms for employees, rising unemployment rates are likely to reduce access to employer-sponsored coverage.

Prescription Drug Benefit for Medicare. A catastrophic prescription drug plan would protect beneficiaries from very high drug expenditures and could allow policymakers to gauge future program costs before committing to more comprehensive coverage. Those who would benefit most from prescription drug coverage are elderly persons with chronic conditions, those with low incomes, those living in rural areas, and elderly women.

Some states have introduced bills mandating lower prescription drug prices for Medicare beneficiaries. However, RAND's evaluation of such a program in California found that many elderly, especially those with low incomes, were unaware of the law, and some pharmacies didn't offer the discount even when asked. These findings suggest that making beneficiaries aware of drug discount laws and monitoring pharmacy compliance will be essential to making drug discount programs successful.

Major Clients of RAND Health

U.S. Government

Department of Defense (through NDRI)
Department of Health and Human Services
- Agency for Healthcare Research and Quality
- Assistant Secretary for Planning and Evaluation
- Center for Medicare and Medicaid Service (formerly HCFA)
  - Health Resources and Services Administration
- Centers for Disease Control and Prevention
- National Institutes of Health
  - National Cancer Institute
  - National Heart, Lung, and Blood Institute
  - National Institute on Aging
  - National Institute on Alcohol Abuse and Alcoholism
  - National Institute of Child Health and Human Development
  - National Institute for Dental and Craniofacial Research
  - National Institute on Drug Abuse
  - National Institute of Mental Health
  - National Institute of Nursing Research
  - Substance Abuse and Mental Health Services Administration

Department of Labor
Department of Veterans Affairs
National Science Foundation

Foundations

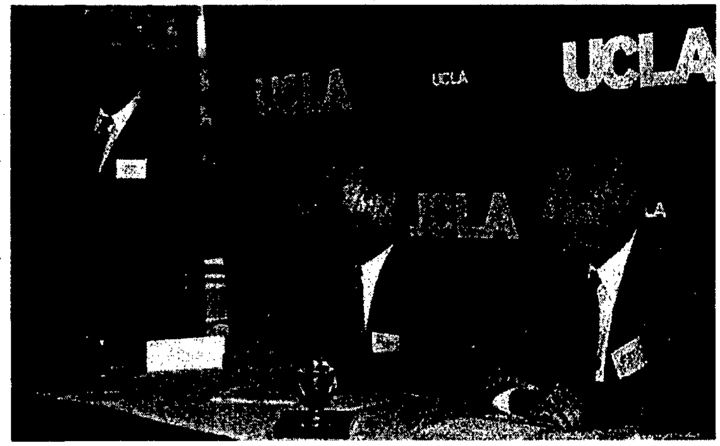
Archstone Foundation
Arthritis Foundation
Best Foundation
California HealthCare Foundation
The Fan Fox & Leslie R. Samuels Foundation Inc.
Hartford Foundation
Heinz Foundation
The Robert Wood Johnson Foundation
The Joseph H. Kanter Foundation
John D. and Catherine T. MacArthur Foundation

Other

AARP
American Dental Association
American Society of Clinical Oncology
Camillus House
George Washington University
Los Angeles Unified School District
National Forum for Health Care Quality Measurement and Reporting
New York City Palliative Care Quality Improvement
The Nuffield Trust
People's Republic of China, Ministry of Health
Research Triangle Institute
Rutgers University
Shelter Partnerships, Inc.
Stanford University
United Healthcare
University of California, Berkeley
University of California, Los Angeles
University of California, San Francisco
University of Minnesota
University of Southern California
Virginia Health Quality Center

Private Sector

Blue Cross and Blue Shield
Bristol-Myers Squibb Corporation
Cerner Corporation
Colorado Health Networks
Ford, General Motors, and Daimler Chrysler
Glaxo Wellcome
Health Industry Manufacturers Association
Hoffman-LaRoche, Inc.
Eli Lilly and Company
Merck & Co., Inc.
National Chiropractic Mutual Insurance Company
Pacific Business Group on Health
Pacificare Health Systems, Inc.
Pfizer, Inc.
Row Sciences
Scientia, Inc.
ValueOptions
Wellpoint
Westat



Robert Brook, UCLA's chancellor Albert Carnesale, and Jim Thomson attended a ceremony celebrating the renewal of a formal relationship between UCLA and RAND in the health services area. The two institutions have been collaborating on health policy research, clinical studies, and training for nearly 30 years.

Designing Prescription Drug Benefit Packages. To control costs, many employers and insurers are increasing co-payments on prescription drugs. In the largest study ever conducted involving non-elderly patients enrolled in employer-sponsored health plans, researchers found that higher co-payments do cut costs because consumers use less medication and less-expensive drugs. But employers, not employees, get the resulting savings.

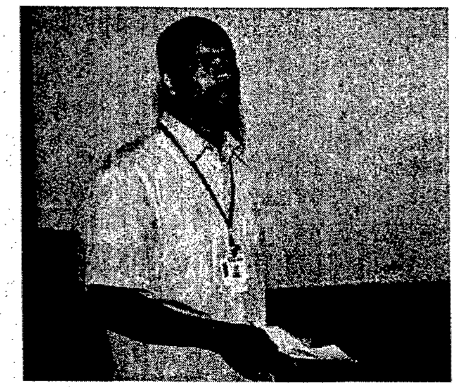
Raising co-payments by just $10 or $20 changed patients' behavior. Such findings suggest that policymakers should be very careful when they change plans for low-income consumers because those consumers may react to even smaller changes in co-payments.

Improving Health Care Quality for Women. In September, the House passed a bill to establish an Office of Women's Health within the Department of Health and Human Services. Key to improving health care for women is the ability to measure, monitor, and report on health care performance. RAND Health has developed a comprehensive, clinically based system for assessing quality of care, including new standards for women's health. Implementing these standards nationwide would significantly improve the quality of care delivered to American women.

Providing health care for some groups of women is especially challenging. For example, Mexican-American women are much more likely to be underscreened for breast cancer because they are hard to reach—more likely to be impoverished, poorly educated, and non-English speaking. But a targeted community-based program can increase screening rates among these women. Such programs may help provide access to other hard-to-reach women, such as the homeless and substance abusers.

RAND Health

Kenneth Shine, director of the Center for Domestic and International Health Security, with psychiatrist Wagdi Attia, discussed health issues in the Middle East on a live Voice of America broadcast to the region, with questions from Cairo, Egypt.



Sociologist Ricky Bluthenthal describes current work investigating the effects of syringe exchange programs on syringe sharing among high-risk injection drug users.

Providing Technical Support to Government Clients

RAND Health has a long history of providing technical support to government decisionmakers, especially in areas where our reputation for independence and excellence is critical to successful resolution of policy issues. Prominent examples this year include designing a prospective payment system for inpatient rehabilitation and providing scientific evidence to support regulatory decisions about ephedra.

A Prospective Payment System for Inpatient Rehabilitation for Medicare Beneficiaries. Medicare pays for the rehabilitation services that beneficiaries receive in the hospital. Medicare payments are important to rehabilitation facilities, accounting for 70 percent of their revenue. However, the cost-based system for determining reimbursement was widely seen as unfair to facilities, in part because the system did not adjust for the severity of patients' illness. The Centers for Medicare and Medicaid Services asked RAND to design a new system that paid for patients prospectively based on clearly specified criteria. Medicare already uses this kind of system to pay for beneficiaries' acute care in hospitals, and RAND played a major role in evaluating and refining that system.

The RAND team identified the major drivers of cost and designed a reimbursement formula that compensates facilities fairly and provides incentives for efficiency. The system, which was

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implemented January 1, 2002, has wide support from all stakeholders. Indeed, the rehabilitation industry successfully petitioned Medicare to fund additional RAND analyses to monitor and refine the system.

Assessing the Safety and Efficacy of Ephedra. Dietary supplements containing the herb ephedra or its purified alkaloid, ephedrine, are among the most popular over-the-counter diet and performance aids currently available, but its efficacy for these purposes has been questioned. After reviewing hundreds of adverse-event reports linking ephedra with a variety of cardiovascular problems and even death, the Federal Drug Administration (FDA) proposed a series of restrictions for the content and marketing of ephedra-containing products. Public Citizen asked the Secretary of Health and Human Services, Tommy Thompson, to ban ephedra as a threat to public health.

But additional evidence was called for. In June, Secretary Thompson asked RAND to conduct a comprehensive review of the existing science about the safety and efficacy of ephedra-containing products for enhancing weight loss and physical performance. The FDA is looking to the RAND review to guide regulation. According to the acting commissioner of the FDA, "The results of the RAND review will help FDA's scientists to develop future regulatory actions on dietary supplements containing ephedrine alkaloids."

Supporting Decisionmaking on Terrorism

The RAND Center for Domestic and International Health Security, officially launched in July, has played a prominent role in RAND's overall terrorism-related efforts. Center staff have presented their work in a variety of public contexts, including a special meeting at the Carter Center, focused on the mental health of children in the post-9/11 era, and one at Biosecurity 2002, the first international meeting focused on the threat of bioterrorism. Staff have also provided information directly to decisionmakers on issues ranging from smallpox vaccination policy to biological surveillance.

A series of articles authored by center staff appeared in the summer issue of the *RAND Review*. The range of topics covered illustrates both the scope of the terrorism-related issues we are addressing, and the wide range of expertise and training that center staff bring to this challenge.

In the *Review* articles, center staff argue the case for making world health the new Marshall Plan, describe what needs to be done to improve surveillance for natural and man-made biological agents, describe the fundamental biomedical research needed, identify how communications of biological events to the public need to be improved, and suggest ways to minimize the psychological consequences of terrorism and to maximize the national resilience to it.

A chapter by center researchers Robert Hunter and Ross Anthony in *Emergency Preparedness: Bioterrorism and Beyond* provides insight about the redefinition of security in American foreign policy and highlights the central role that the health professions will now play. The authors also argue that if we are to succeed in our fight against terrorism, we have to develop strategies that enable us to change the situation that breeds it.

Looking Ahead

Health issues will again be prominent on the congressional agenda in the coming year. Our work will be relevant to many of them, including health care coverage for the uninsured, prescription drug coverage for Medicare, children's mental health, patients' Bill of Rights, patient safety, and quality of care. As we did this past year, we will draw on substantial bodies of work in these and other areas to help frame the issues, identify policy options, and assess trade-offs.

Selected Publications

Analyses for the Initial Implementation of the Inpatient Rehabilitation Facility Prospective Payment System, Grace M. Carter, Melinda Beeuwkes Buntin, Orla Hayden, Jennifer Kawata, Susan M. Paddock, Daniel A. Relles, Gregory K. Ridgeway, Mark E. Totten, Barbara D. Wynn, RAND MR-1500-CMS.

Are Local Health Responders Ready for Biological and Chemical Terrorism? Lois M. Davis, Janice C. Blanchard, RAND IP-221-OSD.

"Compliance Among Pharmacies in California with a Prescription-Drug Discount Program for Medicare Beneficiaries," *New England Journal of Medicine*, Vol. 346, No. 11, March 14, 2002, pp. 830–835, J. H. Lewis, M. Schonlau, J. A. Muñoz, S. M. Asch, M. R. Rosen, H. Yang, J. J. Escarce.

The Costs of a Medicare Prescription Drug Benefit: A Comparison of Alternatives, D. P. Goldman, G. F. Joyce, J. D. Malkin, RAND MR-1529.0-NIA.

"The Effects of Primary Care Depression Treatment on Patients' Clinical Status and Employment," *Health Services Research*, Vol. 37, No. 5, pp. 1145–1158, M. Schoenbaum, J. Unützer, D. McCaffrey, N. Duan, C. Sherbourne, K. B. Wells.

"Employer Drug Benefit Plans and Spending on Prescription Drugs," *Journal of the American Medical Association*, Vol. 288, No. 14, October 9, 2002, pp. 1733–1739, G. F. Joyce, J. J. Escarce, M. D. Solomon, D. P. Goldman.

"Indicators of the Quality of Nursing Home Residential Care," *Journal of the American Geriatrics Society*, Vol. 50, No. 8, August 2002, pp. 1421–1430, D. Saliba, J. F. Schnelle.

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"Reforming Care for Persons Near the End of Life: The Promise of Quality Improvement," *Annals of Internal Medicine*, Vol. 137, No. 2, 2002, pp. E117–E122, J. Lynn, K. Nolan, A. Kabcenell, D. Weissman, C. Milne, D. M. Berwick, for the End-of-Life Care Consensus Panel.

"The Role of Public Insurance and the Public Delivery System in Improving Birth Outcomes for Low-Income Pregnant Women," *Medical Care*, Vol. 40, No. 11, November 2002, pp. 1048–1059, M. S. Marquis, S. H. Long.

"Tapping the Power of Health in Foreign Policy," Chapter 8 in *Emergency Preparedness: Bioterrorism and Beyond*, E. R. Rubin, M. Osterweis, L. M. Lindeman (eds.), Washington, DC: Association of Academic Health Centers, R. E. Hunter, C. R. Anthony.

"What the Federal Government Can Do About the Nonmedical Determinants of Health," *Health Affairs*, Vol. 21, No. 1, February/March 2002, pp. 94–106, N. Lurie.

"Women's Receptivity to Church-Based Mobile Mammography," *Journal of Health Care for the Poor and Underserved*, Vol. 13, No. 2, May 2002, pp. 199–213, K. P. Derose, N. Duan, S. A. Fox.

