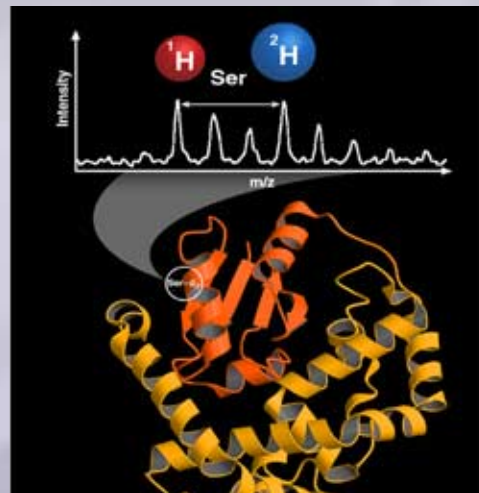
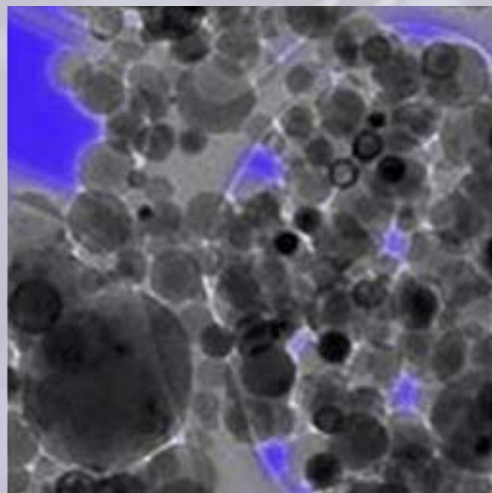


Industrial Business Development Program Office

2000–2001 Progress Report



technology



transfer

Los Alamos National Laboratory

Los Alamos National Laboratory—A National Resource



Los Alamos National Laboratory, a Department of Energy (DOE) National Nuclear Security Administration (NNSA) laboratory, managed by the University of California, is one of the largest multidisciplinary research institutions in the world and is the largest institution and the largest employer in northern New Mexico, with approximately 7,400 University of California employees plus 2,800 contractor personnel. The Laboratory's annual budget is \$1.7 billion.

About one-third of the Laboratory's technical staff members are physicists, one-fourth are engineers, one-sixth are chemists and materials scientists, and the remainder work in mathematics and computational science, biological science, geoscience, and other disciplines. Professional scientists and students come to Los Alamos from all over the world as visitors to participate in scientific projects. Laboratory staff collaborate with universities and industry in both basic and applied research to develop resources for the future and to achieve the Laboratory's mission of applying the best science and technology to make the world a better and safer place. The Laboratory is well known as a major national resource for the development and integration of leading-edge science and technology to solve problems of national and global security.



A Message from the IBD Director



A New Organization

Any new organization has its share of opportunities and challenges—and the new Industrial Business Development (IBD) Program Office at Los Alamos National Laboratory is no exception. Fiscal year (FY) 2000—the first for IBD—offered opportunities for redirecting the work of the former organization and offered challenges in rethinking ways of doing business.

An offshoot of the former Civilian and Industrial Technology Program Office, IBD has been tasked with the transfer and commercialization of technology for the benefit of the nation. We recognize that protecting and managing the Laboratory's intellectual property through patents and copyrights is the first step in technology transfer and the springboard for commercialization. This first step permits us to negotiate licenses and other agreements for the transfer of technologies to the private sector and to positively impact both regional and national economies. FY 2000 realized a revenue increase of over 45 percent from licensing of Laboratory technologies with an additional 24 percent increase in FY 2001. We also recognize that the licenses and agreements we negotiate generate revenues that can fund additional research and development at the Laboratory.

Focus

We directed our efforts during the past two years toward three key areas of technology transfer and commercialization:

- Managing the Laboratory's intellectual property through patents and copyrights and executing licenses and partnership agreements;
- Building strategic partnerships with private industries, universities, government agencies, and other national laboratories; and
- Nurturing new high-tech businesses and attracting entrepreneurs and capital to northern New Mexico.

Copyrights, Patents, and Licenses

IBD worked with inventors/authors and the Laboratory Counsel's Business and Patent Law Office to identify, protect, and manage the Laboratory's intellectual property. We partnered with key technical divisions to educate the technical staff on the importance and benefits of disclosing intellectual property—inventions, discoveries, software, drawings, and technical know-how. We sponsored and organized a patent and licensing award ceremony—an event designed to encourage increased participation in patent, copyrighting, and licensing activities. These activities will aid in the recruitment and retention of scientists at the Laboratory.

From FY 2000 through FY 2001, IBD received 268 invention disclosures and 317 copyright disclosures; 215 patent applications were filed, 98 patents were issued, and 50

new commercial licenses were negotiated. IBD continues to generate significant increases in licensing income each year as Laboratory staff continue to supply a larger number of quality and commercially valuable disclosures annually.

Partnerships

We have successfully nurtured strategic partnerships with Motorola and Proctor & Gamble. Through cooperative research agreements, Los Alamos is partnering with these companies to develop such technologies as fuel cells and the modeling of complex manufacturing systems. Our goal is to grow these partnerships into multi-disciplinary, multi-divisional efforts.

From FY 2000 through FY 2001, we amended 33 existing cooperative research and development agreements (CRADAs) and negotiated 20 new CRADAs and 79 new, nonfederal, Work for Others agreements.

Regional Development

IBD has been actively involved, with the Los Alamos Commerce and Development Corporation, in the development of the Los Alamos Research Park adjacent to the Laboratory's Technical Area 3. We have been successful in attracting tenants for the first building, dedicated on March 24, 2001. The Research Park will house many of our technology partners, including Motorola, and many of the start-up businesses that have licensed Laboratory technologies.

Our regional business development initiatives during the past two years included several very successful entrepreneurial workshops that attracted more than 1000 participants overall. We offered a broad range of services to help regional businesses and entrepreneurs, including business counseling, networking, and funding opportunities. Our efforts in this area earned an "outstanding" rating from the Department of Energy.

Summary

In summary, we in IBD have made notable progress in technology transfer and commercialization on behalf of the Laboratory. Our role will be to continue to protect and manage the Laboratory's intellectual property, to establish channels for collaborations in the external sector, to foster commercialization and business development in the region, and to generate revenues for the Laboratory's research initiatives.



Richard Mah
Program Director
August 1999 to September 2001

Overview of the Industrial Business Development Program Office

Collaborations with other institutions are key to solving problems that impact global security. The Laboratory's Industrial Business Development (IBD) Program Office serves as the link for technology transfer and Laboratory collaborations with private industry, universities, government agencies, and other national laboratories. IBD matches Laboratory scientific and technical talent, expertise, and facilities with research and development endeavors in external sectors for the advancement of national security, technological innovation, and economic competitiveness. IBD is a vital part of the Laboratory. The partnerships we develop and foster through our activities serve to enhance the scientific research and technology developed at the Laboratory.

In addition to developing and managing partnerships, IBD works closely with the Laboratory Counsel's Business and Patent Law (BPL) Office to manage the Laboratory's intellectual property. By protecting this intellectual property, we enhance the development of science and technology at the Laboratory, enable the transfer of new and emerging technologies to private industry, and stimulate regional business development by encouraging the commercialization of Laboratory technologies through spin-off, high-tech, startup businesses.

IBD Accessibility

In order to enhance customer access to information about technology licensing, mechanisms for partnering with the



We welcome visitors through our open Web site.

