

SANDIA NATIONAL LABORATORIES

# Partnerships

ANNUAL REPORT FY2007





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## **Another Bright Idea Invented Here**

### **Contacts**

Sandia works closely with industry, small business, universities, and government agencies to bring new technologies to the marketplace. Sandia has been transferring technology to external partners for more than two decades, especially where such agreements benefit Sandia's primary mission for the Department of Energy.

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## Introduction by David Goldheim

Director of Sandia's Partnership Program (1999-2007)  
and Recipient of the Federal Laboratory Consortium's  
Outstanding Technology Transfer Professional for 2008

The Strategic Relationships Center staff, along with members of all the Strategic Management Units, achieved another year of outstanding performance. This publication highlights a handful of the agreements, licenses, special programs, awards, and metrics.

Notable highlights in FY2007 included:

- Supporting DOE Under Secretary for Science, Dr. Ray Orbach, as his Policy Board for Technology Transfer revitalizes the DOE's Technology Partnerships program.
- Establishing a centralized Grants Administration Office for tracking grant pursuits lab-wide.
- Achieving New Mexico State Legislature approval to increase from \$1.8M/year to \$2.4M/year the credit against Gross Receipts Taxes that enables Sandia to provide technical support to New Mexico small businesses.
- Collaborating with Rockwell Collins to mature and deploy synthetic aperture radar (SAR) technologies.
- Collaborating with Lockheed Martin to develop an inexpensive, easily modifiable, self assembling thin film coating method with optical, electrical and magnetic properties for a variety of defense applications (winner of a R&D 100 award).
- Supporting the National Institute for Nanotechnology Engineering (NINE) with an intellectual property management and royalty distribution strategy to meet industry, university and Sandia objectives.
- Achieving an outstanding rating by NNSA for partnerships activities for the 10th consecutive year.
- Winning 3 national and 2 regional awards from the Federal Laboratory Consortium.

The accomplishments highlighted throughout this report demonstrate Sandia's continuing record of leadership in partnerships – a positive trend that ensures future success.

"The Outstanding Technology Transfer Professional award—one of the FLC's highest honors—recognizes an individual who has demonstrated outstanding achievement in transferring a technology significantly over and above what was called for in the normal course of their work . . . successful in establishing and maintaining relationships that support the partnering processes . . . as well as expanding into new and innovative areas . . . "

— J. Scott Deiter, FLC Chair



Sandia and its partners won five **R&D 100 Awards** in 2007. The awards are given by R&D Magazine to the 100 most significant technical products that became available in that year.

- ArcSafe© with Pulse Arrested Spark Discharge, a patented electrical wiring diagnostic effective in detecting and locating wiring insulation defects in commercial aircraft.
- Mode-Filtered Fiber Amplifier, a breakthrough technology that enables fabrication of practical, high-power, high-beam-quality laser sources that are compact, rugged, and extremely efficient.
- Novint Falcon and Novint/Sandia 3D-Touch Software, the first controller that makes high-fidelity interactive three-dimensional touch possible and practical for consumer computing applications.
- Self-Assembling Process for Fabricating Tailored Thin Films, a simple, economical nanotechnology coating process that enables development of nanoparticle thin films with architectures and properties unattainable by any other processing method.
- ElectroNeedle™ Biomedical Sensor Array, a device that, when pressed against the skin, can make rapid, multiplexed diagnostic measurements in a point-of-care setting.



**The Federal Laboratory Consortium** is the nationwide network of federal laboratories that provides the forum to develop strategies and opportunities for linking laboratory mission technologies and expertise with the marketplace.

Nationally, Sandia received three FY2007 FLC Excellence in Technology Transfer Awards.

- Sandia's technology helped make Advent Solar's breakthrough back-contact photovoltaic (PV) cell design and fabrication

## Winning Technologies

process possible. Advent Solar is making PV less expensive to manufacture.

- Jess®, the Rule Engine for the Java™ Platform, is a tool for building a type of intelligent software called an Expert System. Jess® has also been licensed to hundreds of academic institutions for use in artificial intelligence research laboratories and classrooms.
- Novint's 3D haptic technology software licensed from Sandia won an FLC award in addition to its R&D 100 award.

Sandia and the Federal Aviation Administration received a national Interagency Partnerships Award for the R&D 100 award-winning Pulse Arrested Spark Discharge technology.

In the Mid-Continent region, Sandia received two awards.

- In addition to its R&D 100 Award, ElectroNeedle™ also received an FLC Mid-Continent Regional Excellence in Technology Transfer award.
- Sandia-developed TufFoam™ won an FLC Mid-Continent Regional Notable Technology Development award. TufFoam™ is a major advance in polyurethane foams exhibiting properties superior to commercial products while being significantly safer for manufacturing personnel and free of ozone-depleting chemicals.

**POPULAR SCIENCE** Popular Science Magazine named Nanosolar's non-panel PowerSheet solar cells as an Innovation of the Year and winner of the Green Tech Grand Award. Sandia and Lawrence Berkeley National Labs collaborated with Nanosolar, Inc. on this game-changing technology.



“ Traditionally, we think of national security in the context of overseas engagement or homeland defense. A broader definition also considers potential threats to our nation, including the safety of our food and water supplies. Sandia and our partners are applying advanced technologies to the protection of public health and our society’s well being. ”

**Al Romig**  
Senior Vice President and  
Deputy Laboratories Director  
Sandia National Laboratories

CARVER + Shock can be used throughout the food production and processing industries to assess vulnerability to attack.

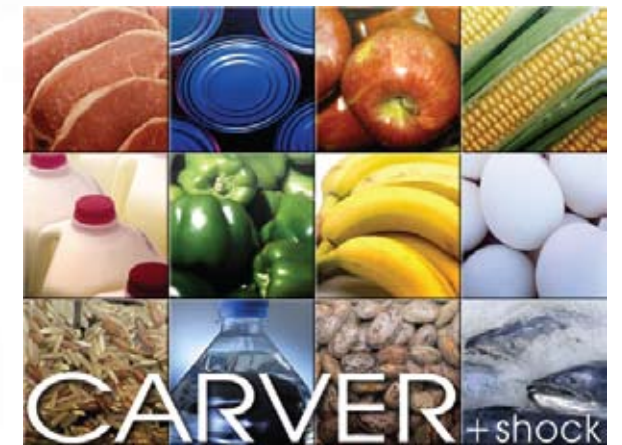
## Closing Off Another Vulnerability

Since September 11, 2001, the world has become a more obviously dangerous place. Americans recognize that certain vulnerabilities don’t stop at our borders. Sandia has supported a number of defensive technologies to protect the nation’s people and infrastructure. A covert attack on our food chain could reach epidemic proportions. A recent innovation is CARVER + Shock, a tool developed to assess the vulnerabilities within a system to an attack, which is being applied now to the food industry.