RAND Institute for Civil Justice

Robert T. Reville, director of the RAND Institute for Civil Justice

SAMPLER OF CURRENT PROJECTS

- Alternative Dispute Resolution
- Asbestos Litigation: New Look at Old Issue
- Auto Accident Personal Injury Compensation and Costs
- Class Actions Against Regulated Industry
- Compensation Programs for Victims of Terrorist Attacks
- Court-Annexed Alternative Dispute Resolution
- Disability and Occupational Injuries
- Driving and the Aging Population
- Evaluation of the National Flood Insurance Program
- Health Coverage Decisionmaking Appeals
- Improving Dispute Resolution for California's Injured Workers
- Improving the People's Court: Issues Facing the Adjudication of Claims Improving the People's Court
- Law and Health Program
- Mass Media Coverage of Mold Liability
- New Social Policy Torts: Litigation as a Legislative Strategy
- Trends in Jury Verdicts
- Workers' Compensation Claims Among Young Injured Workers

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The RAND Institute for Civil Justice (ICJ) is widely regarded as the nation's leading source of objective research on the civil justice system. Its charter is to conduct research that will develop a better understanding of how the civil justice system works, to measure its consequences, to investigate the nature and causes of its problems, and to determine the costs and benefits of possible alternatives.

LIABILITY AND COMPENSATION SYSTEMS

RAND has a long tradition of research on compensation systems. The work includes collecting and analyzing data on caseloads, compensation paid, transactions costs, and program design, to determine how well these systems are functioning compared with their stated intent. This year researchers focused on asbestos litigation, California's workers' compensation system, and auto accident compensation and claiming. ICJ researchers have also begun a study of compensation for victims of terrorism.

Asbestos Litigation. RAND's ICJ has been the most reliable source of information on asbestos litigation since its first studies were published in the 1980s. The current study was designed to update its earlier work by identifying how much has been paid to claimants to date, who is paying compensation, and at what cost. The study also sets out a framework for analyzing alternatives to the current compensation regime.

One of the reasons for such a study is that information on asbestos litigation is highly dispersed and usually confidential. There is no national registry of asbestos claimants. Federal courts collect data on asbestos cases, but most claims are filed in state courts, which do not report such information. Most of the data is gathered by individual defendants and insurers with a stake in the litigation. RAND researchers gained access to a good deal of this data, as well as some proprietary studies, from participants on both sides of the litigation—access that was granted under conditions of utmost confidentiality. The study team also drew upon RAND's previous research on asbestos in the 1980s, other analyses that are publicly available, and extensive interviews with dozens of participants with different perspectives on the litigation.

Study findings show that the number of asbestos claims has risen sharply in recent years and that most of that increase has been for

RAND Institute for Civil Justice

Raymond I. Skilling, executive vice president and general counsel at Aon Corporation, with Nicholas Pace, who made a presentation to the board on improving the dispute resolution process for California's injured workers

Rachel Kaganoff Stern talked about compensation for victims of terrorist attacks at the ICJ board meeting in October 2002.

nonmalignant claims. More than 6,000 companies have been named as defendants, ranging across nearly every type of industry in the United States. Sixty companies have filed bankruptcy as a result of asbestos liability. With an estimated $54 billion already spent on asbestos claims through the year 2000, and estimates of future spending from two to five times that amount, it is not clear whether there will be enough money in the future to compensate seriously ill asbestos victims.

Workers' Compensation. The ICJ has produced a number of reports on the adequacy and equity of workers' compensation permanent disability benefits, research that influenced California's political leaders to increase benefits to injured workers in April of this year. The reports are the result of a comprehensive study of workers' compensation policy in California and five other states. With funding from the State of California Commission on Health and Safety and Workers' Compensation (CHSWC), the project is designed to bring about improvements in the workers' compensation system that are rigorously supported by research, mutually beneficial to employers and labor, and agreeable to the stakeholders of the system.

An initial study published in 1998 concluded that injured workers at insured firms in California from 1991 to 1992 experienced large and sustained earnings losses during the five years following injury and that these losses were not adequately replaced by workers' compensation benefits. Research released this year examined the poor economic conditions of the early 1990s and analyzed their effects on the workers' compensation analysis of the previous study. The results validated the conclusions of the earlier report.

RAND is also conducting a comprehensive study of disability ratings. The first product of this work appeared in the *Journal of Occupational Rehabilitation*, focusing on upper extremity musculoskeletal injuries. In related work, two forthcoming reports will evaluate the California workers' compensation court system and explore the extent to which the problems in California's vast workers' compensation system are common to other states.

Auto Accident Personal-Injury Compensation. Auto accident litigation accounts for about half of all civil litigation, and the costs

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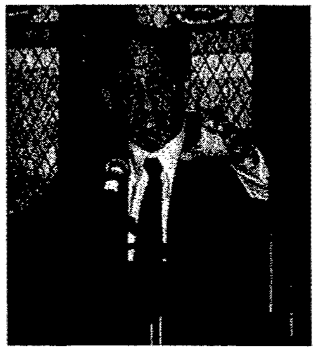

Kenneth Feinberg, Special Master of the September 11th Victim Compensation Fund, spoke at a dinner after the ICJ board meeting in October in Washington, D.C.

of compensation have been rising steadily over the past 25 years. The ICJ has been conducting studies of auto accident personal-injury insurance since its inception, documenting trends, analyzing alternative insurance programs, and estimating the extent and costs of excess claiming. Because of the depth and breadth of its experience in this area, it is often called upon by public decisionmakers to estimate the effects of proposed changes to the current auto insurance system.

When insurance companies pay compensation for nonexistent or exaggerated injuries, the costs are inevitably reflected in higher insurance bills for everyone. But it is difficult to determine how much fraud exists. In a study published in the *American Law and Economics Review*, ICJ researchers took an indirect approach to this issue, by tracking the footprints of fraud. Previous ICJ research found that the ratio of number of claims for soft-tissue injuries—defined as strains to the neck and back—to the number of claims for observable injuries was greater in the tort and dollar-threshold states, where soft-tissue claims might result in general damages. In verbal-threshold states, these claims usually do not yield general damages. Researchers estimated the percentage of all claims that are fraudulent by using a nationally representative sample of auto-accident injury claims and contrasting claimed injuries among states whose insurance systems present different incentives to excess claiming. It concluded that during the period examined approximately 42 percent of reported "soft-injury claims" in tort states and dollar-threshold states were for nonexistent or preexisting injuries.

Compensation of Terrorist Victims. After the terrorist attacks in September 2001, RAND initiated a study of the web of programs that are compensating the victims of those attacks, including the September 11th Victim Compensation Fund established by Congress right after the attacks. The purpose of this work is to examine the gaps and overlaps in the mix of programs—private insurance, the tort system, private charities, and public assistance—that have been set up to help the victims and to better understand how to structure government programs equitably and efficiently in the future.

LAW & HEALTH

Law & Health, a joint endeavor of the ICJ and RAND Health, examines

- health care litigation and its effects
- coverage decisionmaking by health plans
- effects of federal and state regulatory mandates
- challenges posed by the genomics revolution

RAND Institute for Civil Justice

Since its inception in 1999, researchers have published a range of studies, including a series of articles on the consequences of allowing patients to file suit against their health plans in state courts, one of the provisions in the "patients' bill of rights" proposals under discussion in Congress. This year produced a groundbreaking study in *Health Affairs* that focused on the appeals process used when patients dispute their HMO's decisions. Examining more than 11,000 appeals filed by two of the nation's largest HMOs, both in California, between 1998 and 2000, researchers identified the main reasons why patients appealed HMO decisions and the outcomes of their appeals. The study found that, despite conventional wisdom, most disputes between HMOs and patients are not about denials of coverage for medically necessary care. About half of the appeals studies concerned repayment for health services already received. More than three-fourths of them were decided in the patients' favor. The most common source of conflict was about payment for emergency medical services, appeals that patients won in 95 percent of cases.

In other work published this year in the *Stanford Law Review*, ICJ researchers analyzed whether patents should be issued for the discovery of biochemicals (such as genes, proteins, and hormones), tissues, and living organisms that have not been substantially modified. After reviewing the legal precedents to date, the authors concluded that the current issuance of patents on these products is contrary to U.S. Supreme Court precedent and to Congress's original intent in the patent law. They recommend a test—the Substantial Transformation Test—that could be adopted by either Congress or the Supreme Court to distinguish between discoveries and true inventions. The study examines the main policy issues raised by patents of this sort, such as concerns about human dignity and universal heritage as well as economic effects, and demonstrates how their proposed test would alleviate these concerns.

Securing the Future of Civil Justice Research

ICJ research is supported by pooled grants from corporations, trade and professional associations, and individuals; by government grants and contracts; and by private foundations.

As part of the RAND capital campaign, the ICJ has launched two endowments: the Endowment for Insurance-Related Studies and the Endowment for New Initiatives. The first of these will secure long-term support for continued research into liability and compensation issues crucial to the industry that founded the ICJ. The second will enable the ICJ to be proactive in identifying and pursuing research into emerging issues before the moment for policy analysis has passed. We wish to gratefully acknowledge kick-off gifts to the Endowment for New Initiatives from James A. Greer and Robert A. Clifford and a lead gift to the Endowment for Insurance-Related Studies from State Farm Insurance.

Selected Publications

Asbestos Litigation Costs and Compensation: An Interim Report, Stephen J. Carroll, Deborah Hensler, Allan Abrahamse, Jennifer Gross, Michelle White, Scott Ashwood, Elizabeth Sloss, RAND DB-397-ICJ.

"Charges of Human Immunodeficiency Virus Discrimination in the Workplace: The Americans with Disabilities Act in Action," *American Journal of Epidemiology*, Vol. 1, No. 3, pp. 219–229, David M. Studdert.

"Comparing Severity of Impairment for Different Permanent Upper Extremity Musculoskeletal Injuries," *Journal of Occupational Rehabilitation*, Vol. 12, No. 3, pp. 205–222, Robert Reville, Frank Neuhauser, Jayanta Bhattacharya, Craig Martin. Also available as RAND RP-1046-ICJ.

"The Frequency of Excess Auto Personal Injury Claims," *American Law and Economics Review*, Vol. 3, No. 2, pp. 228–250, Stephen Carroll, Allan Abrahamse. Also available as RAND RP-983-ICJ.

"The Jury Is Still In: Florida's Birth-Related Neurological Injury Compensation Plan After a Decade," *Journal of Health Politics, Policy and Law*, Vol. 25, No. 3, pp. 499–526, David M. Studdert, Lori A. Fritz, Troyen A. Brennan. Also available as RAND RP-886-ICJ.

"New Methods and Data Sources for Measuring Economic Consequences of Workplace Injuries," *American Journal of Industrial Medicine*, Vol. 40, pp. 452–463, Robert T. Reville, Jayanta Bhattacharya, Lauren R. Sagér Weinstein. Also available as RAND RP-972-ICJ.

"No-Fault Compensation for Medical Injuries: The Prospect for Error Prevention," *Journal of American Medical Association*, Vol. 286, No. 2, pp. 217–223, David M. Studdert, Troyen A. Brennan.

"Patients in Conflict with Managed Care: A Study of Appeals in Two HMOs," *Health Affairs*, Vol. 21, No. 4, pp. 189–196, Carole Roan Gresenz, David M. Studdert, Nancy Campbell, Deborah R. Hensler.

"Reinventing the Double Helix: A Novel and Nonobvious Reconceptualization of the Biotechnology Patent," *Stanford Law Review*, Vol. 55, No. 303, pp. 303–463, Linda DeMaine, Aaron X. Fellmeth.

"Revisiting the Monster: New Myths and Realities of Class Action and Other Large Scale Litigation," *Duke Journal of Comparative & International Law*, Vol. II, pp. 179–213, Deborah R. Hensler. Also available as RAND RP-979-ICJ.

Trends in Earnings Loss from Disabling Workplace Injuries in California: The Role of Economic Conditions, Robert T. Reville, Robert F. Schoeni, Craig W. Martin, RAND MR-1457-ICJ.

RAND Public Safety and Justice

K. Jack Riley,
director of RAND
Public Safety
and Justice

Public Safety and Justice (PSJ) is a new name in the RAND organization, a name reflecting an important evolution in the research agenda of the unit formerly known as RAND Criminal Justice. PSJ will continue research on traditional criminal justice issues, principally those relating to corrections, policing, firearms, and community violence. The unit will also continue to host the Drug Policy Research Center (DPRC) in association with RAND Health. The new name reflects an expansion of the agenda in the arena of public safety, to include counterterrorism, domestic intelligence policy, institutional issues related to public safety and justice, and border control.

At the time of the September 2001 attacks on the East Coast, RAND was completing a project for California policymakers that characterized the state's vulnerability to terrorist attacks on infrastructure, including information infrastructure, and agriculture. The authors recommended measures to reduce system vulnerabilities, including enhanced physical-security standards, public–private dialogues to increase information sharing, and prevention steps to reduce the likelihood of agricultural losses from disease.

That project was followed by a set of issue papers for the speaker of the California assembly relating to the implications of the September 11 attacks. Several focused on economic effects, including the effects of the attacks on the travel and tourism industry and on the U.S. airline industry in relation to the California economy, as well as effects of the possible limited availability of insurance. Others addressed preparedness for attacks by weapons of mass destruction, access and control of dangerous biological materials, and capabilities for coping with the psychological effects of terrorism. The papers compellingly illustrated that while there is work to be done to better understand terrorism's longer-term effects, some of the consequences feared in September and October 2001 no longer seemed likely to materialize.