Laboratory, and technology commercialization opportunities, IBD launched its redesigned, updated, Web site—<http://www.lanl.gov/partnerships>—in FY 2000. In addition to this multi-purpose, open-access Web site, an internal-access-only partition was launched for Laboratory users in FY 2001. IBD's Intellectual Property Management Web pages reflect the contents of the organization's new handbook, "Intellectual Property Management at Los Alamos National Laboratory." This handbook and IBD's Web pages describe the policies and procedures that Laboratory personnel must follow in order to patent and copyright Laboratory technologies. IBD's intent is to provide clear, concise instruction to Laboratory innovators and authors to facilitate the protection of the Laboratory's intellectual property so that it can be effectively and efficiently transferred to the private sector.

Industrial Partnerships

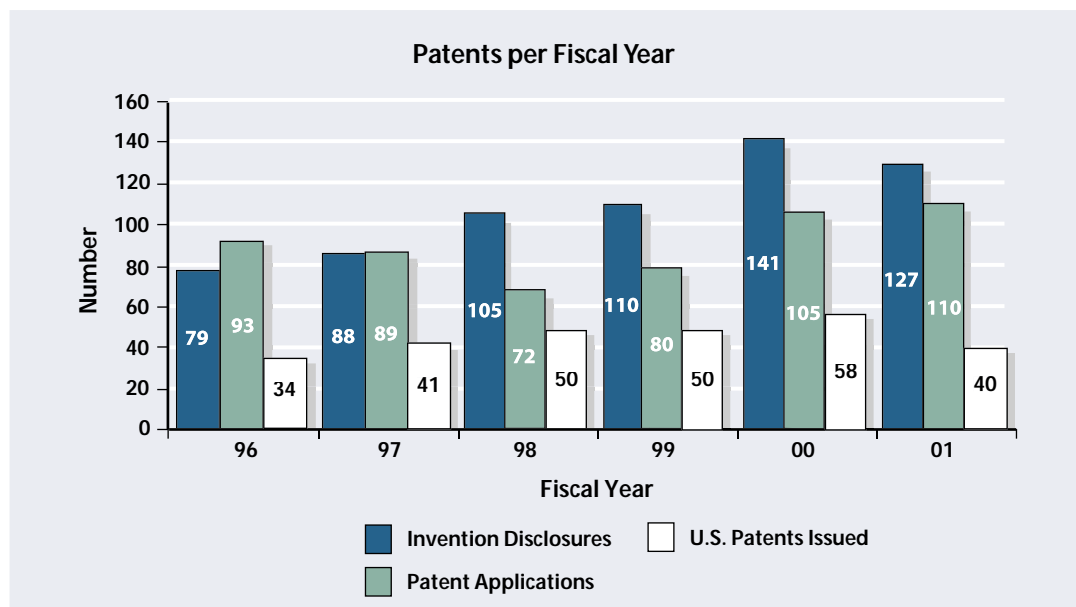
IBD’s Industrial Partnerships Office (IBD-IP) manages the Laboratory’s intellectual property, executes licenses, develops and negotiates research agreements with industry, and develops tactical industrial partnerships for Los Alamos programs, technical divisions, and groups.

Intellectual Property Management

The Laboratory’s ability to use the results of its own scientific research and to effectively meet its technology transfer mission depends on the protection of its intellectual property. Intellectual property includes the inventions, discoveries, software, drawings, and technical know-how of the Laboratory’s staff. IBD-IP works with inventors/authors and the BPL Office to identify, legally protect, and manage the Laboratory’s intellectual property through patents and copyrights so that technologies can be commercialized and partnerships

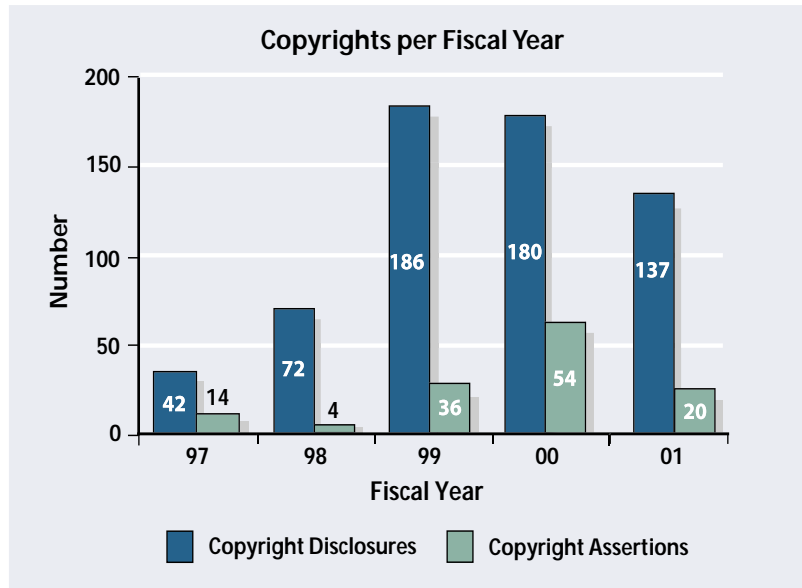
developed with industry. These partnerships have a positive impact on both the regional and the national economies while simultaneously expanding the Laboratory’s intellectual property portfolio and generating resources for Laboratory programs.

Training—During FY 2001, in collaboration with the BPL Office, IBD-IP developed a training handbook, “Intellectual Property Management at Los Alamos National Laboratory.” This handbook thoroughly explains the procedures that principal investigators and authors must follow to protect their inventions and copyrights for the Laboratory and the University. The handbook will be distributed as part of the Lab-wide IP training program that will be implemented during the coming fiscal year. IBD’s recently launched Patents and Copyrights Web pages, available to internal users only, reinforce the handbook.



Patent and Copyright Disclosures—

The number of invention disclosures reported for FY 2000 was 141—a 33 percent increase over the previous year. In FY 2001 IBD received 127 invention disclosures. These numbers represent a significant boost in effort by both Laboratory innovators and IBD. Out of this number of disclosures, the Laboratory filed a total of 105 patent applications in FY 2000 and 110 in FY 2001. Fifty-eight patents issued in FY 2000 and 40 issued in FY 2001. IBD receive 317 copyright disclosures and 74 copyright assertions during this same time period.