CARVER is a nationally recognized target analysis and vulnerability assessment methodology used extensively by all military services and the Intelligence Community. Sandia, working with the Institute of Food Technologists, U.S. Food and Drug Administration’s Center for Food Safety and Applied Nutrition, U.S. Department of Agriculture’s Food Safety and Inspection Service, National Center for Food Protection and Defense, state representatives, and private industry representatives, developed the CARVER + Shock software application.

The CARVER + Shock enhancement allows the user to think like an attacker to identify the most attractive targets for an attack. By conducting a CARVER + Shock assessment of a food production facility or process, the user can determine the most vulnerable points in their facility, and focus resources on protecting the most susceptible points in their system.

CARVER + Shock software allows any member of the food processing industry to conduct a vulnerability assessment of their facilities and processes in a confidential manner. The software is used by state and local food security agencies, industrial providers, and other parties interested in food defense.



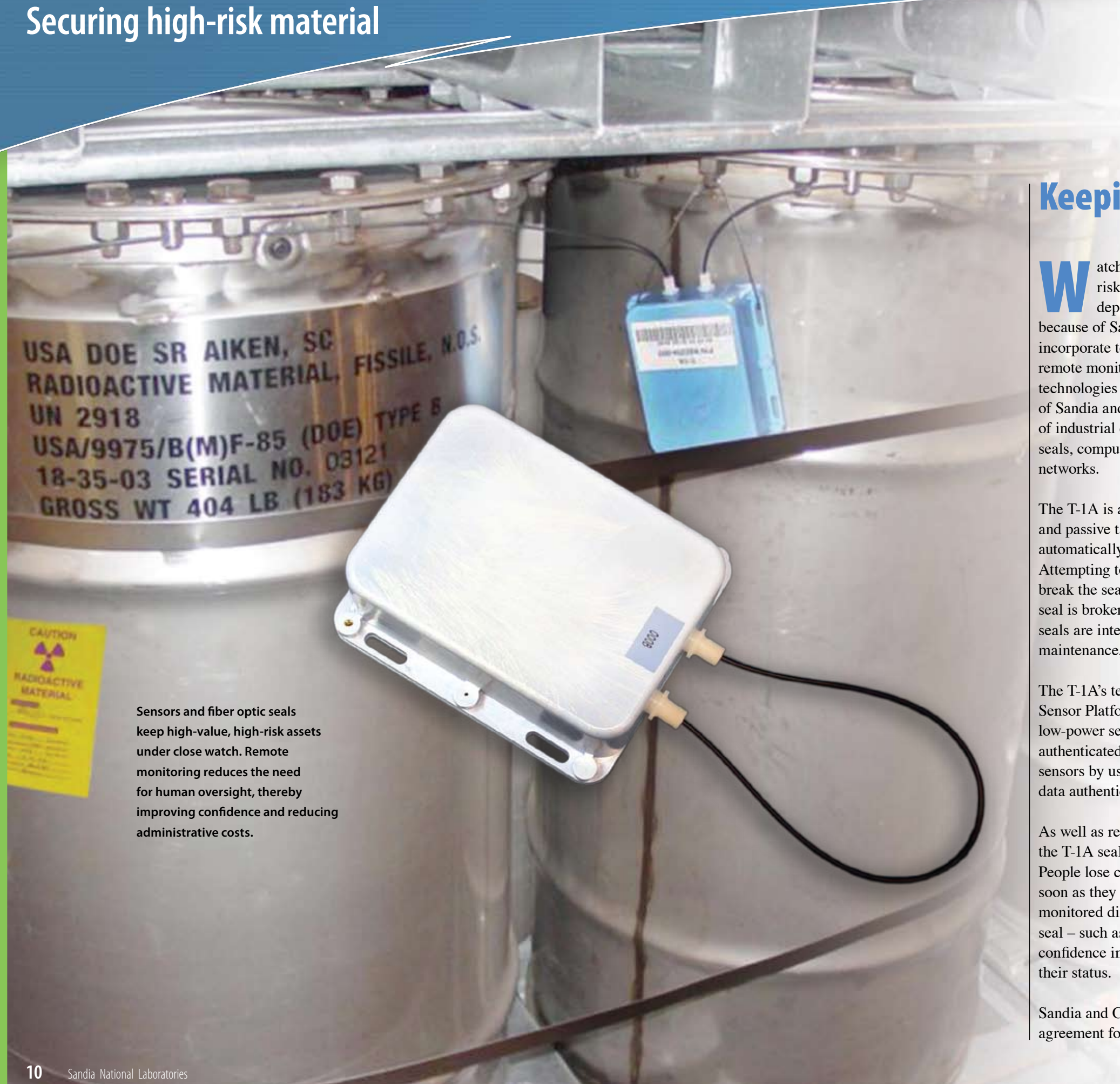
### Seven Attributes of System Vulnerability

CARVER is an acronym for the following six attributes used to evaluate the attractiveness of a target for attack:

- Criticality** - measure of public health and economic impacts of an attack
- Accessibility** - ability to physically access and egress from target
- Recuperability** - ability of system to recover from an attack
- Vulnerability** - ease of accomplishing attack
- Effect** - amount of direct loss from an attack as measured by loss in production
- Recognizability** - ease of identifying target

A seventh attribute, Shock, has been added to the original six to assess the combined health, economic, and psychological impacts of an attack within the food industry.





Sensors and fiber optic seals keep high-value, high-risk assets under close watch. Remote monitoring reduces the need for human oversight, thereby improving confidence and reducing administrative costs.

## Keeping Track of Valuable Assets

Watching over high-value and high-risk assets is more secure and less dependent on human intervention because of Sandia-developed systems that incorporate technologies for seals, sensors, and remote monitoring platforms. Putting these technologies into play is the joint responsibility of Sandia and Canberra Albuquerque, a supplier of industrial controls, safeguards surveillance and seals, computer systems, and secure computer networks.

The T-1A is a fiber optic loop seal with active and passive tamper-indicating features that automatically “report in” several times a day. Attempting to remove material or containers will break the seal on the fiber optic loop, and if the seal is broken, the T-1A sends an alarm. These seals are intended for long-term use without maintenance, up to five years on one battery.

The T-1A’s technological successor, the Secure Sensor Platform (SSP), supports a variety of low-power sensors and provides the secure and authenticated collection of data from those sensors by using NIST-approved cryptology for data authentication and encryption.

As well as reducing administrative overhead, the T-1A seals enhance security and confidence. People lose confidence in mechanical seals as soon as they are applied because they are not monitored directly and continuously. An active seal – such as the T-1A and the SSP – renews confidence in their security each time they report their status.