In a project currently under way for the Alfred P. Sloan Foundation, RAND will provide guidance to individuals and families that will allow them to prepare for and respond to catastrophic terrorist attacks. The goal is to develop practical, affordable measures that can be acceptable to and promulgated by emergency responders and managers. This project will fill an important gap, for no organization has

The Legacy of RAND Criminal Justice

RAND Public Safety and Justice inherits a 30-year legacy of policy analysis in the areas of sentencing and corrections, drug policy, and violence prevention. Throughout that period, RAND provided dispassionate analysis where debate over trends and remedies principally turned on emotion and ideology. The following are among RAND's contributions:

- Estimating the costs and crime reduction benefits of mandatory sentences for repeat offenders, such as those embodied in "three strikes" laws
- Comparing various methods of diverting children from criminal careers in terms of program costs and future crimes averted
- Evaluating innovative programs to rehabilitate juvenile offenders and bringing successful efforts to the attention of interested jurisdictions
- Designing and testing a school-based program using peers as role models to keep adolescents off legal and illegal drugs
- Estimating dealer incomes and other aspects of the market for illegal drugs in a major metropolitan area
- Comparing the cost-effectiveness of treatment, enforcement, and prevention alternatives aimed at reducing drug consumption

RAND PSJ Advisory Board

RAND Public Safety and Justice

Michael Rich, RAND's executive vice president, chats with board member James Q. Wilson (left) and chair Ann McLaughlin Korologos (right) at the PSJ Advisory Board's annual meeting.

yet sought to analyze the effectiveness of potential civil-preparedness actions in the context of specific terrorism scenarios.

RAND has also fielded a follow-up to a 1994 nationwide survey of law enforcement agencies' preparedness for domestic terrorism. In the past eight years, there has been a substantial investment in terrorism preparedness by federal, state, and local governments. What has it bought in terms of better planning, operational procedures, and tactics? The new survey, sponsored by the Memorial Institute for the Prevention of Terrorism, is intended to assess changes in prevention and response capabilities since 1994.

In the drug policy arena, the DPRC is continuing work on Orange County's implementation of California's Proposition 36 mandating treatment instead of jail for nonviolent drug possession and use arrestees. RAND is evaluating the response of law enforcement to Proposition 36; the proposition's impact on prosecutorial discretion, the courts and probation, and the treatment delivery system; and the collaborative efforts of treatment and criminal justice system personnel. That project is being supplemented by another focusing on the issue of minority participation in Proposition 36 diversions. The goal is to determine whether minorities are differentially assigned to treatment vs. the criminal justice system and whether that is influenced by neighborhood attributes or the offenders' own characteristics. Staff will also examine the role of distance between the offender's location and treatment services, other social services, and public transportation lines.

The center has research under way for the Robert Wood Johnson Foundation on the role of plea-bargaining in drug prosecutions. It is known that many imprisoned drug offenders do not have a record of serious crimes, but it is not known what charges may have been bargained away during prosecution or what drug was involved. This study will help ascertain that and thus shed light on the true seriousness of drug crimes that result in imprisonment. Another research

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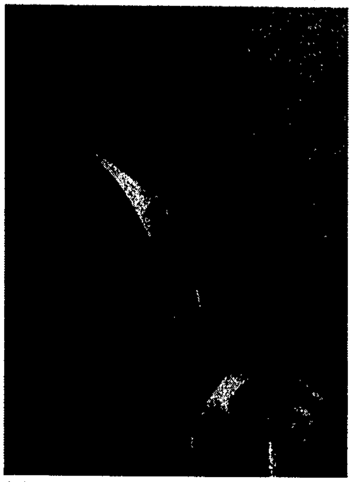
Former Austin Police Chief Elizabeth Watson and former Charlotte-Mecklenburg Police Chief Dennis Nowicki participate as technical experts in a roundtable discussion for the Los Angeles Police Department Training Evaluation. Among the other participants that day were RAND researcher Dionne Barnes-Proby and LAPD personnel.

team is comparing the experience of states and foreign countries that eliminated sanctions for marijuana use (while keeping it formally illegal). The researchers are examining how these "depenalization" policies have varied across jurisdictions in terms of their implementation and their effect on marijuana use. The project should provide a broader understanding of the likely consequences of a range of policy options for cannabis law in the United States.

Finally, the center drew on its core Ford Foundation funding to sponsor a colloquium on the future of U.S. drug problems and policy. The conference was attended by 14 scholars from across the country. It was motivated by the recognition that the vast majority of drug policy discussions focus on the past or present and implicitly assume that the future course of drug problems will be only incrementally different from those of the present. Colloquium participants sought to challenge such assumptions and posit alternative futures for both problems and policy.

Much of the action in the criminal justice system is carried out at the local level, and RAND takes advantage of its headquarters location in the nation's most populous county to pursue its attempts to evaluate and improve that system. In the past year, RAND worked with Los Angeles County in its tests of the community court concept for adjudicating low-level crime (graffiti, prostitution, etc.). This concept involves quick resolution, some element of "payback" to the community as a sanction, community involvement in running the court, and links to social services to address root causes of crime. RAND developed an evaluation framework to determine how one such court is performing and whether it is delivering the expected benefits. The research team devised a needs assessment for a second court. RAND is also serving as an independent consultant to the Los Angeles Police Department to enhance its training programs to help the department better serve the community. Researchers are

RAND Public Safety and Justice



Jack Riley speaks about homeland security to insurance industry executives in New York City.

(Left to right) David Courtwright, University of North Florida; Martin Iguchi, director of the Drug Policy Research Center; and William Brownsberger, Harvard University, at RAND's colloquium on drug policy futures

looking specifically at training modules concerning use of force, laws of arrest, search and seizure, community policing, and diversity.

National research in criminal justice has addressed two topics garnering considerable attention in the news media: application of the death penalty (at the federal level) and domestic violence in the military. In the first of those projects, RAND researchers hope to discern the principal factors affecting prosecutorial decisions on whether to seek the death penalty; racial and geographic biases will be of particular interest. In the second, RAND is undertaking preliminary data collection and analyses related to challenges facing the Department of Defense as it seeks to develop uniform domestic violence policies and improve coordination with local communities.

Selected Publications

"Access to Inpatient or Residential Substance Abuse Treatment Among Homeless Adults with Alcohol or Other Drug Use Disorders," *Medical Care*, Vol. 39, No. 11, Suzanne L. Wenzel, M. Audrey Burnam, Paul Koegel, Sally C. Morton, Angela Miu, Kimberly Jinnett, J. Greer Sullivan. Also available as RAND RP-987.

Biometrics: A Look at Facial Recognition, John D. Woodward, Jr., Christopher Horn, Julius Gatune, Aryn Thomas, RAND DB-396-PSJ.

Evaluation of the South Oxnard Challenge Project, 1997–2001, Susan Turner, Amber Schroeder, Terry Fain, Jodi Lane, Joan Petersilia, RAND MR-1520-VC.

The Implications of the September 11 Terrorist Attacks for California: A Collection of Issue Papers, K. Jack Riley, Mark Hanson (eds.), RAND IP-223-SCA.

"Measuring Global Drug Markets: How Good Are the Numbers and Why Should We Care About Them?" *World Economics*, Vol. 2, No. 4, Peter Reuter, Victoria A. Greenfield. Also available as RAND RP-999.

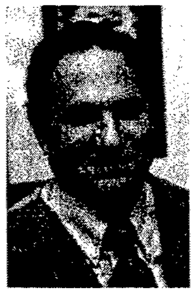
"Reassessing the Marijuana Gateway Effect," *Addiction*, Vol. 97, pp. 1493–1504, Andrew R. Morral, Daniel F. McCaffrey, Susan M. Paddock.

School-Based Drug Prevention: What Kind of Drug Use Does It Prevent? Jonathan P. Caulkins, Rosalie Liccardo Pacula, Susan Paddock, James Chiesa, RAND MR-1459-RWJ.

Security and Safety in Los Angeles High-Rise Buildings After 9/11, Rae W. Archibald, Jamison Jo Medby, Brian Rosen, Jonathan Schachter, RAND DB-381-BOMA.

Security in the Nation's Capital and the Closure of Pennsylvania Avenue: An Assessment, Bruce Hoffman, Peter Chalk, RAND MR-1293-1-FCCDC.

RAND Science and Technology



Stephen Rattien,
director of RAND Science
and Technology

About RAND Science and Technology

RAND Science and Technology (RAND S&T) conducts research and analysis that helps government and corporate decisionmakers address opportunities and challenges created by scientific innovation and rapid technological change. Our work stretches from emerging energy technologies to global environmental change to still other endeavors seeking a better understanding of the nation's scientific enterprise and how best to nurture it. Focal points of RAND S&T work include energy, the environment, information technology, aerospace issues, technology and economic development, bioethics, advanced materials, and "critical" technologies for industries and occupations.

RAND S&T serves a variety of clients, including federal, state, and local government agencies; foreign governments; foundations; and private organizations. Our team has a wide range of expertise and includes physicists and geophysicists; chemists and geochemists; electrical, chemical, mechanical, and information technology engineers; biological and environmental scientists; and economists and other social scientists.

About the RAND Science and Technology Institute

Originally created by Congress in 1991 as the Critical Technologies Institute and renamed in 1998, the Science and Technology Policy Institute (S&TPI) is a federally funded research and development center sponsored by the National Science Foundation and managed by RAND. The Institute's mission is to help improve public policy by conducting objective, independent research and analysis on policy issues that involve science and technology. To this end, the Institute supports the Office of Science and Technology Policy and other executive branch agencies, offices, and councils; helps federal science and technology decisionmakers understand the likely consequences of their decisions and choose among alternative policies; and helps improve understanding in both the public and private sectors of the ways in which science and technology can better serve national objectives. Helga Rippen is the director of S&TPI. Its operations are based in RAND's Washington Office.

Since RAND's founding, science and technology issues have been a central focus of RAND research. To cite one example, in the 1940s RAND analyzed the concept of earth-orbiting satellites, including policy considerations, technological options, and the likely political and psychological impact of launching humans into orbit. Concluding that such satellites were both feasible and a potentially critical resource in the emerging Cold War, RAND's studies profoundly influenced the U.S. decision to develop and deploy reconnaissance satellites. A distinguished historian of the space age, Walter A. McDougall, commends an early RAND space study as "the birth certificate of U.S. space policy" in *The Heavens and the Earth: A Political History of the Space Age.*

This legacy of multidimensional, policy-relevant S&T analysis continues today. RAND S&T's work is intended to help clients, especially federal agencies, address technically complex problems in a multidimensional policy environment.

Specifically, RAND S&T work helps clients

- assess the likely consequences of policy decisions in science and technology areas;
- understand the science and technology components of broader issues, such as homeland security and telecommunications policy; and
- use scientific knowledge and technological tools to improve performance of operations in areas such as space exploration, energy production and use, environmental protection, and information technology.

RAND S&T serves a diverse mix of clients, including federal agencies, state and other government entities, businesses, and foundations. Approximately half of RAND S&T's work is conducted within the Science and Technology Policy Institute (S&TPI), a federally funded research and development center that provides research and analysis for the White House Office of Science and Technology Policy (OSTP) and other federal agencies.

Project Highlights

Homeland Security and Public Safety. Following the terrorist attacks on September 11, 2001, S&TPI has undertaken several projects to help ensure that federal R&D is positioned to meet changing national

RAND Science and Technology

(Left) Debra Knopman, associate director of RAND S&T, with Stephen Rattien and Helga Rippen, director of S&TPI; (right) Mark Wang, associate director of S&TPI

security needs. For example, the National Institute for Occupational Safety and Health (NIOSH) asked RAND to convene a representative group of emergency responders from the incidents in New York City, the Pentagon, Pennsylvania, and Oklahoma City. The conference addressed the unique character of terrorist attack sites, including their intensity and duration, the performance and availability of protective equipment during the response, as well as training issues raised by protective equipment use. The project has helped NIOSH focus its safety and security mission and redirect a portion of its research agenda on terror-response emergency protection. RAND's assistance also enabled front-line responders to present their views to decisionmakers and helped to foster better communication between NIOSH and the stakeholders in its mission area.

Humanitarian Assistance. Breakthrough technologies often evolve by taking successes in one area and applying them in new areas. An S&TPI project for the OSTP did just that when it examined landmine removal technologies by considering advances in groundwater remediation research and practice. Globally, landmines represent an enormous threat to human safety: Estimates of the number of mines around the world reach as high as 50 million. Current technologies for detecting mines remain relatively primitive. Several innovative concepts are currently in the development stage, but none individually will address all the challenges of detection and removal. The study recommended exploring concepts that combine a range of different technologies and made suggestions for U.S. R&D strategies to promote their development.