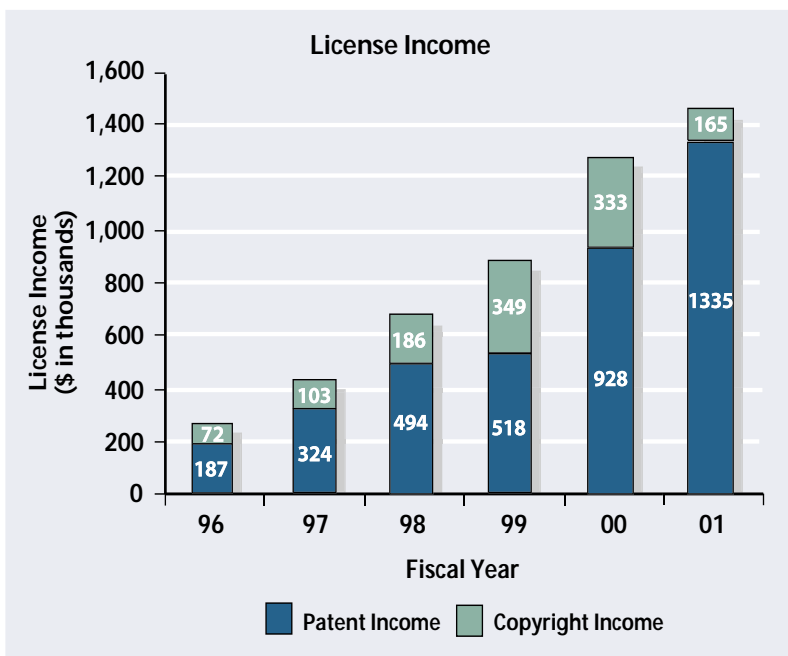
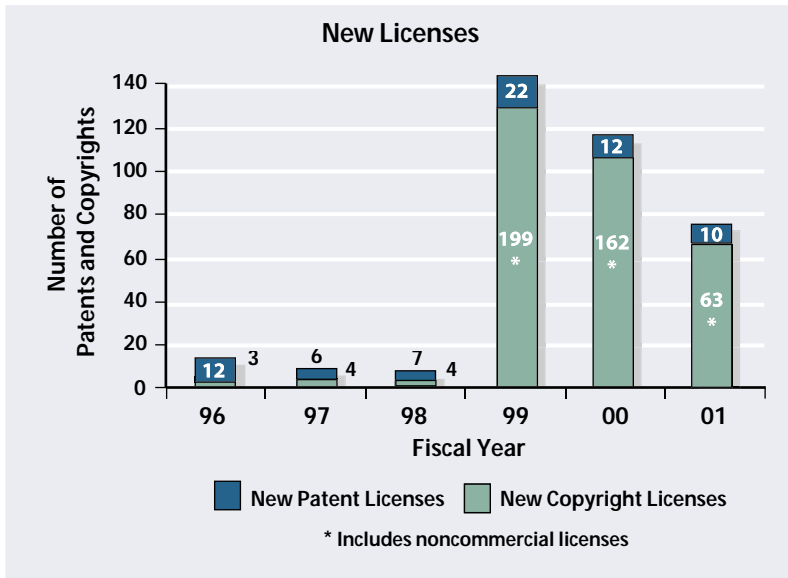
Invention Disclosure Review: A New

Approach—During FY 2000, the licensing team, in cooperation with the Laboratory’s BPL Office, invested significant effort in revamping the Laboratory’s patent filing system. The purpose of this effort was to create a system that efficiently uses the Laboratory’s limited patent filing resources to produce a reasonable number of patent applications within an acceptable time frame. The Laboratory’s patent filing system now has four primary components: (1) a new docket process for the patent attorneys; (2) an invention review process to determine the commercial potential of new inventions (commercial review conducted by the Licensing Program); (3) an invention review process to determine a patent attorney’s ability to write a patent application for the invention (application review conducted by the BPL Office); and (4) an institutional review of each invention to determine whether a patent application should be filed on an invention for commercial or other reasons.

The institutional review may elect to file an application for other, noncommercial, programmatic reasons. The three reviewing bodies together provide a comprehensive review, which gives strong

credibility to the final filing decision for each invention. The new docket system is structured so that each patent attorney may handle the patent application process for anywhere from one to ten inventions at a time. The resulting patent application must be filed within six months from the date the application is approved for filing. The BPL Office uses an external intellectual property law firm to file some patent applications. The IBD Licensing Program contributed \$100 thousand to the BPL Office in FY 2001 to increase the financial resources available for filing patent applications.

Licensing—IBD-IP has a staff of highly skilled legal and technical professionals who negotiate licenses for Laboratory technologies. While the Licensing Program’s income objective for FY 2000 was \$1 million, the Laboratory surpassed this objective by a margin of 26 percent, earning \$1.26 million in license income. Perhaps more importantly, the Laboratory increased its overall annual license income by 46 percent over the previous year’s license income. License income of \$1.56 million in FY 2001 represents a 24 percent increase over FY 2000. The Licensing Program negotiated and the Laboratory Director



executed 50 commercial licenses from FY 2000 through FY 2001.

Laboratory Portfolio—In addition to the 50 new commercial licenses executed by IBD, the Laboratory’s license portfolio now contains more than 600 noncommercial licenses with academia, government entities, and other nonprofit organizations, and more than 157 active commercial licenses. Since its inception in 1988, the Licensing Program has generated more

than \$4.5 million in royalties and granted more than 700 licenses for commercializing Laboratory technologies. Approximately two-thirds of this income goes to fund research, education, and technology transfer activities at Los Alamos. The remainder goes to the innovators.

Honoring Innovators—On February 5, 2001, IBD sponsored an awards ceremony to honor Laboratory researchers who received patents or copyrights in 2000. The Patent and Licensing Awards ceremony also honored employees whose inventions generated license royalties. Employees received awards in three categories: Distinguished Patent, Distinguished Copyright, and Distinguished Licensing. Approximately 260 current and former employees were honored.

Distinguished Patent Award—The Laboratory’s annual Distinguished Patent Award honors inventors whose patented invention exhibits outstanding innovation. Through this award, the Laboratory Fellows recognize a premier patent exemplifying significant technical advance, adaptability to public use, and noteworthy value to the mission of the Laboratory. The patent and the inventor recognized reflect the Laboratory’s stalwart tradition of superior technical innovation and creativity. Gary Selwyn of the Physics Division received the 2000 award for his “Atmospheric-Pressure Plasma Jet (APPJ)” technology. The APPJ produces a high-flux gas stream of reactive chemical species that can clean, decontaminate, etch, or coat surfaces at atmospheric pressure and low temperature. This technology converts a vast range of organic residues or toxins into water vapor, carbon dioxide, and other nontoxic gases in one minute or less and represents a significant improvement over existing technologies. It received an R&D 100 award in 1999 and has received national recognition.

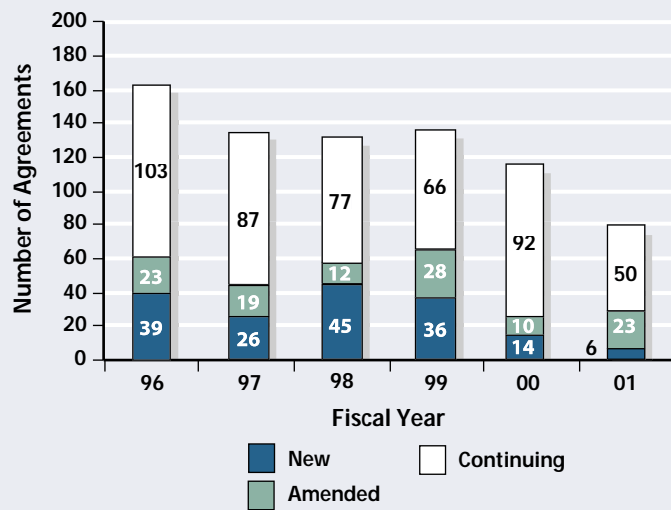
Distinguished Copyright Award—The annual Distinguished Copyright Award honors the authors of disclosed copyrighted materials that are considered extraordinary creations. Nominated copyrights demonstrate a breadth of commercial applications, potential to create economic value, and the highest level of technical excellence. In addition, these works represent vital contributions to the Laboratory’s mission and provide reciprocal benefit to the Laboratory programs from which they were developed. Recipients of this award are true bellwethers in their field and represent the Laboratory’s reputation for rapid and advanced innovation in the fields of copyrighted works and software.