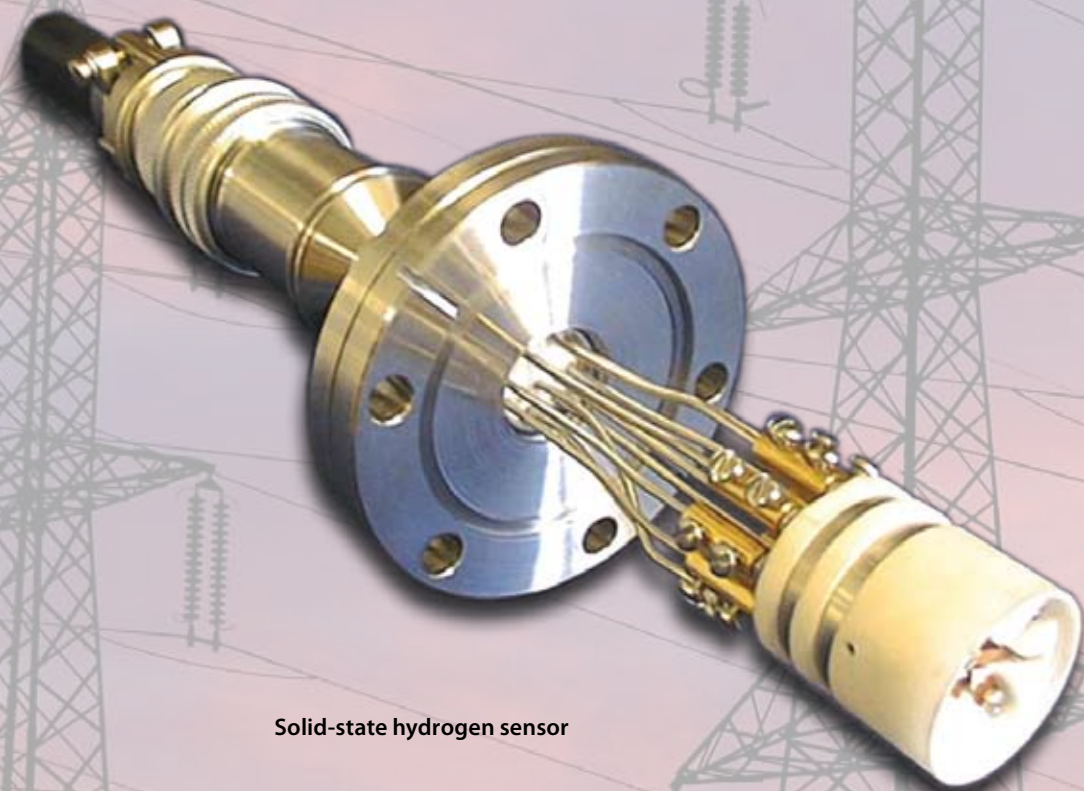
Sandia and Canberra combined a license agreement for the current T-1A sensor with a

CRADA to jointly develop the next generation SSP sensor. The T-1A is in use at DOE’s Savannah River Site for long-term storage, and the SSP has drawn the attention of organizations such as the International Atomic Energy Agency and Euratom.

“Meeting national security needs requires collaboration among the national and other government laboratories, industry, and academia. Today, national security includes defense activities abroad, homeland security, energy security, and economic vitality. Partnerships that encompass the research, development, and application phases accelerate the pace and bring crucial national security technologies to bear on these critical problems.”

**Al Romig**  
Senior Vice President and  
Deputy Laboratories Director  
Sandia National Laboratories





Solid-state hydrogen sensor



## Sensing Risks to the Power Grid

**F**or a decade, Sandia has worked with the Electric Power Research Institute (EPRI), a nonprofit center for public interest energy and environmental research, to help ensure the reliability and safety of the electric power infrastructure.

A current project is developing a simple “health monitor” for power transformers. Power transformers signal the onset of poor health by producing small amounts of so-called fault gases. Two of those gases, hydrogen and acetylene, are especially sensitive indicators of transformer condition. The EPRI/Sandia project is developing solid-state chemical sensors that can be inserted into power transformers to continuously monitor levels of these gases. When thresholds are exceeded, transformers would be inspected, serviced, or, if necessary, taken offline before failure or an unplanned outage occurs.

The ability to address a potentially catastrophic grid failure before it affects other vitally needed services is a crucial aspect of maintaining our security at home.

“ *Our task is to develop partnerships with our customers as well as value propositions for our mission areas that result in customers wanting to work with Sandia to address emerging national security threats.* ”

**Paul Hommert**  
Vice President  
Homeland Security & Defense  
and California Site  
Sandia National Laboratories



Sandia and Lockheed Martin tested an EM-launched missile in a secured site in the New Mexico desert. The missiles will be part of the arms complement on the Navy's all-electric ships.



## Super-low-signature Ship-based Missile Launcher

Standing off hostile territory and launching projectiles is a warfare practice that stretches back thousands of years. Reaching forward just a few years, the U.S. Navy's all-electric warships may provide platforms for a new type of launching mechanism.

All-electric ships are faster, more maneuverable, and more space efficient than their current counterparts in the fleet. Their robust electric power plants also provide additional capabilities, such as electromagnetic (EM) missile launchers and laser weapons systems. Sandia and Lockheed Martin are collaborating on EM launcher technologies.

Ship-based EM missile launchers, or coilguns, will result in less deck heating, help eliminate visual and radar blind spots, and reduce the post-launch infrared signature, all of which are improvements over the chemical-propellant-based launchers now in use.

Coilguns are EM propulsion systems based on pulsed-power technology sequentially energizing a stack of magnetic field coils. To fire a coilgun, a large current is pulsed into a coil, which forms a strong magnetic field and pushes the missile or other projectile through the coil. When the missile nears the end of a coil, its current is switched off and the next coil is switched on, progressively accelerating the missile through the launcher. A coilgun has no moving parts other than the projectile and the only noise produced is that of the moving projectile. Because there is no propellant used in the launch, the visual signature and sound associated with chemical combustion are eliminated, making it especially attractive for a weapon system.

This project, sponsored by the Sandia-Lockheed Martin Shared Vision Program, brings together Sandia expertise with EM launchers and the skills and experience of Lockheed Martin's Maritime Systems and Sensors in systems designs and engineering for naval launcher platforms.

*"I firmly believe that the value of strategic alliances at Sandia will continue to grow as we employ them to increase speed and agility in transitioning technology pathfinders to the warfighter, as aligned with our mission for the DoD. We gratefully salute our many partners' technical and business contributions to Sandia's mission success!"*

**Jerry McDowell**  
Vice President  
Defense Systems & Assessments  
Sandia National Laboratories





## Water, Water Everywhere ... But Who Gets to Drink?

**W**ater is a fundamental part of all social, economic, and ecological systems. Conflicts over water can be destabilizing all over the world. Sandia and its collaborators use a variety of partnering mechanisms to build bridges over troubled waters.

In the western United States, surface water and groundwater rights are being contested, suits are being filed to protect aquatic and riparian habitats, and communities and companies are scrambling to assign limited water rights to future demands. Through its University Research, Laboratory Directed Research and Development, Other Federal Agency, and small business programs, Sandia is applying its expertise to develop computer models for water availability, access, and use to relieve tensions before they reach the boiling point and to predict outcomes in time to design corrective solutions.