Energy. Energy policy represents a complex decisionmaking arena with important economic, environmental, and security ramifications. Our energy work has focused on energy technology assessment, market and regulatory policy, and energy R&D. A study funded by the Hewlett Foundation examined traditional assessments of the nation's potential supply of natural gas and oil resources. Although the assessments vary, each indicates that the Intermountain West contains substantial natural gas and oil resources. Traditional resource assessments, however, are intended to estimate the "technically recoverable" resource, which does not reflect the amount of resource that can be economically

MAJOR CLIENTS OF RAND S&T

U.S. Government

Department of Commerce
  National Institute of Standards and Technology
Department of Education
Department of Energy
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  National Energy Technology Laboratory
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Department of Housing and Urban Development
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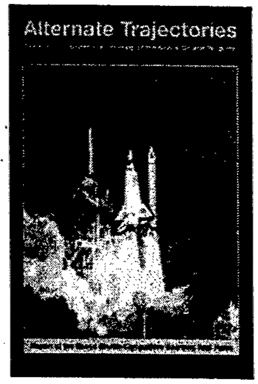
Environmental Protection Agency
National Aeronautics and Space Administration
National Science Foundation
Office of Science and Technology Policy

Other

Building Industry Institute
California Air Resources Board
California State Auditor
  Bureau of State Audits
Commonwealth of Pennsylvania
  University Center for Southwest Pennsylvania
The Energy Foundation
Environmental Planning and Design, Pittsburgh
The William and Flora Hewlett Foundation
Oklahoma City National Memorial Institute for the Prevention of Terrorism
The Pew Charitable Trusts
  Pew Center on Global Climate Change



produced. This study laid the foundation for estimating the "viable" gas and oil resource: that which would likely be available when exploration and production costs, infrastructure and transportation costs, and environmental concerns are considered.

A study supported by the Energy Foundation examined the policy implications of California's reliance on natural gas. The study concluded that a diversified base of energy sources would ease the burden on California's strained distribution system and contribute to ensuring a stable energy supply.

Another recent study for the Department of Energy evaluated the potential of new high-temperature superconducting (HTS) power technologies to address existing problems with the U.S. electric power transmission grid, especially problems with transmission constraints. The study found that HTS cables, when operated at high levels of utilization, can provide energy savings compared with conventional cables or overhead lines.

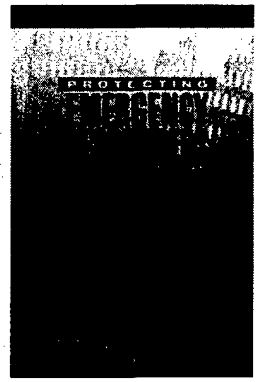
Aerospace. Recent S&TPI work for the National Aeronautics and Space Administration (NASA) exemplifies our ability to help federal clients balance multiple—and at times conflicting—goals. Seeking to improve the cost-effectiveness of its activities while maintaining the highest levels of safety, NASA turned to RAND to provide analytic support for the independent Space Shuttle Competitive Sourcing Task Force.

Environment. Our environmental work has focused on global climate change, ecosystem and natural resource management, the environmental impact of transportation policies, and environmental technologies. A recent study for the Pew Center on Global Climate Change found that patterns of capital investment by businesses can have major effects on the success and cost-effectiveness of climate change policies. Because new capital stock is expensive, firms often extend the life of older equipment as long as possible. Unfortunately, this older equipment may also be a major source of greenhouse gas emissions, which contribute to global warming. The study identifies avenues for policy intervention to encourage investment in new capital stock that would reduce greenhouse gas emissions.

A RAND-sponsored study assessed the cost-effectiveness of California's Zero Emission Vehicle program, which requires that, starting in 2003, a proportion of new vehicles sold in the state must produce no emissions. The study concluded that federal air quality standards can be met more cost-effectively without quotas for zero emission vehicles. It recommended that California eliminate the requirement for zero emission vehicles; instead, the state should tighten emission standards on light-duty vehicles and focus on setting emission performance standards.

Information Technology. RAND's work in this area has examined the role of information technology in the public sector, assessed its potential impact across a range of activities (notably improving government services), and designed systems for organizing and exploiting information. For example, the Department of Justice (DOJ), like many other federal agencies, has made substantial investments in information technology, both to improve public services and to adapt to the new homeland security dimensions of its mission. Through S&TPI, RAND staff used policy analytic methods and technology

RAND Science and Technology



expertise to help the DOJ plan, implement, and assess a large-scale information system and infrastructure.

Federal R&D Portfolio. In FY2003, the federal government will invest approximately $110 billion to support R&D. Effective management of the federal government's vast R&D enterprise is critical for achieving national goals and for ensuring that this large investment is wisely spent. A recent S&TPI study for the President's Council of Advisers for Science and Technology (PCAST) examined trends and patterns in federal R&D. Federal R&D spending is at an all-time high—growing from $60 billion in 1976 to its current $110 billion level. Despite this increase, however, U.S. R&D funding has not kept pace with the growth in the U.S. economy. Furthermore, funding in nondefense areas other than health has been largely flat or declined in constant dollars over the same period. Among other sources, the analysis used the RaDiUS data system, RAND's comprehensive data source on federal R&D spending and activities. (RaDiUS stands for Research and Development in the United States.)

Science Education. One approach to improving science education in the United States has involved partnership programs that pair university science students with K–12 teachers. As part of a larger assessment, the National Science Foundation (NSF) asked S&TPI to study the range of current programs that connect universities with K–12 education. The goal of this research was to identify the challenges of creating and sustaining such programs, assess their impacts on participants, and highlight successful strategies for implementation. The study concluded that these programs can have significant benefits for all participants.

In conjunction with RAND Education, S&TPI also undertook a pair of projects sponsored by the Department of Education to assess current knowledge of early-school math and reading skills and to develop a research agenda to address critical gaps in understanding what works and why.

Selected Publications

Alternative Trajectories: Options for Competitive Sourcing of the Space Shuttle Program, Space Shuttle Competitive Sourcing Task Force, Washington, D.C., prepared for the Office of Space Flight, National Aeronautics and Space Administration.

Assessing Gas and Oil Resources in the Intermountain West: Review of Methods and Framework for a New Approach, Tom LaTourrette, Mark Bernstein, Paul Holtberg, Christopher Pernin, Ben Vollaard, Mark Hanson, Kathryn Anderson, Debra Knopman, MR-1553-WFHF.

Capital Cycles and the Timing of Climate Change Policy, Washington, D.C.: Pew Center for Global Climate Change, Robert J. Lempert, Steven W. Popper, Susan A. Resetar, Stuart L. Hart.

Concepts for Enhancing Critical Infrastructure Protection: Relating Y2K to CIP Research and Development, David Mussington, MR-1259-OSTP.

Driving Emissions to Zero: Are the Benefits of California's Zero Emission Vehicle Program Worth the Costs? Lloyd Dixon, Isaac Porche, Jonathan Kulick, MR-1578-RC/S&T.

Federal Investment in R&D, Elisa Eiseman, Donna Fossum, Kei Koizumi, MR-1639.0-OSTP.

Generating Electric Power in the Pacific Northwest: Implications of Alternative Technologies, Christopher G. Pernin, Mark A. Bernstein, Andrea Mejia, Howard Shih, Fred Reuter, Wilbur Steger, MR-1604-PCT.

Implications and Policy Options of California's Reliance on Natural Gas, Mark Bernstein, Paul D. Holtberg, David Ortiz, MR-1605-EF.

Linking Effectively: International Cooperation in Science and Technology, Caroline S. Wagner, Linda Staheli, Richard Silberglitt, Anny Wong, James Kadtke, DB-345-OSTP.

Merging University Students into K–12 Science Education Reform, Valerie L. Williams, MR-1446-NSF.

New Foundations for Growth: The U.S. Innovation System Today and Tomorrow, Steven Popper, Caroline Wagner, MR-1338.0-OSTP.

Protecting Emergency Responders: Lessons Learned from Terrorist Attacks, Brian Jackson, D. J. Peterson, James Bartis, Tom LaTourrette, Irene Brahmakulam, Ari Houser, Jerry Sollinger, CF-176-OSTP.

Redirecting R&D in the Commercial Aircraft Supply Chain, Lance Sherry, Liam Sarsfield, IP-212-OSTP.

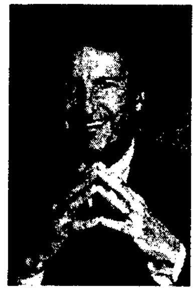
Strengthening the Grid: Effect of High-Temperature Superconducting Power Technologies on Reliability, Power Transfer Capacity, and Energy Use, Richard Silberglitt, Emile Ettedgui, Anders Hove, MR-1531-DOE.

EDUCATIONAL OPPORTUNITIES

RAND Graduate School

Other Educational Programs

RAND Graduate School



Robert Klitgaard, dean of the RAND Graduate School

In 2002, RGS made progress on its three strategic objectives:

- Solidify the School's status as the world's leading Ph.D. program in policy research through better funding for scholarships and dissertations, cutting-edge experimentation with curriculum, and the creation of a world-class facility for the School's new home in the RAND headquarters building.
- In conjunction with RAND, develop new lines of teaching and research on some of the world's most difficult challenges in security, poverty, and justice.
- For the profession as a whole, help rethink what public policy means in a time when we no longer automatically turn to government to solve all problems but increasingly rely on partnerships among government, business, and civil society.

Supporting Scholars

This past year has seen an expansion of scholarships and dissertation awards. Each scholarship supports a graduate student during his or her first two years of residence at RGS. After that point, most course work is completed, and students are able to support themselves through on-the-job training on RAND research projects.

Thanks to generous donors, the Rice, Vogelstein, Michelson, and Kaufman Scholarships now support seven fellows in the entering class, and the Minow Scholarship provides partial support for one. In addition, each year three or four entering students bring their own support. Our goal is a scholarship for the rest of the entering class, which this year numbers 22.

RGS fellows usually write their dissertations in conjunction with RAND research projects. But project-based research, valuable as it is, is not always fully compatible with the doctoral dissertation. Additional financing is needed. Sometimes this funding allows a brilliant dissertation-writer to generalize results to another policy area. Sometimes it allows time to deepen a theoretical finding. Sometimes it funds a full dissertation that no RAND sponsor will support.

This year, RGS launched two full dissertation awards. The Hagopian Dissertation Award supports new ways of thinking about poverty, race relations, education, and health. The Los Angeles

About the RGS

RGS was founded in 1970 as one of the eight original graduate programs in public policy in the United States. It is the only program that focuses exclusively on the Ph.D. It is also the only one not at a university but rather at a think tank. RGS takes advantage of its unique location at RAND by combining advanced course work in fields RAND has helped pioneer (systems analysis, economics, organizational analysis, evaluation, quantitative methods, strategy) and "on-the-job training," where students work with RAND researchers and clients on interdisciplinary teams. This powerful synergy of theory and practice is unique in American higher education.

With 57 professors and a student body of 79, RGS enjoys one of the most favorable faculty-student ratios in higher education.

The RGS student body is remarkable and remarkably diverse. Most students have already earned advanced degrees, ranging from doctorates in the sciences or in medicine to master's degrees in a variety of disciplines. Their practical experience ranges from starting their own companies to volunteer work in Africa, from basic research to government service. In all their diversity, RGS students have three things in common: passion, discipline, and intellectual power.

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With 55 professors serving a student body of 75, RGS enjoys one of the most favorable faculty-student ratios in higher education.

Educational Partnership is sponsoring a pathbreaking thesis on the impact of in-service teacher training.

Cutting-Edge Curriculum

Each year we ask RAND's researcher leaders, "What's an issue coming down the road that we don't yet know how to address?" Based on their suggestions, the faculty designs five-week workshops for students and researchers. Each workshop moves from "here's the problem" to "here's doable research that would shed practical light on that problem."

In the last four years, RGS has featured more than 15 such workshops on emerging issues, ranging from new directions in arts policy to cybersecurity, from communities and violence to the looming crisis in the Southern California transportation infrastructure, from bioterrorism to racial disparities in health.

This year the School has launched a new set of courses on the next generation of policy analysis. The topics include data mining, computational economics, and learning from artificial societies. Each course is taught by an RGS professor and features visits by some of the world's leading experts.

Another new course, cosponsored by the Center for Middle East Public Policy, is a seminar on understanding the Middle East. This innovative course runs throughout the academic year. It combines lectures by distinguished visitors who present the results of their research in the region with more theoretical classes led by RGS professor Jerrold Green on what it might mean to "understand" another "region" or a "culture."

A final new course is a collaboration between UCLA and the RAND Frederick S. Pardee Center for Longer Range Global Policy and the Future Human Condition. It looks at societal collapse throughout history—and what lessons might be learned for today. The course, led by UCLA professor Jared Diamond and RGS professor Jim Dewar, will combine lectures at UCLA with small group discussions at RAND.

RAND Graduate School

RGS graduation ceremony, June 2002

A Changing Profession

Our vision of change must transcend the traditional view of "public policy"—i.e., the idea that solutions should be sought through new government programs alone. Few of the major problems facing the world in the 21st century can be solved with a one-sided approach—give *this* to government, leave *that* to the market. Instead, government, business, and citizens will all have a role in creating vital and relevant solutions. Better answers will come from improved institutions in both the public and private sectors, and from improved partnerships among them.

RGS courses and research are exploring how new kinds of policy analysis can help new kinds of partnerships to flourish. In addition, there are special initiatives to reach out beyond RAND.

- RGS's "What We Need to Know" series invites civic leaders, activists, and practitioners to describe the research they wish they had—what topics, time frames, methods of delivery, and partnerships.
- RGS is developing workshops and short courses that invite civil society, business, and government to come together to work on problems ranging from school improvement to protection from possible terrorist attacks.
- Working with international partners, RGS is creating a virtual network of independent research organizations around the world to devise new approaches to poverty, justice, and security.

Our ability to find solutions to the world's complex problems—in international security, health care, energy resources, and education, to name a few—will have a significant impact on our children's futures. Building on distinctive resources and a unique strategy, the faculty and students of the RAND Graduate School are shaping the next generation of policy researchers.