Year 2000 recipients of this award, Lloyd Young and Jim Billen of the Spallation Neutron Source Division, were recognized for development of the “Phase and Radial Motion in Electron Linear Accelerators” (PARMELA, Version 2.0). The PARMELA computer code simulates the performance of electron and ion accelerators and beam-transport lines. The code’s beam-dynamics predictions have been experimentally confirmed at Los Alamos and other laboratories around the world. Because of the detailed physics included in the code, PARMELA can accurately model charged-particle beams, not only of electrons, but also of any species, and can transport up to three different ion or electron species simultaneously. Because PARMELA makes fewer approximations than other popular, accelerator, beam-dynamics codes, designers use it to check the results of the other codes. The code is currently licensed to Sumitomo Heavy Industries, Inc., Physics Institute Bonn University, and the Japan Atomic Energy Research Institute. It also has numerous noncommercial licenses.

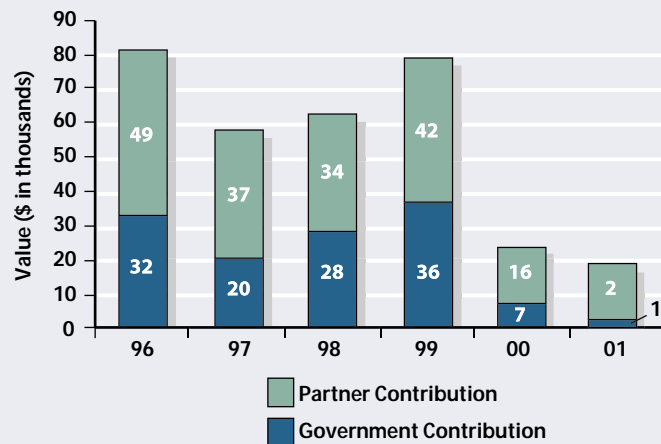
Distinguished Licensing Award—The annual Distinguished Licensing Award recognizes an innovator who proactively engages in commercialization activities at the Laboratory and has had a positive impact on the Licensing Program. This individual demonstrates, by example, outstanding success in transferring Laboratory-developed technologies to the public and private sectors. In addition, the recipient’s commercialization track record has served to enhance the reputations of both the University of California and the Laboratory. Nominees are evaluated based on ongoing active engagement in the licensing process; active participation in the promotion of their technologies; number of technologies licensed; number of licenses per technology; and support for multiple uses of the licensed technologies (private and public).

The recipient of this award is a champion for the Laboratory’s licensing program and is recognized for his or her role in confirming the benefits of proactive technology commercialization activities. Mahlon Wilson of the Materials Science and Technology Division received the 2000 award for his work in fuel cell technology, widely recognized by industry and other researchers throughout the world. His dedication to this field of research has resulted in 18 new invention disclosures, from which 15 patent applications have been filed. The Laboratory has received 10 issued patents from these patent applications. To date, Wilson’s portfolio of work has resulted in seven commercial license agreements.

CRADA Agreements



Value of Newly Executed CRADAs



“The purpose of the CRADAs and other agreements is to ensure that the parties have rights to use the results of their joint research. Without a clear statement of legal rights within a joint technology development effort, lawsuits and disputes are likely to occur.”

—Donna Smith, Program Manager for IBD’s Industrial Partnerships Office

Agreements

Through IBD-IP, the Laboratory maintains a variety of mechanisms that enable industry, academia, and other research institutions to establish partnerships and collaborations with the Laboratory. These mechanisms include agreements for non-disclosure of proprietary information, cooperative research and development (CRADA), non-federal work for others (WFO), personnel exchange, and user facilities.

CRADA Process Improvements—In September 2000, IBD-IP achieved success in its efforts to streamline the CRADA process for principal investigators. The required CRADA paperwork now averages three pages, down from a previous average of 15 pages. This reduction in paperwork also cut the average processing time for a CRADA from three months to approximately one month. IBD-IP worked in collaboration with Sandia National Laboratories and DOE-Albuquerque to simplify the CRADA process. These efforts coincided with IBD’s work with the multi-laboratory Technology Partnerships Working Group to optimize the CRADA process through regulatory changes to the Stevenson-Wydler Act.

WFO: New Mexico Department of Labor—The Laboratory’s “Bridge to Employment” program—which has shown a 97 percent success rate in helping welfare recipients become viable, productive workers who hold jobs with better-than-average pay—did not initially meet DOE’s defined Scope of Work uniqueness requirement. In FY 2000, in collaboration with the Laboratory’s Business Operations Division and the New Mexico Department of Labor, IBD-IP was able to set a precedent by negotiating a custom agreement with DOE to establish this award winning program.

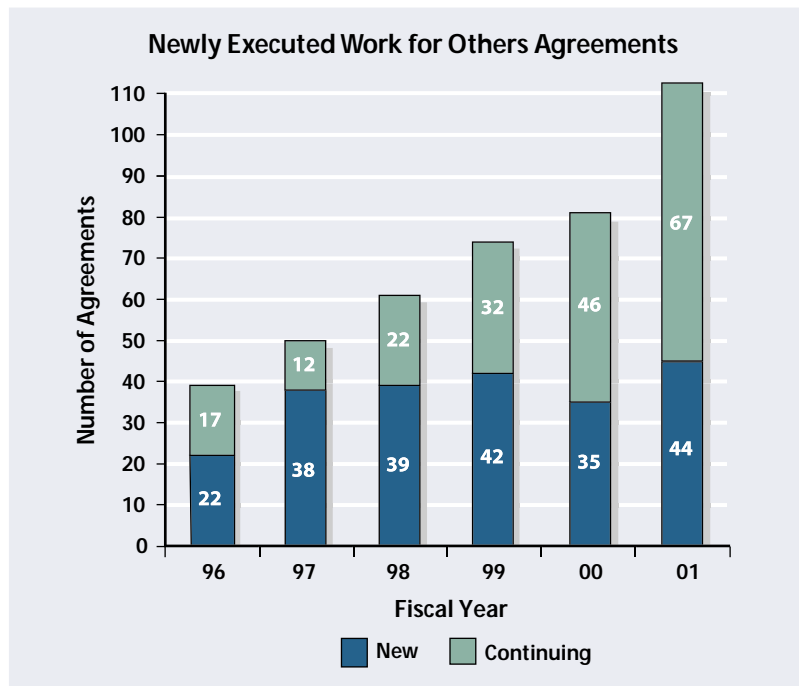
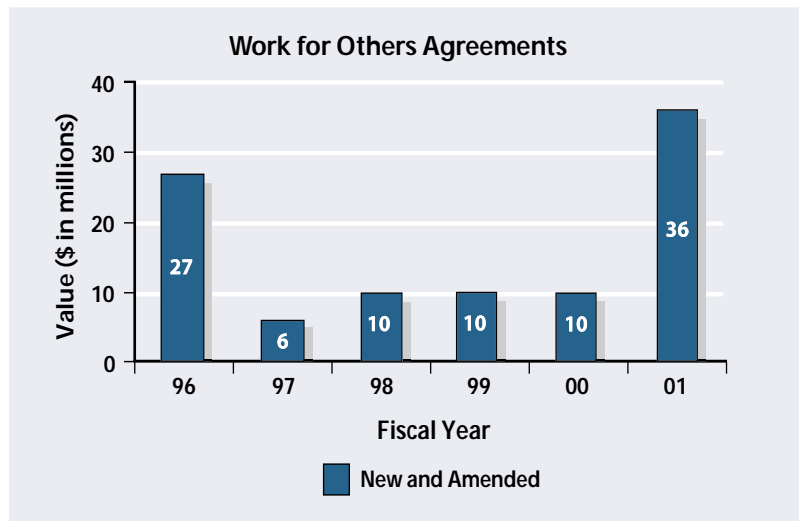
This program, which was featured at a national Welfare-to-Work Conference in Phoenix in October 2000, has been highly successful in providing job training for unemployed welfare recipients in the State of New Mexico.