Sandia researchers worked with groups representing governmental, agricultural, urban, and environmental interests in New Mexico, Arizona, and Texas to develop surface water and groundwater models for use in regional

water planning. The models are available to city, county, and state water managers as rapid analysis tools to help them develop regional water solutions.

Partners in a host of other water projects include the U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, U.S. Geological Survey, U.S. Fish and Wildlife Service, New Mexico Office of the State Engineer, New Mexico Interstate Stream Commission, Southwestern New Mexico Water Planning Group, Mimbres Water Users Group, University of New Mexico, New Mexico State University, New Mexico Tech, University of Arizona, University of Texas, and environmental organizations.

The work has an international component as well. A team of Sandia researchers, in collaboration with the U.S. Departments of Energy and State, are helping scientists and engineers in Jordan, Iraq, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan build computer models to help analyze their water concerns.

“One of our goals is to assure the safety, security, and sustainability of water supplies and interdependent energy infrastructures. Working with Sandia’s partners helps us achieve that goal.”

*Les Shephard  
Vice President  
Energy, Resources, & Nonproliferation  
Sandia National Laboratories*

### Bundled Intellectual Property for Water Treatment

Sandia’s Licensing organization has joined with their colleagues at Lawrence Livermore and Los Alamos National Laboratories to develop a five-patent bundle for produced water clean-up. Produced water is that which is trapped in rocks within oil and gas wellbores. Disposal of produced water is an environmental problem due to its high salt content. Each of the patents addresses a particular water treatment problem and can be licensed together as a package to create an innovative “treatment train.” Cleaning up and reusing the estimated

22 billion barrels of water each year from the oil and gas industries would go a long way toward solving future clean-water requirements.

One proposed use of cleaned and desalinated produced water is for rangeland improvement. Partners in this activity include U.S. Department of Interior/Bureau of Land Management, U.S. Department of Agriculture, New Mexico State University, and the New Mexico Oil Conservation Division.

### NMSBA Support for Creating Cleaner Water

A New Mexico Small Business Assistance (NMSBA) partner, Altela, Inc., received technical assistance from Sandia’s Microscale Science and Technology department that helped optimize the patented AltelaRain™ technology. According to Albuquerque Journal business writer Andrew Webb, the company was founded to solve a problem for oil and gas producers — what to do with thousands of gallons of “produced water” brought to the surface daily.

In most cases, that waste is trucked, at high cost, to disposal sites where the water is injected back into the ground. AltelaRain™ desalinates and decontaminates produced water without the

energy-intensive equipment, high temperatures, or high pressures of other water desalination technologies, such as reverse osmosis. AltelaRain™, based on technology developed at Arizona State University, can desalinate and purify the water at very low cost, often using waste energy produced right at the wellhead. One self-contained system, which fits into a customized truck shipping container, can produce about 4,000 gallons per day and leaves about 90 percent of the water clean and drinkable. The remaining superconcentrated 10 percent is disposed of by conventional means.

### Support for Grants

Sandia’s Grant Administration Office coordinates externally funded grant awards and facilitates processes that assist Sandia Principal Investigators in obtaining funding to further Sandia’s missions, such as the water-related research. Grants

can come from diverse sources, including federal, state, and local government agencies, private foundations, not-for-profit organizations, corporations, and community-based organizations.

## Modeling Human Behavior

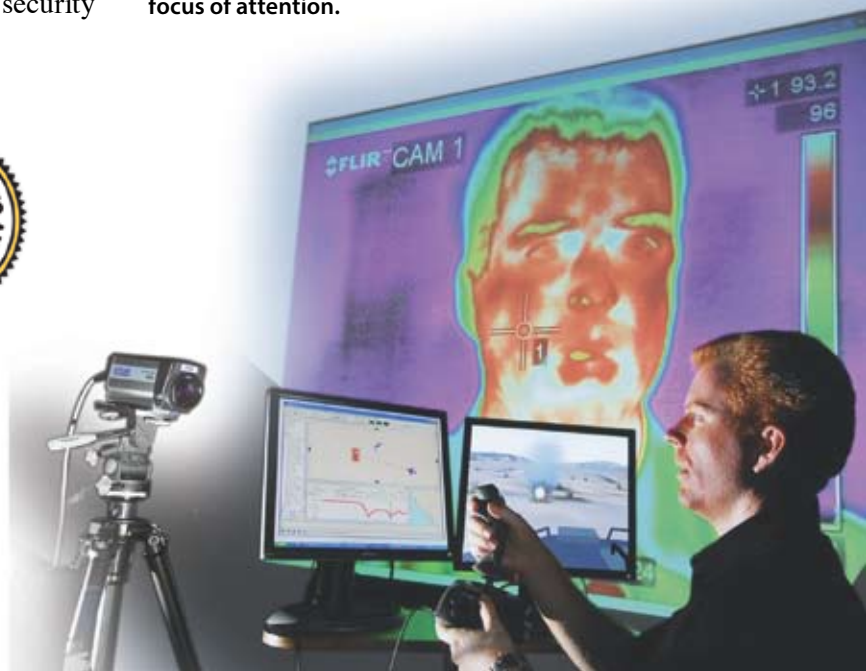
**S**andia has a long history of providing traditional engineering solutions to national security problems; however, these approaches alone are not sufficient to address many of the most significant problems our nation faces today. Sandia's Cognitive Science and Technology (CS&T) program may be as vital to our national defense as traditional military technology as our nation adapts to an increasingly complex world in which conflicts are less likely to be resolved on the battlefield.

Technologies augmenting human decision making, and specifically, enhanced context recognition, offer a critical capability to enable the nation to better address a wide range of national security situations. Sandia's work combines an established cognition program recognized for its innovative technologies, its ability to apply world-class engineering science capabilities to problems within cognitive science, and its emphasis upon national security applications.

In CS&T, Sandia applies its capabilities in cognitive neuroscience, modeling and simulation, and sensor technologies to real-world problems for the Department of Defense, the intelligence community, and industry.

Current CS&T projects include first responder and military training, detecting foreign and insider threats, driver and pilot augmentation, adaptive thinking and leadership development, and the augmented analysis of written and oral communication.

**Sandia researcher Rob Abbott uses a joystick and plays the role of a student in a training exercise driving an amphibious assault vehicle simulator used by the Navy and Marines. The second monitor is an instructor/operator application called CDMTS. In the background is a thermal image of a student's face used for investigating biometrics to monitor the student in various ways including the level of engagement and focus of attention.**



A user tests the new interpersonal skill building and cross-cultural awareness videogame technology Sandia recently turned over to DARPA.