Other Educational Programs

RAND's **Graduate Student Summer Associate Program** is designed for students who have completed at least two years in a graduate program leading to a doctorate or other advanced degree. Each summer associate conducts independent research during the approximately 12 weeks that he or she spends at RAND assigned to a research project and mentored by a research staff member. In 2002, 23 summer associates from 18 different universities applied their skills to the analysis of a wide range of public policy problems.

A sample of summer associate research topics in 2002 includes an exploration of options for compensating victims of terrorist attacks, examining the relationship between adolescents' viewing of sexual content on TV and their sexual attitudes and behaviors, determining the most critical technologies toward the development of a futuristic electric ship, studying the politics of control that the U.S. intelligence community has exerted in encryption and remote sensing, and analyzing data on substance abuse treatment process from clients in a therapeutic community treatment program.

Students are selected for associateships based on their interests and skills and their match with current RAND research projects. Several hundred individuals apply each year. In 2002, as in 2001, about half of the students (ten in all) spent their associateships in Santa Monica, nine students worked out of the Washington Office, and four worked out of the Pittsburgh Office.

Several Specialized Pre- and Postdoctoral Programs are conducted under the auspices of individual research units. In 2002, the Labor and Population Program, for example, supported four postdoctoral fellowships in population studies and in the study of aging, which were sponsored by the National Institute of Child Health and Human Development (NICHD) and by the National Institute on Aging (NIA), respectively. The UCLA/RAND Postdoctoral Training Program, jointly housed in the RAND Health program and the UCLA School of Public Health, provides fellowships for doctoral and postdoctoral study in health services research. The RAND/ Spencer Postdoctoral Fellowship in Education Policy, housed within RAND Education and cosponsored by the Spencer Foundation, blends formal and informal training and extensive collaboration with distinguished researchers in a variety of disciplines. All of these programs enable scholars to sharpen their analytic skills, learn to communicate research results effectively, and develop a future research agenda. The programs offer formal and informal training and extensive collaboration with RAND researchers.

STAFF

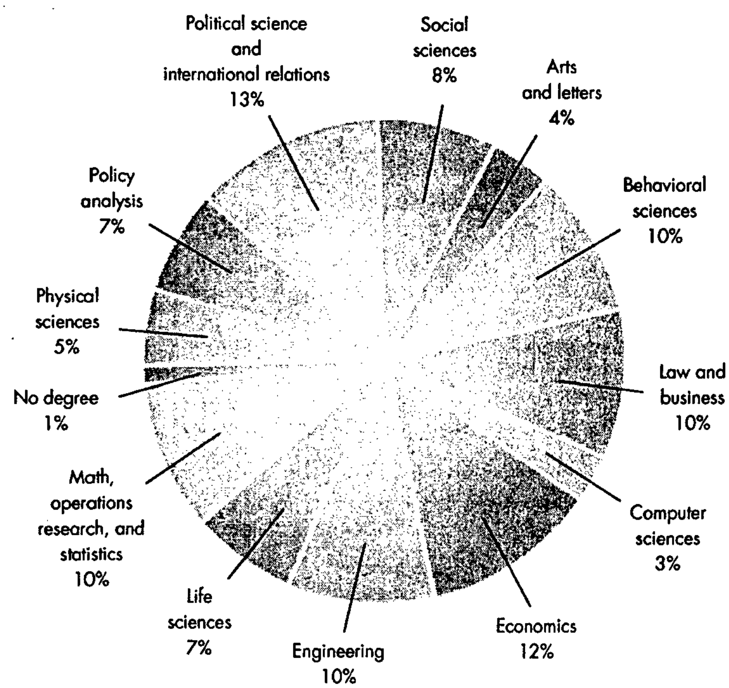
External Recognition and Service

President's Awards

RAND Alumni Association

Staff

The full- and part-time staff of more than 1,600 represent diversity in work experience; political and ideological outlook; race, gender, and ethnicity; and academic training. Most staff members work at RAND's three principal U.S. locations—Santa Monica, California; Arlington, Virginia; and Pittsburgh, Pennsylvania. Others operate from RAND Europe in Leiden, the Netherlands; Berlin, Germany; and Cambridge, U.K.; from RAND's Council for Aid to Education in New York City; and from several smaller sites. Eighty-five percent of the research staff hold advanced degrees, with more than 65 percent having earned Ph.D.'s or M.D.'s. To provide the varied expertise needed to fully address public policy issues, the staff's training reflects the wide variety of disciplines shown in the figure.



RAND's research staff is trained in a wide variety of disciplines.

External Recognition and Service

RAND staff regularly gain both national and local recognition for their outstanding achievements. A partial list of honors conferred in 2002 by professional organizations, government, and the community is shown below.

Awards

- **Dana Goldman** and **James P. Smith** received an award from the National Institute for Health Care Management for the best research article of the year, titled "Can Patient Self-Management Help Explain the SES Health Gradient?"
- **Brian Jackson** received the John Henry Cowles Prize for Graduate Academic Achievement at George Washington University.
- The United States Air Force honored Lieutenant General **Glenn Kent** (USAF Ret) with the Air Force Analysis

Each summer, participants in RAND's Graduate Student Summer Associate Program conduct independent research during the approximately 12 weeks that they spend at RAND assigned to a research project and mentored by a research staff member. In 2002, summer associates from 18 different universities applied their skills to the analysis of a wide range of public policy problems. (Above right) Laura Baldwin speaks to RAND staff about research under way at the Pittsburgh Office. (Right) In August 2002, the start of the construction for the new Santa Monica headquarters was celebrated at a ceremony attended by roughly 350 staff, alumni, and guests.

Community's Lifetime Achievement Award for "enlightening decades of Air Force decisionmakers" and mentoring a generation of young analysts.

- **Debra Knopman** received the Woodrow Wilson Award for Distinguished Government Service. Established in 1990, the award recognizes alumni of Johns Hopkins University who have brought credit to the institution through distinguished service to the public as elected or appointed officials.
- **J. R. Lockwood** and **Brian Williams** were honored by the International Society for Bayesian Analysis for the contributions that their doctoral dissertations have made to the field of Bayesian statistics and econometrics. Lockwood's work on "Estimating Joint Distributions of Contaminants in U.S. Community Water System Sources" received the Leonard J. Savage Award for the best thesis in application methodology. Williams's dissertation, "Sequential Design of Computer Experiments to Minimize Integrated Response Functions," was a finalist in the category of best thesis in theory and methods.

Staff

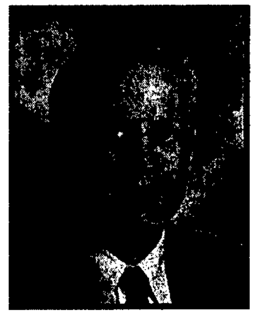
- **Kevin O'Connell** and **John Baker** received the 2002 Outstanding Service Award from the American Society for Photogrammetry and Remote Sensing for their role in preparing the publication *Commercial Observation Satellites: At the Leading Edge of Global Transparency*.
- The American College of Physicians–American Society of Internal Medicine honored **David Solomon** with the John Phillips Memorial Award for outstanding work in clinical medicine. In addition, the American Geriatrics Society has created the David Solomon Distinguished Public Service Award, which will recognize efforts to improve the health and well-being of older people.

New Appointments to Advisory Groups

- **Robert Brook** was appointed to a panel of medical professionals and consumer representatives who advise the Office of Statewide Health Planning and Development on how to report outcomes of coronary artery bypass graft surgery at California hospitals. The California Chapter of the American College of Cardiology, the California Medical Association, and consumer organizations jointly nominate candidates for this panel.
- **José Escarce** was invited to join a National Academy of Sciences Committee on data needs for studying racial and ethnic disparities in health and health care.
- The Federal Research Division of the U.S. Library of Congress selected **Ted Karasik** to be a subject matter expert for Armenia, Azerbaijan, Bahrain, and Qatar.
- The Secretary of the Army appointed **John Matsumura** as a consultant to the Army Science Board (ASB), a federal advisory committee on scientific and technological matters. The ASB provides independent counsel to the secretary in the field of science and related matters. **Laura Miller** also joined the ASB in 2002.

Other Honors

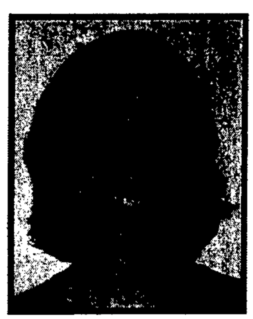
- **Tora Bikson** provided expert testimony to an Institutes of Medicine (IOM) panel on the protection of private identifiable medical records in research. Her testimony resulted in RAND's being cited in the "best practices" section of the IOM report.
- **Rick Eden** was named one of four social sciences reviewers for *The Key Reporter*, the quarterly publication of Phi Beta Kappa.
- **David Johnson** presented the inaugural Dr. James J. Whalen Memorial Lecture at the U.S. Army War College. His topic was "Learning to Change: The Role of Military Education in Transformation." The purpose of the annual lecture is "to convene the faculty for an opportunity to hear a renowned expert speak on the subject of higher education in a military context."
- *The Transformation of American Air Power* by **Ben Lambeth** was selected for the U.S. Air Force Chief of Staff's reading list, which



Kenneth Burkhalter, deputy director of Facilities, for his effective leadership of the multidisciplinary team charged with selecting the furniture, fixtures, and equipment for RAND's new headquarters building and for his overall contributions to long-range facilities planning.

Jill Cannon, associate director of the Child Policy Project and RAND Graduate School Associate Professor of Policy Analysis, for her pathbreaking contributions to the Promising Practices Network, an innovative approach to disseminating the lessons of high-quality, objective research and analysis to practitioners and policymakers.

Michele Colon, operations manager of RAND's Pittsburgh Office, for her positive role in the growth of the Pittsburgh Office and its integration with the research and support operations at other RAND locations around the world.



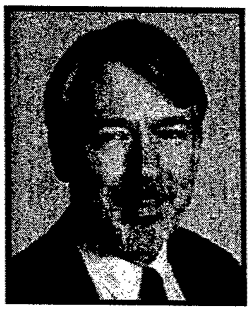
Kim Cragin, associate international policy analyst, for her extensive contributions to RAND's broad program of research on counterterrorism and homeland security, which included innovative research products, support for several special-assistance efforts and new initiatives, and stewardship of the RAND Terrorism Chronology.

INTERNAL RECOGNITION

President's Awards

In 1991, RAND President and CEO James A. Thomson established the President's Awards program to recognize the achievements of RAND staff who have made important sustained contributions to RAND and, in doing so, have devoted time and energy beyond the call of duty. Made possible by the generosity of donors to the RAND Policy Circle, the awards provide staff with research time and support to pursue activities related to career development or exploratory research.

These individuals are the fiscal year 2003 President's Award recipients.



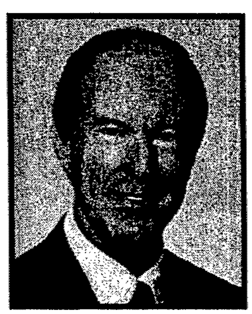
Rick Eden, senior defense research analyst and associate director of the Arroyo Center's Military Logistics Program, for his efforts to strengthen RAND's research quality assurance processes and for his lengthy and effective service as a member of RAND's Human Subjects Protection Committee.

Mirjam van het Loo, senior analyst at RAND Europe, for her noteworthy research on critical policy questions facing European governments, including questions on health, education, social welfare, immigration, and research and development, and for the sizable contributions she has made to the collaborative environment at RAND Europe.

Michael Hurd, senior economist, director of the Center for the Study of Aging, and member of the RAND Graduate School Admissions Committee, for important analytical contributions on issues related to aging, innovative work on new methods of survey data collection, and exemplary service to the RAND Graduate School.

John Parachini, international policy analyst, for his body of research on weapons of mass destruction and his active and effective efforts to disseminate that work widely, to both the policymaking community and the general public.

Jody Jacobs, operations research analyst, for her creative leadership of the Diversity Advisory Committee, a team drawn from across RAND to advise and assist with our ongoing efforts to attract and retain the diverse staff necessary to carry out RAND's mission and uphold our core values of quality and objectivity.



Gregory Treverton, senior policy analyst and RAND Graduate School Associate Dean for Research, for his outstanding contributions to RAND's various outreach programs, drawing on his extensive research on intelligence policy and international affairs.

Staff

(Left) Carole Roan Gresenz, associate director of the RAND Institute for Civil Justice, addressed members of the ICJ Board of Overseers. (Above) At a recent meeting of the Drug Policy Research Center Advisory Board, Barbara Williams and Audrey Burnam shared thoughts with other participants on optimizing the influence of RAND's drug policy research.

helps form determine course content within the professional military education system. In 2002, Ben was also elected an honorary member of the Order of Daedalians, the national fraternity of U.S. military pilots.

- **Martin F. Shapiro** was elected president of the Society of General Internal Medicine for 2002–2003. In addition to his RAND affiliation, Martin is Professor of Medicine as well as chief of the Division of General Internal Medicine and Health Services Research at UCLA.
- **Tom Szayna** was invited to become a member of the Research Committee on Armed Forces and Society of the International Political Science Association.
- **Susan Turner** was elected fellow of the Academy of Experimental Criminology, a division of the American Society of Criminology.

RAND Alumni Association

The RAND Alumni Association was established in 1992 as an independent organization. Membership in the Alumni Association is open to current and former RAND personnel; consultants; and military officers who served as research fellows at RAND. The main purpose of the Alumni Association is to foster social and professional contacts among the members, who currently number more than 1,600. Benefits to members include the *Alumni Bulletin*, which is published three times a year, and invitations to briefings and social events. The RAND Alumni Association's Web site address is http://www.rand.org/alumni.