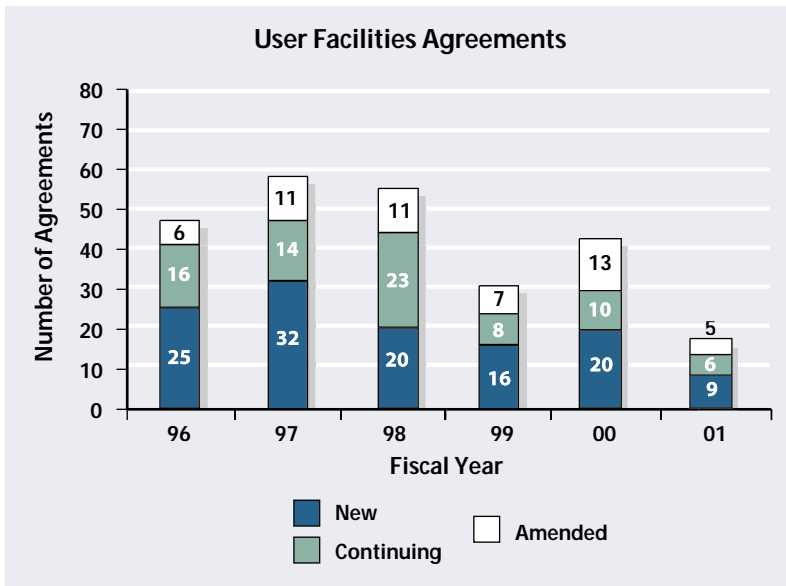
WFO: Florida State University (FSU)—In FY 2000, IBD-IP successfully negotiated the renewal of the WFO Agreement for the National High Magnetic Field Laboratory at Los Alamos with FSU for \$27 million over a five-year term. The National Science Foundation funds this project through FSU.

User Facility: The Library Without Walls (LWW)—The Laboratory’s User Facility Agreements permit outside users from industry, universities, and other governmental agencies, to conduct research using the Laboratory’s unique experimental research equipment and facilities. The LWW, a digital library that delivers scientific, technical, and business information to users through the Internet, is available for access by outside companies and universities. IBD-IP negotiates and maintains agreements with outside organizations to give them access to the LWW. During FY 2000, additional users and capabilities were added to the LWW User Facility agreement to enhance its importance as a wide-reaching scientific research tool. The Library Alliance, a consortium of New Mexico libraries, maintains access to the LWW for several universities in New Mexico.

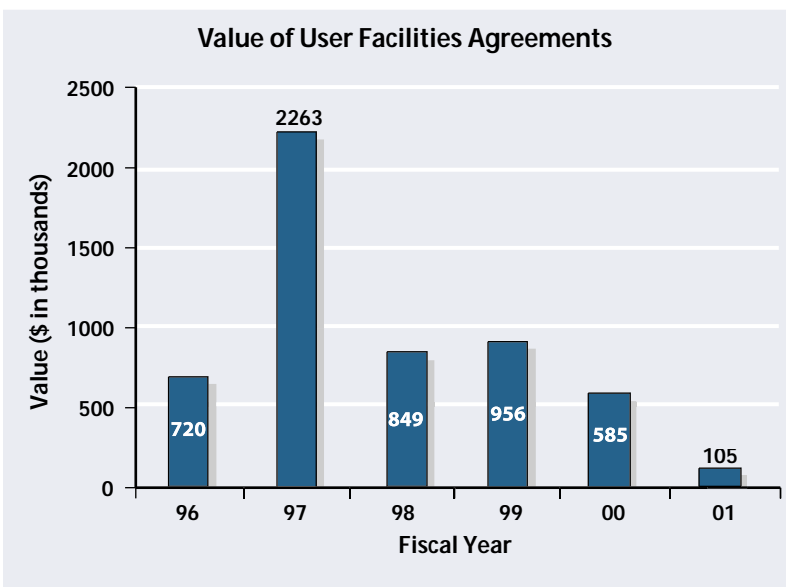
Through the LWW, users can access over 120 journals, more than 10,000 unclassified scientific reports published by Los Alamos National Laboratory scientists, and more than 23 public databases and indices. This allows quick and easy access to the latest scientific information to students within New Mexico. The LWW

Since the early 1990s, the Laboratory has had cooperative work agreements with approximately 350 companies, including small New Mexico businesses and major national corporations. In fiscal year 2000, jointly funded CRADA-sponsored work at the Laboratory totaled an estimated \$23million.





also offers “alert” services that inform users about new publications in their areas of interest. The funding received through the User Facility program helps to underwrite the costs of this facility to both the Laboratory and DOE, as other DOE sites also access the library.



Agreement Types, Definitions, and Conditions

Agreement	Rights in Intellectual Property	Laboratory Resource Commitment	Industry Resource Commitment
Cooperative Research and Development Agreement (CRADA): Enables industry, academia, and non-profit entities to collaborate with the Laboratory for the purpose of joint research and development activities.	Each party may take title to its own CRADA-generated intellectual property. Partners have first rights to an exclusive license in a designated field of use. The U.S. Government retains a nonexclusive, royalty-free, irrevocable license to every subject invention under a CRADA.	Cost-shared through contributions of personnel, equipment, services, materials, and facilities.	Cost-shared through contributions of personnel, equipment, services, materials, facilities, and funds.
Non-Federal Work for Others (WFO) Agreement: Enables a non-federal partner to ask the Laboratory to perform a defined scope of work or list of tasks that draws upon a unique capability of the Laboratory. It may not place the Laboratory in competition with the private sector. (Also known as a funds-in agreement or a sponsored research and development agreement.)	Rights to Laboratory inventions generated under a WFO Agreement may be available to a sponsor under DOE's Class Waiver. Exceptions may include sponsor's ownership and field(s) of use for the technology. When work is done with federally funded grant dollars, the Laboratory retains rights to Laboratory inventions; the sponsor retains rights to sponsor's inventions; and the U.S. Government retains a Government-use right to all such inventions.	Personnel, equipment, materials, and facilities are used.	Sponsor covers the cost of all Laboratory work (including personnel and materials) to be completed under the Statement of Work signed by both parties.
Personnel Exchange Agreements: Industrial Fellow Agreements allow Laboratory staff members to work at a partner company. Industrial Assignment Agreements allow Laboratory staff members to work in the private-sector. Industrial Staff Member Agreements allow private-sector staff to work at the Laboratory.	All are subject to negotiation.	The Laboratory and partner cost-share the Industrial Fellow. Loan of Laboratory personnel (subject matter expert). Office space, laboratory, and support costs for Industrial Staff Members assigned to the Laboratory.	Partner pays percentage of salary; provides office space, laboratory, and associated support costs. Company pays costs (salary and benefits) for Laboratory staff on assignment to company. Company pays costs for Industrial Staff Member assigned to the Laboratory.
User Facility Agreement: Permits outside users from industry, universities, and other governmental agencies, to conduct research using the Laboratory's unique experimental research equipment and facilities.	User retains rights.	None	Partner covers all costs associated with using the facility for the tasks defined in the scope of work.
Non-Disclosure Agreement (NDA): Protects proprietary information exchanged between parties during initial interactions and discussions between the Laboratory and another party on specific technical areas.	None—no IP is generated by either party under an NDA.	None	None
Memorandum of Intent (MOI) Nonbinding document signed by parties interested in pursuing a comprehensive agreement for the transfer of technology which defines specific technical areas of interest and the ground rules for interactions and discussions between the parties.	None—no IP is generated under an MOI.	None	None

Strategic Partnerships

IBD's Strategic Partnerships Office (IBD-SP) concentrates on developing and nurturing strategic relationships with industry that will provide appropriate competitive advantage for both program development and definition of future missions for the Laboratory.