## Reading the culture

*Here is a simulation used to train personnel to interact with an indigenous population. The trainee controls the behavior of the soldiers via voice or joystick, while the people they encounter are controlled by a cognitive model that responds to the behaviors of the soldiers.*

In a busy marketplace in an Iraqi town filled with shoppers and cars, a small team of U.S. soldiers is patrolling on foot. The soldiers are searching for a suspected weapons cache. Near one of the market stands is a 58-year-old vendor and his 28-year-old nephew. The vendor is a cognitive character and will respond dynamically to the behavior of the soldiers; he may feel threatened and become aggressive or flee, or he could become angry and escalate a confrontation. The vendor is hiding a weapons cache and if the soldiers approach, he may order his nephew to fire on the soldiers. The soldiers' behavior and conditions in the marketplace will affect his behavior.

Nearby, two other cognitive characters, a husband and wife, are also trying to sell their merchandise. These characters are generally hospitable. The male is intent on selling his merchandise by vigorously calling people to come see his wares. The wife is more interested in talking with her female friend. When the two vendors see the U.S. soldiers, they become distressed. This may be exhibited by the female vendor ending



Characters in a training simulation for interactions with indigenous populations.

the conversation with her friend and the male vendor becoming more formal. How the soldiers interact with the vendors will determine how successful they are determining if the vendors are hiding weapons. That is, like actual humans, the cognitive characters respond very well to culturally appropriate gestures and greetings. If the soldiers give the proper greeting, exchange pleasantries, and follow social norms when speaking to the male and female pair, the vendors will become more relaxed and demonstrate a lower level of anger or fear. If cultural norms are followed, the soldiers will receive all the information they need.



Researchers at UTMB prepare a biohazard suit for work in the Biosafety Level 4 lab.

## From Bench to Bedside: Biomedical Research in Diagnostics and Countermeasures

As part of the Sandia/University of Texas strategic relationship, a collaboration of computational biologists, microsystems engineers, spectro-microscopists, molecular biologists, immunologists, virologists, clinicians, biochemists, technical staff, managers and faculty, and others have joined together to pursue NIH grants, fund post-docs, and propose a joint institute for biodefense.

This partnership, between staff at Sandia/California and Sandia/New Mexico and personnel at the University of Texas Medical Branch (UTMB) in Galveston, will focus on disease diagnostics and medical countermeasures.

As a national security lab, Sandia has responsibilities to protect deployed military forces and our civilian population from bioattacks. The Labs also has a mission to prepare to mitigate a pandemic, a widespread emerging disease against which we have no natural immunity.

UTMB is home to the Galveston National Laboratory, which houses a Biosafety Level 4 lab, the highest level of biocontainment precautions for biological agents. The National Institute of Allergy and Infectious Diseases has named UTMB as one of ten Regional Centers of Excellence for Biodefense and Emerging Infectious Diseases.

The complementary capabilities of Sandia and UTMB make both organizations stronger,

particularly in the area of biodefense. Together, the partners will work the spectrum from basic research to the commercialization of technologies to detect adversarial or naturally occurring bioattacks and to protect the affected populations.

*“We’re driving a new era of labs-universities-industry partnerships to revitalize the nation’s engineering education and keep fresh the cycle of innovation: the inquisitive minds of academia, the technology breakthroughs of the national labs, and the fast-paced, market-driven demands of industry.”*

**Rick Stulen**  
Vice President and  
Chief Technology Officer  
Sandia National Laboratories





Now on the shelves of retailers, Mold Control 500 kills mold the way Sandia's original decontamination formulation kills anthrax.

## Products in Service to America

**M**old Control 500, distributed by Scott's Liquid Gold, is now available in Home Depot, Wal-Mart, True Value, Ace Hardware, and other home improvement stores across the country.

The product is based on Sandia's decontamination formulation, which is a first-responder tool for cleanup of chemical or biological warfare agents. It is best known for helping remediate anthrax-contaminated buildings. The product kills molds in much the same way as the original decontamination formulation kills anthrax.

Two companies hold Sandia licenses to market products based on the formulation: Modex, Inc. and Intelagard, Inc. Scott's Liquid Gold has an arrangement with Modex to sell Mold Control 500 in retail markets.

In the Summer of 2007, the **Novint Falcon**, named for one of nature's most powerful birds of prey, was launched on an unsuspecting group of video game players, leaving many in a state of shock and awe.

Moving gracefully through the air in three dimensions, the Novint Falcon outperforms existing force-feedback joysticks and traditional mice, delivering high-fidelity 3D touch and a realistic and immersive experience that surpasses existing point and click technology. With its effortless glide and touch interface design, and sophisticated engineering, the Novint Falcon, like its namesake, is a natural predator of the mouse, and is destined to change computing forever.

Novint's software is largely based on technology originally developed at Sandia National Laboratories, which was exclusively licensed by Novint for commercialization. Novint is one of Sandia's first start-up licensee companies to go public and is one in which Sandia holds an equity position.

The Novint Falcon is for sale in a number of specialty computer, gaming, and electronics stores. It can also be ordered from SkyMall, either online from their Website or from their catalogues found in airplane seat pockets.

While best known as a game controller, Novint's Falcon can also be used in medical training, architecture, and undersea exploration.



## Taking Matters into Their Own Hands ... With a Little Help from Their Friends

**T**wo programs available to Sandia employees that may be parlayed into life-changing opportunities are Entrepreneurial Separation to Transfer Technology (ESTT) and Technology Ventures Corporation (TVC), a Lockheed Martin entity.

### More Here Than Meets the Eye

In just about 12 years, a Sandia optics researcher and his partner, an aerospace marketing executive, parlayed their talents, energy, and some help from TVC into a multimillion dollar company.

In 1995, Dan Neal and Tim Turner went to TVC with plans to establish a business around a line of high-resolution light measurement devices. Dan had developed the necessary technologies at Sandia to measure and characterize the output of lasers and other optical devices. Armed with three licenses from Sandia and an Entrepreneurial Separation to Transfer Technology agreement for Dan, he and Tim formed WaveFront Sciences, Inc.

From a company that focused on delivering innovative solutions to optics researchers and laser manufacturers, WaveFront expanded into the technologies needed by ophthalmic surgeons for LASIK procedures and other eye surgeries. The company became the world's leading manufacturer of Shack-Hartmann-based optical metrology with products for customized LASIK surgery, intraocular and contact lenses, as well as conventional optical metrology.

In 2007, WaveFront was acquired for \$20 million by Advanced Medical Optics, Inc., (NYSE:AMO) a global leader in ophthalmic surgical and eye-care products.

Since its founding in 1993, TVC has helped dozens of laboratory scientists start technology-based businesses by providing entrepreneurial training, intellectual property assessment, business plan development, and funding proposal preparation. TVC also works extensively with private equity investors to help them find and evaluate quality investment opportunities.

### Entrepreneurial Leave was Music to His Ears

Dustin Carr left Sandia in January 2006 through the ESTT program and in 2007 landed \$2.71 million in institutional and individual venture capital funding for his young company, Symphony Acoustics.