DISSEMINATION ACTIVITIES

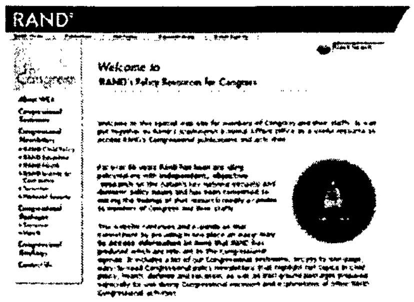
Publications

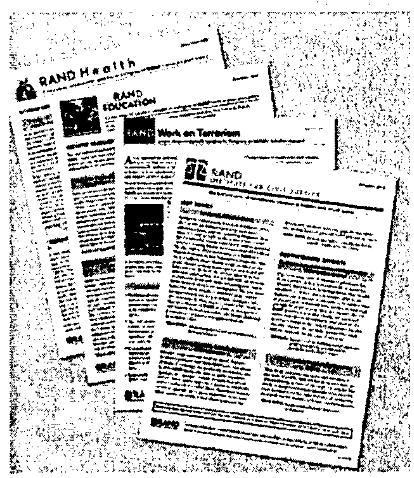
Reach of Reason

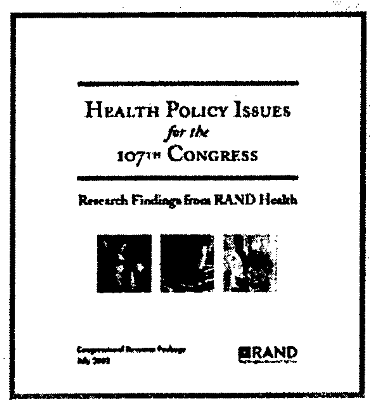
RAND Policy Circle

President's Circle

Dissemination Activities







Whatever the issue—welfare reform or information warfare, health insurance or terrorism—RAND's mission is to help improve policy and decisionmaking through research and analysis. A key element of achieving that mission is getting the results of RAND's work into the right hands. As noted in the descriptions of the research units, RAND uses a variety of ways to communicate its research to the broadest possible audiences, and especially to critical groups such as policymakers, scholars, and the media.

- RAND's Washington External Affairs Office responds to requests from Congress, updates Congress regularly on recent policy research, and assists staff who are asked to provide testimony. RAND's Policy Resources for Congress Web site is available at www.rand.org/congress.
- RAND research staff present their findings to a wide range of government and private audiences through briefings, testimony, and speeches.
- The Office of External Communications disseminates research findings and other RAND news and facilitates media access to staff expertise.
- Each year, RAND welcomes visits from hundreds of local, state, national, and international public- and private-sector leaders to its U.S. offices in Santa Monica, Arlington, New York, and Pittsburgh; and to RAND Europe's offices in Leiden, the Netherlands; Berlin, Germany; and Cambridge, U.K.
- The *RAND Review* builds cover stories and feature articles around timely research on a variety of topics and encourages researchers with divergent points of view to weigh in on major issues of the day.
- RAND's site on the World Wide Web (http://www.rand.org) provides access to recent reports, books, testimony, and commentaries; research initiatives; summaries of selected projects; and a searchable database, which includes more than 50 years of RAND titles. Visitors can subscribe to the monthly electronic newsletter, *RAND News Bulletin*, to learn about new material added to the site.
- The Child Policy Project's primary mission is to increase the impact of RAND's child-related research by better communicating to

Recent Reviews of RAND Books

The European Security and Defense Policy: NATO's Companion—or Competitor?

by Robert Edwards Hunter

"... Provides useful detail on the evolution of the European Union's efforts to develop an autonomous defense and security policy."

—*Foreign Affairs*

The Origins and Evolution of Family Planning Programs in Developing Countries

by Judith R. Seltzer

"This well-referenced research report addresses multiple aspects of birth control programs in developing nations, from their history and rationales to criticisms, lessons learned, and policy implications."

—*Reference & Research Book News*

Space Weapons Earth Wars

by Bob Preston, Dana J. Johnson, Sean J. A. Edwards, Michael Douglas Miller, Calvin Shipbaugh

"This book is recommended to those wishing to be informed about space weapons. I am not aware of any other book that is as comprehensive. Whether you are for or against space weapons this book provides the material upon which to base your arguments. If you are interested in the military use of space or in national security policy, this is a book for you."

—*Physics & Society*

Networks and Netwars

by John Arquilla, David F. Ronfeldt

"*Networks and Netwars* offers not only a compelling explanation of why organizations such as al Qaeda are so difficult to defeat, but also unusual insight into how government may seek to prevent attacks such as happened on Sept. 11."

—*San Francisco Examiner*

Changes in the Standards for Admitting Expert Evidence in Federal Civil Cases Since the Daubert Decision

by Lloyd S. Dixon, Brian P. Gill

"This study should not be underestimated. It makes a valuable contribution, if incremental contribution to the evolving understanding of how the DAUBERT standard is actually working."

—*The Law and Politics Book Review*

NATO's Air War for Kosovo: A Strategic and Operational Assessment

by Benjamin Lambeth

"Benjamin Lambeth's 300-page book on the Kosovo war combines concise history, sound strategic analysis, military facts and figures, and a detailed assessment of how NATO's air war was conducted and what it should tell us about future conflict. In all these areas, Lambeth's writing and research is strong."

—*Survival*

Vivian Arterbery, RAND's corporate secretary, with Secretary of Defense Donald H. Rumsfeld

policymakers, practitioners, and other decisionmakers. Its Web site serves as a resource for information on RAND research projects, publications, and staff who work in this area (http://www.rand.org/child). The project also operates the Promising Practices Network (PPN) on Children, Families, and Communities. PPN is a Web site founded in 1998 by four state-level organizations acting as intermediaries between researchers, policymakers, and practitioners. PPN's objective is to promote evidence-based information about what works to improve the outcomes of children and their families (http://www.promisingpractices.net).

Two other key dissemination mechanisms—RAND's publications and the RAND Policy Circle—are described in detail on the pages that follow.

Publications

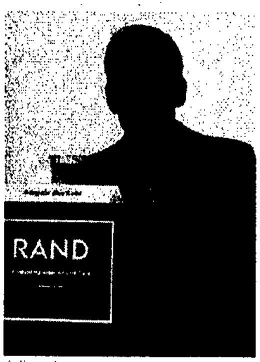
To ensure broad public access to its unclassified research, RAND releases its findings into the public domain. An important outlet is the RAND publication series, to which more than 175 libraries worldwide subscribe. In 2002, RAND published more than 225 books, reports, and papers in these series. Many RAND studies also appear as books from commercial publishing houses and university presses and as articles in professional, scholarly, and technical journals. Of the 300-plus journal articles published by RAND authors, almost 50 appeared in the RAND reprint series in 2002.

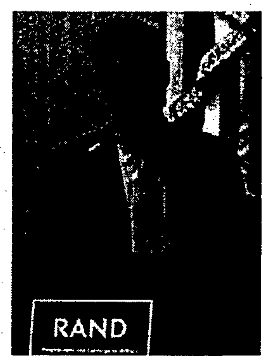
In addition to traditional books, reports, and articles, RAND continues to increase the accessibility of its work through the publication of research briefs, short issue papers, press releases, congressional testimony, newsletters, and the *RAND Review*. RAND publications

Dissemination Activities

RAND's Vice President for External Affairs Bruce Hoffman presented a briefing on suicide bombers. He is shown here with Rep. Jane Harman (D-CA), who cosponsored the briefing with Rep. Saxby Chambliss (R-GA).

Gail Zellman and Susan Gates briefed Senate staff on military child care.





Rebecca Kilburn (above) met with child policy staff from the office of Senator Dianne Feinstein (D-CA). Megan Beckett (far left) briefed the California delegation on after-school care. James Hosek (left) briefed the U.S. House and Senate bipartisan Armed Services Committee staff and the House Women's Caucus on employment and earnings of military wives.

are available from bookstores throughout the world (including online bookstores such as amazon.com), from RAND's Distribution Services group, from government documentation centers, and from the worldwide network of subscription libraries. Documents can also be ordered from RAND's Web site.

Reach of Reason

RAND's initiative to increase its level of philanthropic support, the Reach of Reason campaign, was announced publicly in 2000. By December 31, 2002, significant progress had been made toward the campaign goals: $20 million to support RAND's overall efforts; $20 million to be raised specifically for RAND research units; $20 million to be donated for the RAND Graduate School; and $40 million in project support from private foundations. RAND's trustees, advisory board members, alumni, and friends have been asked to consider major philanthropic investments in RAND's future, and they have responded generously. Their commitments will strengthen RAND for the challenges and opportunities ahead.

RAND Policy Circle

An outstanding group of public, business, and academic leaders plays a central role in shaping and disseminating RAND's work. Through their ideas, critical responses to research presentations, and financial support, they contribute to the institution's growth and the achievement of its mission.

RAND Connects with Policymakers Through the Washington External Affairs Office

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In 2002, Shirley Ruhe became the director of Washington External Affairs.

SELECTED 2002 CONGRESSIONAL BRIEFINGS AND TESTIMONY

Topic	Audience	Briefer
Reauthorizing Higher Science and Math Education Programs (January 17 meeting)	House Committee on Science staff	Dominic Brewer
Economic Consequences of Population Change (January 31 meeting)	House staff	David Adamson, Sally Patterson
Phase II in the War on Terrorism (February 11 briefing)	House and Senate staff	Bruce Hoffman
Veterans Equitable Resource Allocation (VERA) System (March 1 and July 9 briefings)	Senate offices	Jeffrey Wasserman, Jeanne Ringel, Ross Anthony
Family Planning Programs in Developing Countries: Criticisms and Controversies (March 18 briefing)	House and Senate staff	Judith R. Seltzer
Privacy vs. Security: Electronic Surveillance in the Nation's Capital (March 22 testimony)	House Committee on Government Reform, Subcommittee on the District of Columbia	John D. Woodward, Jr.
The Implications of the 9/11 Attacks for California (April 10 briefing)	California congressional delegation	Stephen Carroll, Bruce Hoffman, John Parachini, Jack Riley
Workers' Compensation in New Mexico (April 11 meeting)	New Mexico congressional delegation	Robert Reville
The Future of NATO and Enlargement (April 17 testimony)	House International Relations Subcommittee on Europe	Thomas Szayna
Assessing Gas and Oil Resources in the Intermountain West (April 18 testimony)	House Committee on Resources, Subcommittee on Energy and Mineral Resources	Debra Knopman
Crime-Fighting Technologies (May 2 meeting)	U.S. Senate staff	Helga Rippen, Brian Jackson
Final Assembly and Checkout Alternatives for the Joint Strike Fighter (May 3 briefing)	California congressional offices	Cynthia Cook
Some Key Points on Nuclear Earth Penetrators and the Problem of Deeply Buried Facilities (June 5 meeting)	Senate staff	Glenn Buchan, Natalie Crawford
Introduction to Population Matters (June 5 meeting)	House staff	Julie DaVanzo, Sally Patterson
After 9/11: Stress and Coping Across America (June 10 written testimony)	Senate Committee on Health, Education, Labor, and Pensions	Mark A. Schuster, Bradley Stein, Lisa Jaycox, Rebecca Collins, Grant Marshall, Marc Elliott, Annie Jie Zhou, David E. Kanouse, J. L. Morrison, Sandra H. Berry
How to Construct a Balanced Portfolio of R&D and Other Policies to Address Climate Change, Energy Security, and Other National Concerns (June 20 briefing)	House Committee on Science	Debra Knopman, Robert Lempert
Providing High-Quality Child Care: Lessons Learned from the Department of Defense (June 14 and July 25 briefings)	House and Senate staff	Gail Zellman, Susan Gates
Homeland Security Issues (June 21 briefing)	Senate staff	Lynn Davis
Suicide Terrorism as a Tactic and a Strategy (September 26 briefing)	House and Senate staff	Bruce Hoffman
Lessons of 9/11 (October 8 testimony)	Joint September 11, 2001, Inquiry Staff of the House and Senate Select Committees on Intelligence	Bruce Hoffman
Evaluating After-School Care (October 21 briefing)	House and Senate staff	Megan Beckett
The Effects of Workforce Shaping Incentives on Civil Service Retirement System (CSRS) Retirements (October 23 briefings)	House Committee on Government Reform; Senate Committee on Governmental Affairs; House and Senate Committees on Armed Services	Beth Asch
Employment and Earning of Military Wives (October 23 briefing)	House and Senate Committees on Armed Services	James Hosek
A Look Ahead at Child Policy Issues in the 108th Congress (December 4 briefings)	House and Senate staff	Rebecca Kilburn
Pay Competitiveness and Quality of Department of Defense Civilian Scientists and Engineers (December 11 briefing)	Senate Committee on Armed Services	Beth Asch

Dissemination Activities

(Above) RAND trustee Robert Curvin with RGS Dean Robert Klitgaard.
(Right) Edward Harshberger and Richard Fallon, RAND vice president and chief financial officer, with RAND trustee Lovida Coleman.

RAND's Development Office facilitates the RAND Policy Circle, a membership program organized around briefings, panel discussions, and other events across the country that feature RAND researchers as well as domestic and international leaders. Highlights are Policy Forums and RAND Roundtables, featuring presentations about current RAND work on timely issues. In 2002, trustees and friends of RAND hosted such events in New York, Miami, Palm Beach, Pittsburgh, San Francisco, Santa Barbara, Santa Monica, and Washington, D.C. Through these events, RAND Policy Circle members have opportunities to interact directly with the experts. Informing such influential citizens of the results of RAND's work is an important means of disseminating the results and influencing policy development.