Strategic partnerships are long-term, working relationships built on mutual trust and commitment between the Laboratory and industry partners with complementary capabilities and shared goals and risks. These partnerships seek to achieve goals that may be difficult or impossible for either party to accomplish alone. They are designed to benefit all parties while ensuring the necessary technological capabilities to assist the Laboratory in meeting its programmatic responsibilities. For these partnerships to be strategic, they must be broad-based, long-term, and have strong support from senior management on both sides.

Ongoing Relationships

Among the strategic relationships that IBD-SP has developed and maintained

“Finally, there has been a big, in-kind payoff for LANL. That is, we get first crack at some unique and useful (and proprietary) data that would not come our way otherwise. This is crucial in making sure that the theoretical work we push has a market—one that is in science, defense, and industry too.”

— Bucky Kashiwa, LANL PI for Computational Fluid Dynamics CRADA with P&G

on behalf of the Laboratory are partnerships with Motorola, and Procter and Gamble.

The Motorola–Los Alamos Partnership—The six-year relationship between Motorola and Los Alamos began with a single project in the area of modeling and simulation of semiconductor processing technologies. The partnership, which has expanded into other areas such as enterprise modeling, image processing, and fuel cell technologies, has shown clear benefit to the Laboratory's threat reduction, energy, and weapons programs. During FY 2000, one of the positive results of the strategic relationship between the Laboratory and Motorola was the company's commitment to occupy 11,000 square feet within the newly constructed Los Alamos Research Park. The Laboratory, DOE, and the Los Alamos Commerce and Development Corporation are jointly developing this project with support from the County of Los Alamos. In FY 2001, additional collaboration opportunities were pursued in sensors, biotechnology, and nanoscience.

The Procter & Gamble–Los Alamos Partnership—Seven years ago Procter & Gamble (P&G) approached the Laboratory with a request for help with development and implementation of new statistical approaches and models for a continuous assembly line in constant need of maintenance and repair. Under a CRADA, the Laboratory, in collaboration with P&G, developed reliability engineering software that has significantly enhanced P&G's production capabilities. Today, P&G is the exclusive licensee for this reliability engineering software and is actively marketing the technology in industry. At its

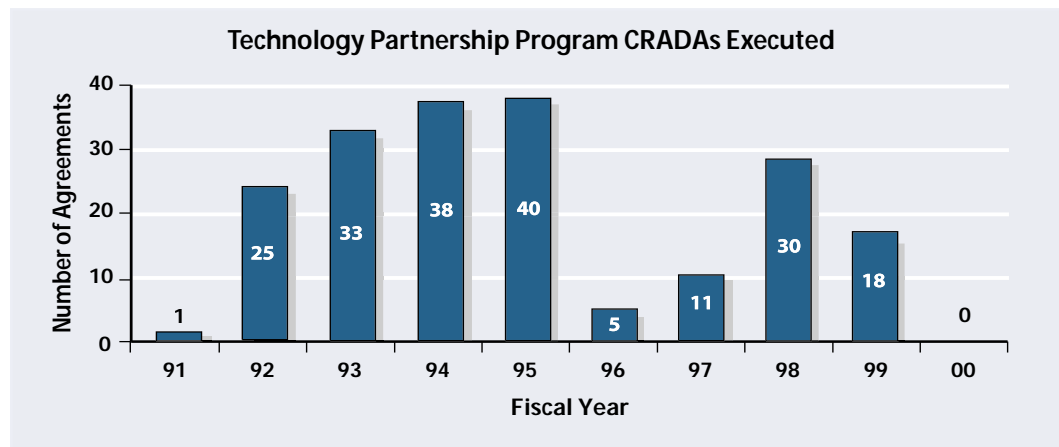
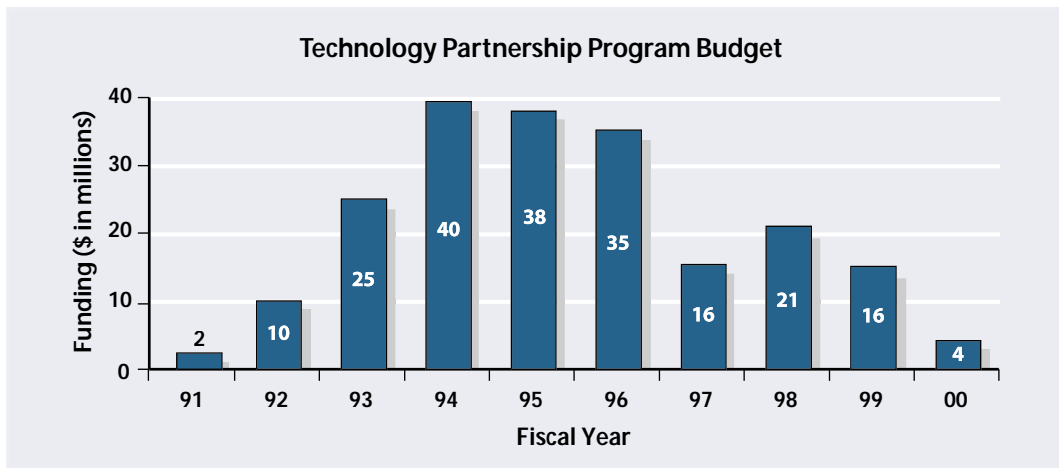
Innovation 2000 Expo in Cincinnati, OH, P&G announced that its partnership with Los Alamos had helped the company save \$1 billion in its operations over the past several years. Such partnerships give the Laboratory the opportunity to use readily available and testable manufacturing data to improve systems that are crucial to its stockpile stewardship mission.

Defense Programs Technology Partnerships Program

From FY 1991 through FY 2000, the Technology Partnerships Program (TPP), formerly the Defense Programs (DP) Technology Transfer Initiative, invested a total of \$962 million to support research and development partnerships between the DOE sites and the private sector. The

original goal of the program was to stimulate partnerships between the DOE-DP laboratories and the private sector and to commercialize technology developed by the DOE laboratories, particularly in the areas of advanced manufacturing, advanced computing, aerospace, semiconductor manufacturing, advanced materials, and health care.

From FY 1995 through FY 2000, Congress and DOE steadily reduced designated funding for these partnerships and encouraged the laboratories and plants to transfer partnerships with industry into their core weapons programs. The TPP was successfully completed in FY 2000 with the transfer of 16 CRADAs to full support within the Nuclear Weapons Campaign



budgets (with a total commitment of \$4.7 million for FY 2001). Thus, responsibility for investing in partnerships with industry now lies with the individual Nuclear Weapons Program Campaign Managers.

The Industrial Fellows Program

The Industrial Fellows Program, managed by IBD-SP, assigns experienced Laboratory professionals to work with senior managers at a host company for at least one year and preferably longer. The Industrial Fellow assignment provides an ideal opportunity to forge strategic partnerships with host companies based on well-understood mutual interests and grounded in an established record of trust and cooperation. Laboratory staff members chosen as Industrial Fellows work for carefully selected companies with the goal of building strategic technical alliances. Such alliances tend to evolve when researchers from very different backgrounds work together on projects of mutual interest. Negotiations with Motorola in FY 2000 resulted in a mutual commitment for two Laboratory Industrial Fellows to work with the company during the next two years. Other recent industry participants in the program include Parke Davis Pharmaceutical Research (Ann Arbor, MI), PPG Industries (Pittsburgh, PA), and Phillips Petroleum Research Center (Bartlesville, OK).