For its first products, Symphony is concentrating on improving hearing aid microphones and establishing new standards for performance, size, and cost in other consumer products, such as cell phones. Patented and patent-pending technologies will produce smaller microphones that deliver better sound quality, are insensitive to electromagnetic interference, and are simpler and less expensive to manufacture.

Sandia established the ESTT program in 1994 for employees with an urge to try their hands at starting or expanding a technology-based business, based on Sandia technologies licensed or learned during their employment at Sandia. Over 130 Sandia scientists and engineers have taken advantage of the opportunity.



Greg Bogart (left) and Dustin Carr at the Symphony Acoustics manufacturing facility.

### TVC Helps Build Businesses, Create Jobs

When Lockheed Martin Corporation founded Technology Ventures Corporation in 1993 as part of its successful proposal to manage Sandia, TVC's charter was to facilitate the commercialization of technologies developed in national laboratories and research universities. Since 1993, TVC has helped with 94 new company formations, \$802 million in investments, and the creation of 9,661 new jobs.



### ESTT Helps Transfer Technology

The Entrepreneurial Separation to Transfer Technology program is one of Sandia's mechanisms to transfer technology to the commercial sector. Under this program, employees terminate their employment at Sandia for the purpose of starting up or expanding small technology-based businesses. Since its inception in 1994, 134 Sandians have left the Labs to start up or expand more than 90 businesses.

## Easing access to Sandia services



The Innovation Parkway Office Center houses a number of Sandia services, as well as the headquarters of the Sandia Science & Technology Park.

## Sandia Services Move Outside the Fence, Into the Park

The newest addition to the Sandia Science & Technology Park (SS&TP) is the Innovation Parkway Office Center (IPOC), a 150,000 square foot, three-story facility built by DePonte Investments, Inc. and leased to Sandia. The building, completed in September 2007, has one- and two-person offices, state-of-the-art conference rooms, and high-quality support space.

Sandia's Badge Office moved to the new building so that visitors and new employees can obtain badges without having to enter Kirtland Air Force Base first. Several organizations within Sandia's Integrated Enabling Services strategic management unit, including Facilities and Procurement, are also located in IPOC, as is the SS&TP Program Office. When totally occupied, over 600 Sandians will call IPOC home.

### IPOC in the SS&TP

- The addition of IPOC in the SS&TP brings the number of organizations and private companies in the Park to 25.
- The number of employees in the Park is over 2,100.
- There are 18 buildings in the Park with a total of 885,000 sq. ft. of occupied space.
- Investment in the Park now exceeds \$291.5 million.

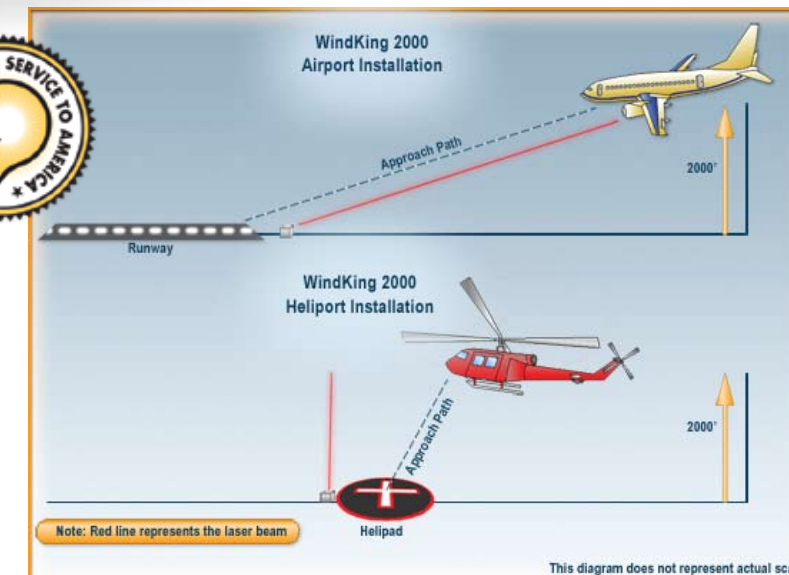
## Detecting turbulent air

### Safer Take-Offs and Landings

The New Mexico Small Business Assistance (NMSBA) program helps New Mexico small businesses resolve specific technical and business issues. Sandia offers its assistance through technical consultation, training, testing, and access to specialized equipment and facilities. The NMSBA initiative, which was passed by the New Mexico Legislature in 2000, allows Sandia to utilize a portion of its gross receipts taxes to provide technical assistance to New Mexico small businesses.

Through this program, a small New Mexico government-services company called Entereza developed a laser wind velocimeter that can look at and define clear-air turbulence. This technology can measure microbursts, wake vortexes, and wind shear at airports and heliports. Entereza investigated other potential applications for the technology, such as chem-bio detection, forest fire safety, and dust storms on highways, and decided to spin-off LaLuz Technologies, Inc., with the intention of producing and marketing this laser-based technology.

The company turned to Sandia for technical assistance through the NMSBA program. Working with Sandia's Special Radars and Communication Systems group, they evaluated and optimized the system, now called WindKing 2000. With this technical assistance, LaLuz participated in a joint funding opportunity through Sandia and Technology Ventures Corporation (TVC) for further technology support. TVC showcased them in the TVC-sponsored New Mexico Equity Capital Symposium.



WindKing 2000 detects microbursts, wake vortexes, and wind shear at airports and heliports.

### New Mexico Small Business Assistance Program

#### Calendar Year 2006 NMSBA program

- 2006 tax credit taken: \$1,799,916.59
- Total number of companies assisted in 2006: 293
- 110 urban companies were assisted with the average project cost being \$3,318.74. 183 rural companies were assisted with the average project cost being \$7,840.74.