The RAND Policy Circle recognizes six categories of support. Membership in the President's Circle is reserved for those corporations, foundations, and individuals who provide extraordinary service and financial support to RAND. Other levels of support include Benefactors, Leaders, Patrons, Associates, and Friends. Corporations and foundations are invited to join the RAND Policy Circle with annual gifts at the Patrons' level and above; individuals may join at the Friends' level and above. Contributions may be designated for current operations, endowment, or construction of RAND's new headquarters building. Gifts for the latter purpose are eligible for matching on a dollar-for-dollar basis through The Jones Challenge. Membership gifts may be directed to the President's Fund, giving RAND's president the freedom and flexibility to provide seed money for especially promising areas of policy research, or may be earmarked for specific RAND research units or for the RAND Graduate School. Major donors to the specific units are recognized in earlier sections, but we repeat them here, along with major donors to RAND as a whole, representing the full membership of the RAND Policy Circle.

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(as of January 2003)

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(as of March 1, 2003)

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Financial Report

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Report of Independent Accountants

To the Board of Trustees
The RAND Corporation

In our opinion, the accompanying consolidated statement of financial position and the related consolidated statements of activities and changes in net assets and of cash flows present fairly, in all material respects, the financial position of The RAND Corporation and its subsidiaries at September 29, 2002, and the changes in their net assets and their cash flows for the year then ended in conformity with accounting principles generally accepted in the United States of America. These financial statements are the responsibility of the Company's management; our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit of these statements in accordance with auditing standards generally accepted in the United States of America, which require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

The prior year summarized consolidated comparative information included in the financial statements referred to above has been derived from the Company's September 30, 2001 consolidated financial statements, and in our report dated January 18, 2002, we expressed an unqualified opinion on those financial statements.

PricewaterhouseCoopers LLP

January 28, 2003

Financial Report

CONSOLIDATED STATEMENTS OF FINANCIAL POSITION
(In Thousands)

	September 29, 2002	September 30, 2001
ASSETS		
Current assets		
Cash and cash equivalents	$ 3,808	$ 3,825
Short-term investments (Note 4)		49,187
Receivables		
Billed and unbilled costs and fees (Note 2)	37,596	35,933
Other receivables	3,481	7,321
Prepaid expenses and other current assets	3,488	3,089
Restricted cash (Note 15)	602	
Total current assets	48,975	99,355
Property and equipment		
Land (Note 14)	1,334	1,334
Buildings and improvements	183	183
Leasehold improvements	5,230	5,012
Equipment	27,386	26,006
	34,133	32,535
Less: Accumulated depreciation and amortization	19,030	16,867
	15,103	15,668
Construction in progress (Note 14)	16,039	6,840
Net property and equipment	31,142	22,508
Long-term investments (Note 5)	131,649	75,336
Building project fund investments (Note 15)	117,231	
Bond issue costs, net (Note 15)	3,166	
Other assets	5,783	6,154
Total assets	$ 337,946	$ 203,353
LIABILITIES AND NET ASSETS		
Current liabilities		
Accounts payable and other liabilities	$ 20,457	$ 17,401
Accrued bond interest payable	515	
Bank loan payable (Note 6)	1,000	3,500
Unexpended portion of grants and contracts received	18,595	21,295
Accrued compensation, vacation, and retirement	11,611	11,228
Total current liabilities	52,178	53,424
Other liabilities	697	1,172
Accrued postretirement benefit liability (Note 8)	10,979	10,906
Long-term debt (Note 15)	130,190	
Commitments and contingencies (Notes 9 and 10)		
Total liabilities	194,044	65,502
Net assets		
Unrestricted		
Operations	2,848	2,958
Designated for investment (Note 11)	108,178	105,793
Designated for special use (Note 11)	4,054	3,110
Total unrestricted	115,080	111,861
Temporarily restricted (Note 12)	9,615	6,576
Permanently restricted (Note 13)	19,207	19,414
Total net assets	143,902	137,851
Total liabilities and net assets	$ 337,946	$ 203,353

The accompanying notes are an integral part of these consolidated financial statements.

CONSOLIDATED STATEMENTS OF ACTIVITIES AND CHANGES IN NET ASSETS

with summarized financial information for the year ended September 30, 2001
(In Thousands)

	For the Years Ended						
	September 29, 2002						September 30, 2001
	Unrestricted Net Assets						
	Operations	Designated	Total Unrestricted	Temporarily Restricted	Permanently Restricted	Total	Total
REVENUES, GAINS, AND OTHER SUPPORT							
Contracts and grants	$ 167,356		$ 167,356			$ 167,356	$ 162,439
Fees	4,980		4,980			4,980	5,491
Income on investments, net		$ 2,524	2,524	$ 472		2,996	4,698
Net realized (losses) gains on investments		(1,508)	(1,508)	(337)		(1,845)	1,857
Net unrealized gains (losses) on investments		5,362	5,362	1,243		6,605	(11,534)
Contributions	3,474	194	3,668	5,451	($ 207)	8,912	10,809
Other	636		636			636	103
Transfer of designated net assets to operations	3,243	(3,243)					
Net assets released from restrictions due to satisfaction of program restrictions	3,790		3,790	(3,790)			
Total revenues, gains, and other support	183,479	3,329	186,808	3,039	(207)	189,640	173,863
EXPENSES							
Research	150,668		150,668			150,668	147,199
Management and general	32,921		32,921			32,921	30,339
Total expenses	183,589		183,589			183,589	177,538
Change in net assets before other item	(110)	3,329	3,219	3,039	(207)	6,051	(3,675)
Other item—(loss) on sale of land (Note 10)							(1,291)
Change in net assets	(110)	3,329	3,219	3,039	(207)	6,051	(4,966)
Net assets at beginning of year	2,958	108,903	111,861	6,576	19,414	137,851	142,817
Net assets at end of year	$ 2,848	$ 112,232	$ 115,080	$ 9,615	$ 19,207	$ 143,902	$ 137,851

The accompanying notes are an integral part of these consolidated financial statements.

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CONSOLIDATED STATEMENTS OF CASH FLOWS
(In Thousands)

	For the Year Ended September 29, 2002	For the Year Ended September 30, 2001
Cash flows from operating activities:		
Change in net assets	$ 6,051	($ 4,966)
Adjustments to reconcile change in net assets to net cash provided by operating activities:		
Adjustment to postretirement benefit liability	73	(146)
Depreciation	3,286	2,989
Amortization	399	672
(Gain) loss on disposition of property and equipment	(26)	13
Permanently restricted contributions	(282)	(4,984)
Net realized/unrealized (gains) losses	(4,760)	9,677
Increase in billed and unbilled costs and fees	(1,663)	(4,080)
Decrease (increase) in other receivables	3,840	(3,272)
Increase in prepaid expenses and other current assets	(399)	(722)
Increase in restricted cash	(602)	
Increase in accounts payable and other liabilities	3,056	2,469
Increase in bond interest payable	515	
(Decrease) increase in unexpended portion of grants and contracts received	(2,700)	6,000
Increase in accrued compensation, vacation, and retirement	383	989
Decrease in other liabilities	(475)	
Net cash provided by operating activities	6,696	4,639
Cash flows from investing activities:		
Purchase of investments	(72,377)	(38,588)
Proceeds from sale of investments	70,197	35,045
Purchases of building project fund investments	(117,231)	
Purchase of property and equipment	(12,155)	(5,873)
Proceeds from disposal of property and equipment	66	35
Net cash used in investing activities	(131,500)	(9,381)
Cash flows from financing activities:		
Permanently restricted contributions	282	4,984
Net repayments under line-of-credit	(2,500)	(250)
Principal payment of bonds		
Proceeds from issuance of bonds	130,192	
Payment of bond issue costs	(3,187)	
Net cash provided by financing activities	124,787	4,734
Net decrease in cash and cash equivalents	(17)	(8)
Cash and cash equivalents at beginning of year	3,825	3,833
Cash and cash equivalents at end of year	$ 3,808	$ 3,825
Supplemental disclosures of cash flow information:		
Cash paid during the year for interest (net of capitalized interest of $323,000 and $327,000 in fiscal years 2002 and 2001, respectively)	$ 70	$ 110

The accompanying notes are an integral part of these consolidated financial statements.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. SUMMARY OF ACCOUNTING POLICIES:

A. CORPORATE ORGANIZATION. The RAND Corporation (RAND) is a nonprofit, tax-exempt corporation performing research and analysis funded by contracts, grants, and contributions. In addition, RAND conducts educational programs that provide graduate training.

The consolidated financial statements of RAND include the accounts of two controlled affiliates: RAND Europe, a foundation domiciled in The Netherlands, and the Council for Aid to Education (CAE), a nonprofit organization in New York. All inter-company balances and transactions have been eliminated in consolidation.

B. FISCAL YEAR. RAND's fiscal reporting for both financial statement and tax purposes is based on a 52- or 53-week year ending on the Sunday closest to September 30. The fiscal year includes operations for a 52-week period in 2002 and a 53-week period in 2001.

C. BASIS OF PRESENTATION. The accompanying financial statements have been prepared on the accrual basis of accounting in accordance with the American Institute of Certified Public Accountants Audit and Accounting Guide, "Not-for-Profit Organizations."

Certain prior-year amounts have been reclassified to conform with the current-year presentation.

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosures of contingent assets and liabilities at the date of the financial statements. Estimates also affect the reported amount of revenues, expenses, or other changes in net assets during the reporting period. Actual results could differ from these estimates.

Net assets are classified into three categories according to donor-imposed restrictions, as follows:

Permanently restricted—Net assets subject to donor-imposed stipulations that neither expire by passage of time nor can be fulfilled or otherwise removed by actions of RAND. Generally, the donors of these assets permit RAND to use all or part of the investment return on these assets.

Temporarily restricted—Net assets whose use by RAND is subject to donor-imposed stipulations that either expire by passage of time or can be fulfilled and removed by actions of RAND.

Unrestricted—Net assets that are not subject to donor-imposed stipulations. Unrestricted assets may be designated for specific purposes by action of the Board of Trustees.

The financial statements include certain prior-year summarized comparative information in total but not by net asset category. Such prior-year information does not include sufficient detail to constitute a presentation in conformity with accounting principles generally accepted in the United States of America. Accordingly, such information should be read in conjunction with RAND's financial statements for the year ended September 30, 2001, from which the summarized financial information was derived.

D. REVENUE AND EXPENSE RECOGNITION. RAND derived 76 percent of its revenues in 2002 and 77 percent of its revenues in 2001 from contracts, grants, and fees with agencies of the federal government.

Contract and grant revenues are recognized as the related services are performed in accordance with the terms of the contract or grant or using the percentage of completion method.

Contributions, including unconditional promises to give, are recognized as revenue in the period received and are reported as increases in the appropriate category of net assets. Donor-restricted contributions which are received and either spent or deemed spent within the same fiscal year are reported as unrestricted revenue.

Expenses are generally reported as decreases in unrestricted net assets. Expirations of donor-imposed stipulations or of board designations that simultaneously increase one class of net assets and decrease another are reported as transfers between the applicable classes of net assets.

Gains and losses on investments and investment income are reported as increases or decreases in unrestricted net assets, unless their use is restricted by explicit donor stipulation.

Investment income is shown net of related expenses of $623,000 and $575,000, for the fiscal years ended September 29, 2002, and September 30, 2001, respectively.

E. CASH AND CASH EQUIVALENTS. RAND considers all highly liquid debt instruments purchased with a maturity of three months or less to be cash equivalents.

F. PROPERTY AND EQUIPMENT. Property and equipment are stated at cost and are depreciated using the straight-line method over their estimated useful lives, as follows:

	Estimated Useful Life
Buildings and improvements	5 years
Leasehold improvements	2–15 years
Equipment	3–10 years

When assets are retired, the assets and related allowances for depreciation and amortization are eliminated from the accounts and any resulting gain or loss is reflected in operations.

G. INCOME TAX STATUS. RAND is exempt from income tax under Section 501(c)(3) of the U.S. Internal Revenue Code and corresponding California provisions and has qualified for the 50 percent charitable contributions limitation. RAND has been classified as an organization that is not a private foundation under Section 509(a)(1) and has been designated a "publicly supported" organization under Section 170(b)(1)(A)(vi) of the Internal Revenue Code.

2. BILLED AND UNBILLED COSTS AND FEES:

The following table summarizes the components of billed and unbilled contract and grant costs and fees (in thousands):

	September 29, 2002	September 30, 2001
U.S. government agencies		
Billed	$ 14,629	$ 12,752
Unbilled	10,075	9,971
	24,704	22,723
State, local, and private sponsors		
Billed	5,691	7,154
Unbilled	7,201	6,056
	12,892	13,210
	$ 37,596	$ 35,933

Unbilled amounts principally represent recoverable costs and accrued fees billed in October 2002 and October 2001, respectively.

No significant contract terminations are anticipated at present, and past contract terminations have not resulted in significant unreimbursed costs.

3. CONTRIBUTIONS RECEIVABLE:

At September 29, 2002, and September 30, 2001, RAND included $2,563,000 and $5,952,000, respectively, of unconditional promises to give in the financial statements as part of other receivables. The receivables are recorded net of the discount for future cash flows. The discount rate applied was 5 percent.