R&D 100 Awards Sponsorship

IBD-SP sponsors Laboratory participation in *R&D* magazine's annual R&D 100 Awards competition by submitting the Laboratory's most innovative technologies to the R&D 100 review panel. This program, now in its 39th year, is designed to honor significant commercial promise in products, materials, or processes developed by the international research and development community. Technologies are nominated in open competition and judged by technical experts selected by the Illinois-based *R&D* magazine. The magazine uses technical criteria to select the 100 most significant, unique, or promising entries from the nominations received. The projects recognized by annual competition span a diverse range of scientific and technical areas—from innovative computing techniques to revolutionary engine technology and plasma physics. Los Alamos has been competing successfully for more than a decade with many of its winning technologies developed in collaboration with private-sector companies and other scientific institutions. The Laboratory won two awards in 2000 and three in 2001. The Laboratory has received more than 70 awards since it began competing in 1978.

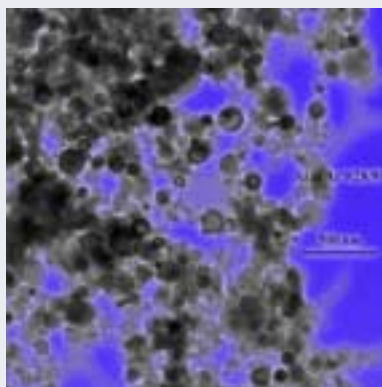
R&D 100 Award Winners

“Technologies such as the ones that earned our latest R&D 100 Awards serve as reminders to the nation of the many practical contributions Los Alamos researchers make to our economy and our country,” said Laboratory Director John Browne. The projects recognized by the 2000 and 2001 R&D Awards were developed in collaboration with private-sector companies and other government agencies.

ANDE, Advanced Nondestructive Evaluation System, is a detector system that uses ultrasonic interferometry and resonance to quickly identify the contents of sealed containers. Its primary application is in national security because it can be used to identify chemical warfare agents and other toxic chemicals at distances of up to 15 feet.



Electro-exploded Metal Nanoparticles, originally developed in Russia and refined for peaceful uses by Los Alamos scientists in collaboration with U.S. industry, provide a novel method for creating nanoscale metal powders that significantly enhance the effectiveness of rocket fuels and improve lubricants, wear-resistant coatings, and batteries. Because they are smaller in diameter—one ten-thousandth the diameter of a human hair—the surface area per volume and reactivity of these nano-particles is much greater than that of the ultrafine metal powders currently in use.



SCORR, short for supercritical carbon dioxide resist remover, is a novel method for processing computer chips that uses supercritical carbon dioxide to remove a coating called photoresist. Applications include the removal of coatings, residues, and particles from very small features in integrated circuits ranging from cellular phones and electronic equipment to computers and household appliances. The SCORR system works without the use of toxic chemicals and has the potential to save the semiconductor manufacturing industry tens of millions of gallons of water per day.



The Tandem-Configured Solid-State Optical

Limiter, a high-performance, solid-state optical limiter, can protect the human eye from concentrated beams of intense light such as those produced by lasers. Los Alamos scientists developed the limiter in collaboration with Gel-Tech Inc. and the Center for Research and Education in Optics and Lasers in Orlando, FL, and the U.S. Army. The limiter, which consists of a special dye embedded onto a polymer matrix, works much like photochromic eyeglass lenses, automatically darkening or lightening in response to changing daylight conditions. Unlike conventional devices, this one responds to intense light much faster and takes only a millisecond to recover, offering protection from light even more intense than concentrated sunlight.



Free-Space Quantum Cryptography is a communication system that uses tiny bits of light to send “quantum keys” through the air over long distances. These randomly polarized photon transmissions create a random string of numbers known only to the sender and receiver. This string of numbers becomes the quantum cryptographic key that locks or unlocks the encrypted messages sent via normal communication channels. Because the photons cannot be intercepted without being destroyed, and therefore tipping off the receiver, the quantum cryptographic key is perhaps the most practicable means available for creating unbreakable data encryption systems. The Los Alamos technology is intended to serve as a model on which to base a global satellite quantum key distribution system.



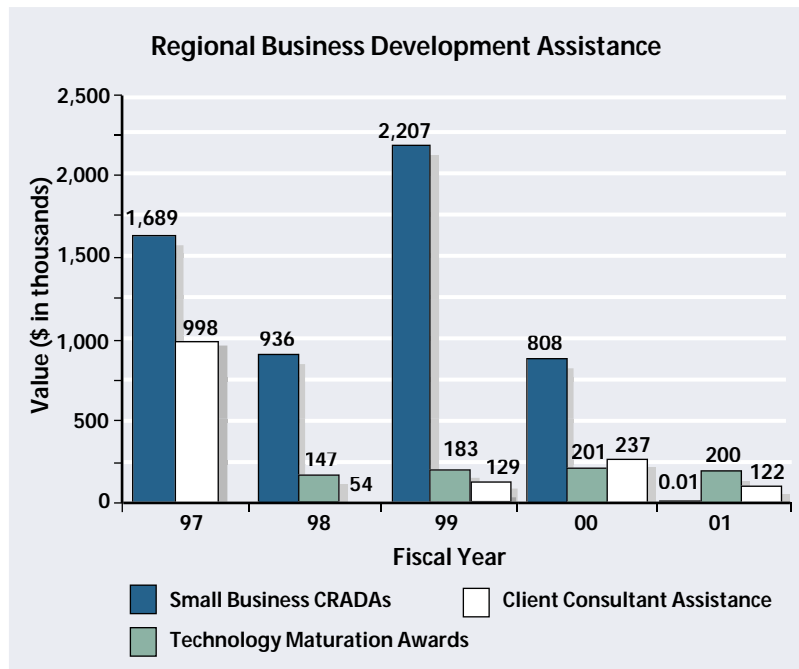
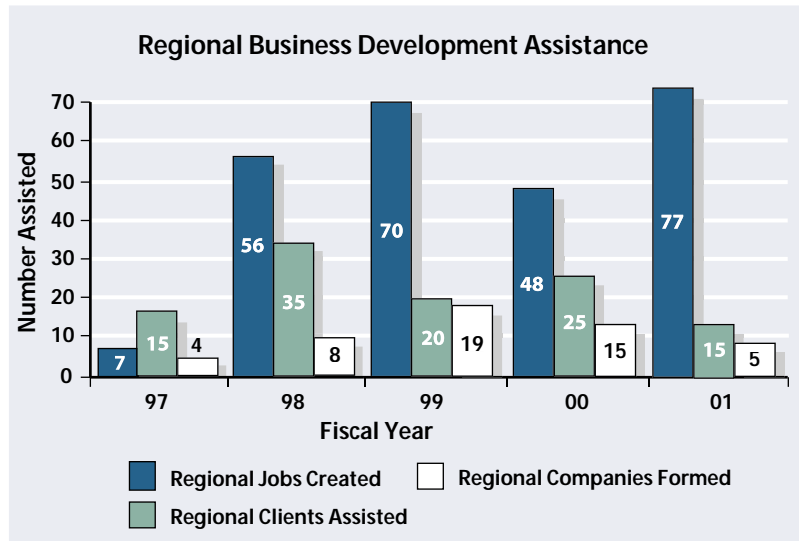
Regional Business Development

The focus of the Regional Business Development Office (IBD-RBD) is to develop ways to use emerging Laboratory technologies to stimulate high-tech business startups, create job opportunities, and attract entrepreneurs, businesses, and capital to northern New Mexico.