#### Economic Impact Results through Calendar Year 2006 (reporting on six years)

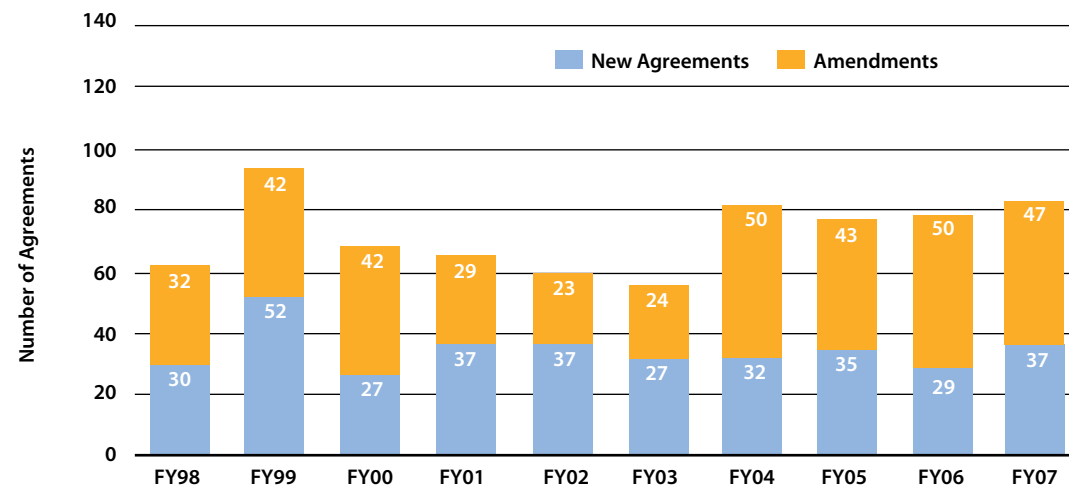
- Over the six year period, 495 jobs have been created and retained.
- The mean salary for these jobs is \$36,636.
- Participating small businesses reported a total of \$11.9 million of increased revenue and a \$6.9 million decrease in operating costs.
- Participating small businesses invested \$5.5 million on goods and services.
- For 2007, the funds available to Sandia for the NMSBA program increased from \$1.8 million/year to \$2.4 million/year.

These scorecards show how Sandia uses partnerships with industry to support our national security and DOE/NNSA missions, transfer technologies to the commercial sector to improve the competitiveness of U.S. industry, and enhance job creation and small business development.

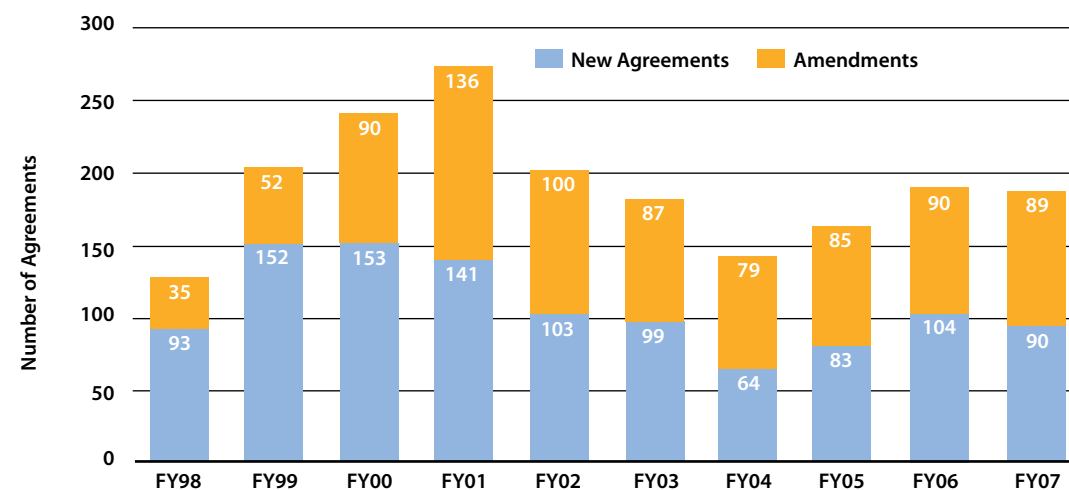
## CRADAs and WFO-Industrial

The number of new CRADAs increased by 22 percent from FY2006.

### Sandia CRADA Program Activity



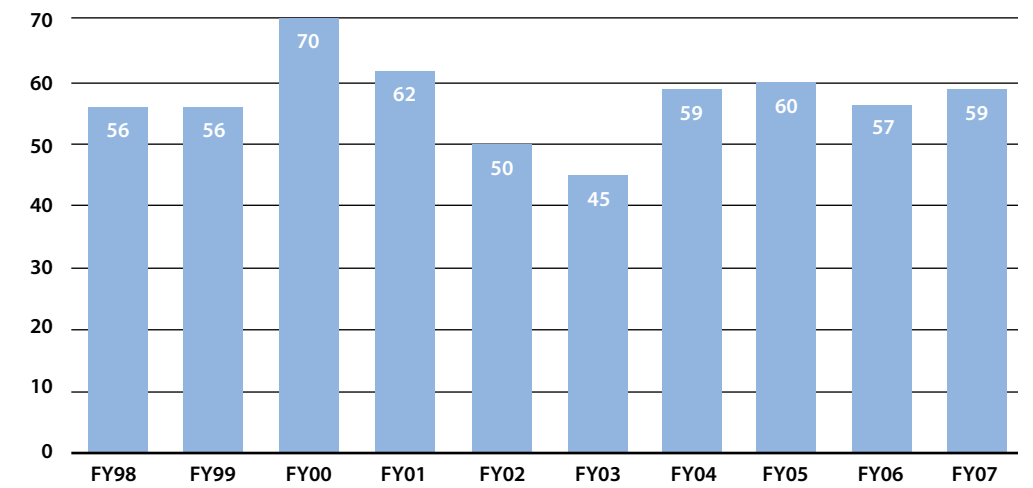
### Sandia WFO-Industrial Partners Activity



## Industry Funds-in

Industry contributions were up by \$2 million in FY2007.

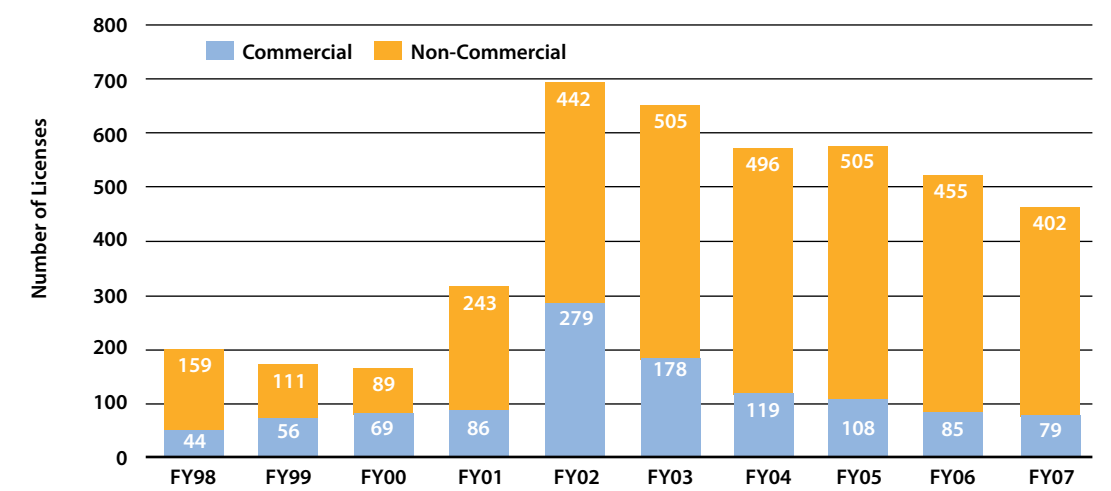
### Industry Funds-in to Sandia (\$M)