Realization of the promises at September 29, 2002, and September 30, 2001, is expected in the following periods (in thousands):

	September 29, 2002	September 30, 2001
In one year or less	$ 1,797	$ 2,005
Between one year and five years	812	4,571
Less discount	(46)	(624)
	$ 2,563	$ 5,952

Contributions receivable at September 29, 2002, and September 30, 2001, are intended for the following uses (in thousands):

	September 29, 2002	September 30, 2001
General support	$ 2,272	$ 1,687
Permanently restricted	291	4,265
	$ 2,563	$ 5,952

During the fiscal year ended September 29, 2002, RAND received payments of prior-year promises in the amount of $4,614,000. No allowance for uncollectible promises receivable has been recorded in the consolidated financial statements at September 29, 2002, or September 30, 2001.

Donors have made conditional promises to give of $4,378,000 and $2,640,000 as of September 29, 2002, and September 30, 2001, respectively. The conditional promises to give, which include revocable deferred gifts, are not recorded in these consolidated financial statements.

4. SHORT-TERM INVESTMENTS:

The proceeds from the sale of the Main Street property (see Note 14) were invested under a one-year agreement with Morgan Stanley to purchase securities with an agreement to resell ("REPO"). The original agreement was executed on May 4, 2000, and the repurchase transaction matured on April 24, 2002. In June 2002, these funds were earmarked for long-term investment as designated by RAND's Board of Trustees.

5. LONG-TERM INVESTMENTS:

Cash and cash equivalents include commercial paper, money market funds, and other short-term investments and are carried at cost, which approximates fair value.

Shares of bond funds and investment funds are presented at fair value. Investment funds consist of investments in both domestic and foreign equity securities and bonds. Approximately 8 percent of the long-term assets consist of foreign stocks and bonds.

RAND also has equity interest in alternative investments that invest in securities and other instruments. The alternative investments are carried at RAND's portion of each investment's net book value which approximates fair value.

Cost of securities sold is determined by the specific identification method.

Long-term investments consist of the following (in thousands):

	September 29, 2002	September 30, 2001
Cash and cash equivalents	$ 12,673	$ 26
Shares of bond funds, at fair value (cost, 2002—$74,330, and 2001—$18,899)	79,485	19,450
Shares of equity funds, at fair value (cost, 2002—$29,347, and 2001—$47,477)	24,598	41,793
Alternative investments (cost, 2002—$10,140, and 2001—$10,511)	14,893	14,067
	$ 131,649	$ 75,336

6. BANK LOAN:

RAND has an uncollateralized line of credit with Bank of America in the principal amount of $18,000,000 at September 29, 2002, which expires on May 31, 2003. The line of credit contains covenants that require RAND to maintain a minimum amount of liquid assets and tangible net worth. The outstanding balance at September 29, 2002, and at September 30, 2001, was $1,000,000 and $3,500,000, respectively. Under the terms of the credit agreement, interest is payable monthly at the prime interest rate less 0.75 percent, which was 4.00 percent at September 29, 2002. The largest amounts drawn on the line-of-credit agreement were $15,325,000 and $15,575,000 in 2002 and 2001, respectively. Interest expense was $191,000 and $425,000 for the fiscal years ended September 29, 2002, and September 30, 2001, respectively.

7. Employee Retirement Plans:

RAND has three defined contribution employee plans: a Qualified Retirement Plan ("QRP"), a Supplemental Retirement Annuity Plan ("SRAP"), and a Nonqualified Supplementary Plan ("NSP"). Most full-time, regular employees are eligible to participate in the QRP and SRAP. Certain employees are eligible to participate in the NSP. RAND has reserved the right to terminate the plans at any time, but in such an event, the benefits already purchased by the participant and contributions already made by RAND would not be affected. The QRP and the NSP are entirely RAND financed. RAND's contributions to the Plans for eligible employees range from 5 percent to 14 percent of salaries, depending on the level of wages and age of the participating employee. RAND's contributions to the QRP vest at the earlier of retirement or four years of service. Vesting begins after two years of service and increases weekly to 100 percent at the end of four years of service. The NSP vests under various conditions specified in the plan. All contributions made by RAND are charged to operations. RAND's contributions were $7,630,000 and $7,198,000 for the fiscal years ended September 29, 2002, and September 30, 2001, respectively. The SRAP only requires employee contributions and RAND does not contribute to this plan.

8. Postretirement Benefits Other Than Pensions:

In addition to providing pension benefits, RAND provides health care benefits to certain employees who retire having met the required age and years of service with RAND. This coverage also applies to their dependents. Retirees may elect coverage under the Preferred Provider Organization, various HMOs, or reimbursement of individually purchased Medigap policies. Medicare becomes the primary coverage for retirees when they reach age 65. Retirees and dependents share substantially in the cost of coverage. RAND retains the right, subject to existing agreements, to change or eliminate these benefits.

The following table sets forth the plan's funded status reconciled with the amount shown in the consolidated statements of financial position (in thousands):

	September 29, 2002	September 30, 2001
Change in benefit obligation		
Benefit obligation at beginning of year	$ 11,846	$ 10,802
Service cost	352	316
Increase due to passage of time	843	795
Plan participants' contributions	230	215
Amendments	69	
Actuarial (gain) loss	(186)	261
Benefits paid	(726)	(543)
Benefit obligation at end of year	12,428	11,846
Change in plan assets		
Fair value of plan assets at beginning of year	3,502	4,257
Actual return on plan assets	(326)	(855)
Employer contributions	597	428
Plan participants' contributions	215	206
Benefits paid	(695)	(534)
Fair value of plan assets at end of year	3,293	3,502
Funded status	(9,135)	(8,344)
Unrecognized net actuarial gain	(1,476)	(2,023)
Unrecognized prior service cost	(368)	(539)
	$ (10,979)	$ (10,906)

The health care cost trend rate assumption has a significant effect on the amounts reported. Increasing the assumed health care cost trend rates by one percentage point in each year would increase the service cost and increase due to passage-of-time components of the fiscal year 2002 expense by $207,000 and the accumulated postretirement benefit obligation as of September 29, 2002, by $1,778,000. Decreasing the assumed health care cost trend rates by one percentage point in each year would decrease the service cost and increase due to passage-of-time components of the fiscal year 2002 expense by $168,000 and the accumulated postretirement benefit obligation as of September 29, 2002, by $1,472,000.

The net periodic postretirement benefit cost (credit) for fiscal years ended September 29, 2002, and September 30, 2001, included the following components (in thousands):

	2002	2001
Service cost-benefits attributed to service during the period	$ 352	$ 316
Increase in the accumulated postretirement benefit obligation to recognize the effects of the passage of time	844	795
Return on plan assets	(274)	(320)
Recognition of gain	(150)	(408)
Recognition of prior service cost	(101)	(101)
	$ 671	$ 282

RAND contributes to a Voluntary Employee Benefit Association irrevocable trust that is used to partially fund health care benefits for future retirees. In general, retiree health benefits are paid as covered expenses are incurred.

For measuring the liabilities, the health care cost trend rates were assumed to be 9.0 percent and 10.0 percent for the fiscal year ended September 29, 2002, for pre-65 and post-65 benefits, respectively, gradually declining to 5.0 percent for both after 8 years, and remaining at that level thereafter. The APBO discount rate was 6.75 percent and 7.25 percent at September 29, 2002, and September 30, 2001, respectively.

9. Long-Term Commitments:

Operating lease commitments, net of sublease income of $2,743,000, are as follows (in thousands):

2003	$ 6,746
2004	5,595
2005	4,644
2006	4,101
2007	4,073
Thereafter	34,603
	$ 59,762

Future minimum rentals are primarily composed of several microcomputer, equipment, office, and warehouse space leases. All property leases generally require RAND to pay for utilities, insurance, taxes, and maintenance. RAND's rental expense was $9,063,000 and $8,015,000 for the fiscal years ended September 29, 2002, and September 30, 2001, respectively.

10. Commitments and Contingencies:

Contract costs billed to government clients are subject to audit by the Defense Contract Audit Agency ("DCAA"). Resulting indirect cost adjustments, if any, are prorated to all contracts. Contract costs billed prior to September 30, 2001, have been audited and accepted. To date, there have been no significant cost disallowances. In the opinion of management, contract costs billed subsequent to September 30, 2001, are allowable, and any potential cost disallowance would not materially affect RAND's financial position or results of operations.

RAND has certain contingent liabilities with respect to claims arising from the ordinary course of business. In the opinion of management, such contingent liabilities will not result in any loss that would materially affect RAND's financial position or results of operations.

During development and construction of the new Santa Monica facility, RAND will lease its current building from the City of Santa Monica for a period not to extend beyond October 31, 2005. Under the terms of the lease, RAND will pay all maintenance, and operating costs of the property, in lieu of rent. At the termination of the lease and occupation of the new facility, RAND is responsible for demolition of the existing buildings and environmental remediation with respect to the underlying land. RAND accrued an additional liability of $1,291,000 in fiscal year 2001 presented as "Other item—loss on sale of land" for this purpose. The estimated outstanding liability associated with the demolition and environmental remediation included in liabilities is $4,657,000 and $4,800,000 as of September 29, 2002, and September 30, 2001, respectively. In accordance with the agreement with the City of Santa Monica, an escrow account has been established to ensure performance of these matters.

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11. Board-Designated Net Assets:

Board-designated net assets are available for the following purposes (in thousands):

	September 29, 2002	September 30, 2001
Designated for investment	$ 108,178	$ 105,793
Designated for special use		
Institute for Civil Justice	1,897	1,788
National Security Research and Training	1,093	877
Center for Russia and Eurasia	425	373
President's Fund	316	
RAND Education	176	
Lectureship on Science Policy	59	44
Other	88	28
	4,054	3,110
	$ 112,232	$ 108,903

12. Temporarily Restricted Net Assets:

Temporarily restricted net assets are available for the following purposes (in thousands):

	September 29, 2002	September 30, 2001
Center for Middle East Public Policy	$ 2,944	$ 518
National Security Research and Training	1,546	1,570
RAND Health	1,057	
Center for Domestic and International Health Security	774	
RAND Graduate School	636	385
Drug Policy Research Center—general support	495	962
Center for Asia Pacific Policy	377	234
Center for Russia and Eurasia		
General support	219	218
Business Leaders Forum	922	757
Institute for Civil Justice	185	101
Lectureship on Science Policy	117	118
Labor and Population	115	
RAND Education—general support	108	122
Council for Aid to Education	60	867
Other	60	724
	$ 9,615	$ 6,576

13. Permanently Restricted Net Assets:

Permanently restricted assets are shown below by the purpose designated by the donor. The assets are invested in perpetuity and the income is available to support the restricted activities (in thousands):

	September 29, 2002	September 30, 2001
National Security Research and Training	$ 4,500	$ 4,500
Institute for Civil Justice—general support	4,149	4,149
RAND Frederick S. Pardee Center	3,788	4,192
Professorship in Policy Analysis	2,471	2,467
RAND Graduate School		
General support	1,533	1,510
Awards	970	920
RAND—general support	1,152	1,152
Center for Russia and Eurasia—general support	250	250
Lectureship on Science Policy	246	246
RAND Education	115	
Other	33	28
	$ 19,207	$ 19,414

14. Construction Commitment:

Effective June 12, 2002, RAND is obligated for $72,728,000 under an Initial Guaranteed Maximum Price Contract related to the construction of a new facility in Santa Monica, California. As of September 29, 2002, $2,403,000 had been expended under the contract and recorded as Construction in Progress. Also included in Construction in Progress are $934,000 and $649,000 for capitalized interest as of September 29, 2002, and September 30, 2001, respectively.

15. Long-Term Debt:

RAND issued $130,000,000 of tax-exempt revenue bonds in July 2002, to finance construction of its new Santa Monica facility. Long-term debt as of September 29, 2002, is as follows:

	2002
California Infrastructure and Economic Development Fixed Rate Revenue Bonds, Series 2002A, issued in the original principal amount of $32,500,000, in connection with the construction of a new facility in Santa Monica, California, on July 2002; interest rates ranging from 3.50% to 5.50%; annual principal payments ranging from $345,000 to $1,905,000, beginning April 1, 2006, and ending April 1, 2042, net of unamortized bond premium of 190,247 as of September 29, 2002	$ 32,690,247
California Infrastructure and Economic Development Bank Variable Rate Revenue Bonds, Series 2002B, issued in the original principal amount of $97,500,000, in connection with the construction of a new facility in Santa Monica, California, on July 2002; weighted average interest rate of 1.26% for the year ended September 29, 2002; annual principal payments ranging from $1,430,000 to $4,400,000, beginning April 1, 2006, and ending April 1, 2042	97,500,000
	$ 130,190,247

Annual bond principal payments are required in the following fiscal years:

2003	$ —
2004	—
2005	—
2006	2,415,000
2007	1,785,000
Thereafter	125,800,000
	$ 130,000,000

The payment of the principal and interest on the bonds is insured by a third party.

Restricted cash. Restricted cash is related to bond issue proceeds held in the bond trustee account at year end to be used for payment of interest on October 1, 2002, and remaining costs of bond issuance on December 31, 2002.

Building Project Fund Investments. The net proceeds from the tax-exempt bond issuance have been invested under a collateralized flexible draw investment agreement. The interest rate is based on the Bond Market Association Municipal Swap Index Rate plus sixty-five (65) basis points. The amount of interest earned on the investments in fiscal year 2002 was $506,000. Withdrawals are made to fund the Santa Monica building project.

Bond Issue Costs, Net of Amortization. Bond issue costs represent expenses incurred in connection with issuing the bonds and are being amortized on a straight-line basis over the term of the related bond issue.