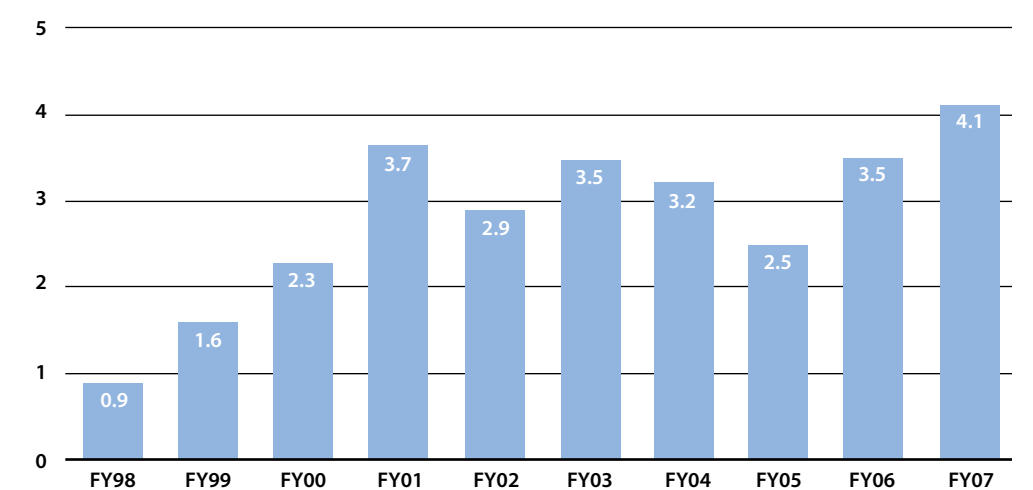
## Licenses

In spite of this decrease in the number of licenses, revenue was up by over \$500,000.

### Licenses



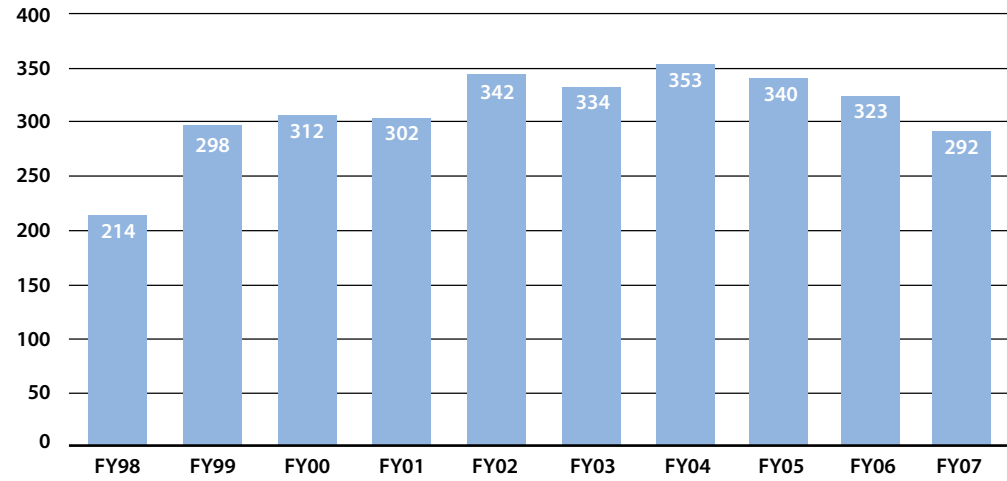
### Licensing Income (\$M)



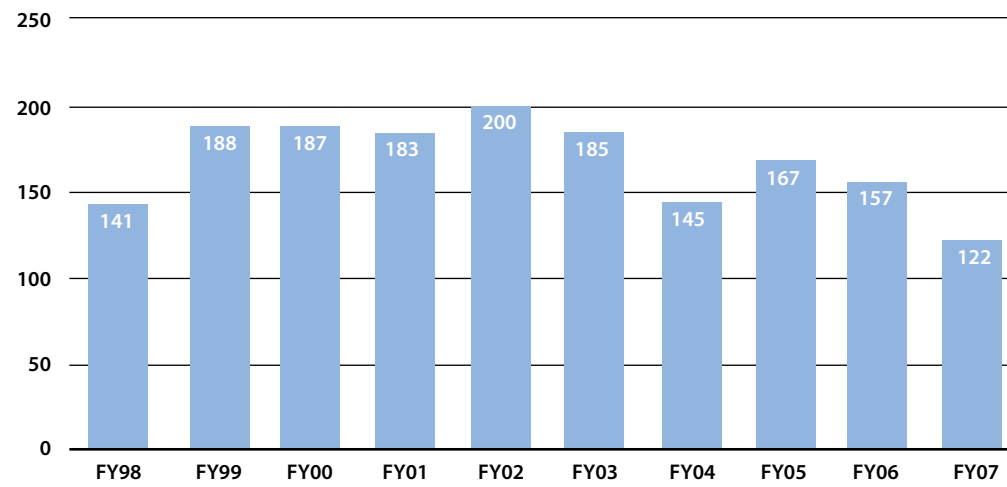
## Inventions and Patents

Over one-half of our patents have been associated with an agreement and/or license.

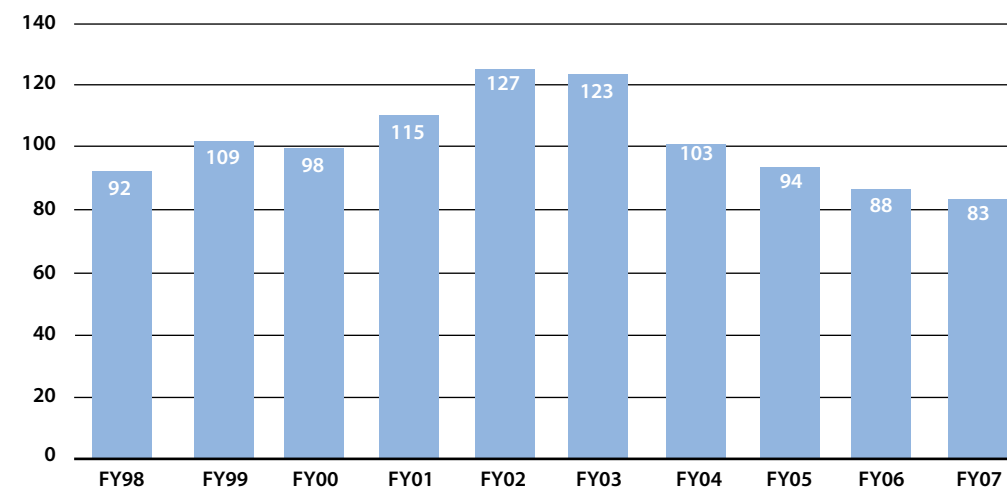
### Invention Disclosures



### Patent Applications



### Patents Issued



Partnerships Annual Report Staff

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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

SAND number: 2008-2297P



*Another Bright Idea  
Invented Here*