Technology Commercialization

Through its Technology Commercialization Office (TCO), IBD-RBD offers a broad range of services that provide assistance to regional businesses and fledgling entrepreneurs. These services include business counseling, access to funding sources, market assessments, training programs, expert consulting, and access to networking events and professional organizations. With the support of IBD-RBD, 51 new companies have been established in the region, more than 250 new jobs have been created, and over \$50 million in external capital has been invested in these companies. An External Advisory Board, comprising key representatives from regional business and economic development organizations and nationally recognized experts in high-tech entrepreneurship, provides external guidance.

Technology Commercialization Awards—The Technology Commercialization Awards, in their fourth and final year during FY 2001, provided regional high-tech, for-profit companies with an opportunity to vie for subcontracts that helped recipients further develop and commercialize their companies' best technical inventions. From FY 2000 through FY 2001, 14 northern New Mexico businesses



“These awards are another indication of the Laboratory’s continuing commitment to strengthen and encourage northern New Mexico’s business and industrial community. I look forward to watching these companies turn their promising ideas into commercial activities that can benefit the region.”

—Laboratory Director John Browne



received awards from this approximately \$200,000 per year program aimed at facilitating the development and commercialization of promising new technologies. From 1997 through 2001, 29 regional companies received funding through this program. Total funding provided by the program was more than \$700,000.

Training and Development—TCO periodically conducts full-day entrepreneurial training workshops on such topics as business plan fundamentals, marketing essentials, financing alternatives, and new venture management. These workshops are advertised widely throughout the northern New Mexico region and attract a

diversity of participants from the Laboratory and its surrounding communities. TCO has partnered with the New Mexico Economic Development Department, the New Mexico Information Technology and Software Association, The Electronic Commerce Resource Center, and others to underwrite these events. From 1999 through 2001, TCO hosted 8 such workshops attracting over 1200 participants. More than 2000 regional residents have participated in 12 workshops conducted in the last 4 years.

To encourage more active involvement by Laboratory staff in startup and other commercialization efforts, TCO piloted a customized corporate entrepreneurship training course for Laboratory staff members in 1999. The course provides participants with an overview of the commercialization process, fundamentals of new venture development, and an awareness of the risks and rewards associated with entrepreneurial activities. Topics may include: evaluating technology concepts, market analysis and research, intellectual property overview, business plan fundamentals, or other topics of interest in this area. The success of this pilot program has made this a continuing course offering through TCO specifically for Laboratory technical staff. Over 35 Laboratory employees have participated in a new “corporate entrepreneurship” training program. In addition, the program helped identify at least 10 new Lab technologies with potential for regional startup.

In conjunction with Sandia National Laboratories and the New Mexico Economic Development Department, TCO also sponsored a series of training courses to help companies become ISO 9000-certified. Eighteen companies graduated from this program in 2000.

“Launchnm.com: The Internet and the Entrepreneur” was a highly successful TCO-sponsored, entrepreneurial workshop conducted in Santa Fe in April 2000. This stimulating, one-day workshop focused on using the Internet to expand business. It brought an impressive array of speakers and panelists from the Internet industry and the entrepreneurial community to Santa Fe to brief more than 300 participants on topics ranging from launching a business on the Internet to competing on an international scale via the Internet. Presenters included a University of California computer science professor and dot-com founder, the author of the book *Marketing on the Internet*, the president and CEO of E-stamp Corp., and the vice president of sales and marketing for TEMA, an Albuquerque furniture company.

MBA Internships—The TCO’s Summer Entrepreneurial Internships program offers MBA candidates a unique opportunity for hands-on experience nurturing the development of high-tech startups or commercializing new technologies developed at the Laboratory. IBD recruits student interns from New Mexico universities and other top-ranked business schools located in the Southwest, especially schools with strong programs in entrepreneurial studies. Most interns hold one or two technical degrees and are currently specializing in entrepreneurial studies in their graduate work. Interns work side by side with Laboratory and regional entrepreneurs and technologists to evaluate opportunities, write business plans, conduct financial analyses and perform a variety of business-related functions. Twenty-six students have participated in the program to date, assisting about 40 regional companies and more than a dozen Laboratory technologists with their entrepreneurial endeavors.

“The TCO MBA Internship program was the most useful thing I did during my time in business school. The program is well structured. I was able to choose my own projects after a comprehensive evaluation of those submitted, set my own schedule, and travel through the beautiful high mountain desert of New Mexico to meet with my clients. I got to learn about cutting edge technologies, e-business strategies, patent licensing negotiations, distribution channel management, and venture capital acquisition in my projects.”

—Eric Salzman, Thunderbird School, AZ

During summer 2001, seven MBA candidates successfully completed internships at the Laboratory. In addition to evaluating Laboratory technologies for commercial potential, the 2001 interns were dubbed “tech scouts,” assigned to search out Laboratory technologies for intellectual property potential and to motivate researchers to get their ideas patented and copyrighted. The concept of tech scouts has generated renewed enthusiasm among the graduate interns and has evolved into new, full-time positions at the Laboratory.

Regional Development

Laboratory Spin-offs—The Laboratory proactively supports new business development in northern New Mexico based on Laboratory technology and expertise. TCO counsels Laboratory employees who want to create a new business venture based on their own technologies or expertise. By providing access to a robust set of resources including expert consultants, market assessment studies, and business plan training sponsored by the Laboratory, TCO helps employees evaluate their ideas and

launch their businesses. Since 1997, 17 Laboratory employees have taken Entrepreneurial Leave of Absence from their technical positions to start or participate in new regional companies based on Laboratory technology or expertise. Product and service offerings range from production of conductive polymers, to plasma cleaning tools, to the development of unique nano materials, and the use of highly specialized computer algorithms to address problems faced by the financial, pharmaceutical, and other major U.S. industries.

Protecting and Enhancing Northern New Mexico Infrastructure: Water Resource Management—The Laboratory’s commitment to effective water resource management and regional sustainability is evidenced by its participation, through IBD-RBD, in co-chairing and providing technical support to both the Governor’s Blue Ribbon Task Force on Water and the Jemez y Sangre Water Planning Council. The Task Force, which emphasizes long-range water use planning within New Mexico, is chartered to investigate current New Mexico water policies and laws and recommend changes or propose new initiatives to the Office of the Governor.

The Jemez y Sangre Water Planning Council, with its 40-year horizon, is helping secure an adequate and continuous water supply for future generations. Regional water planning includes inventorying the quantity and quality of water resources; projecting water resource

demands under a range of conditions; and determining the manner in which water requirements might be met with management and conservation of water supplies available to the region. The Laboratory is a proactive participant in strategic and “smart” infrastructure planning with other northern New Mexico community leaders and developers.

Los Alamos Research Park

The Laboratory, DOE, and the Los Alamos Commerce and Development Corporation, with support from the County of Los Alamos, are steering the development of the Los Alamos Research Park. The IBD-RBD team played a major role in facilitating the site lease, buildout, and tenancy, and continues to coordinate Laboratory interactions with the Los Alamos Commerce and Development Corporation, manager of the park. The 44-acre park, located directly across from the main technical area of the Laboratory, provides space for housing collaborative efforts among Los Alamos researchers and corporate, academic, and institutional research and development staff. Motorola and members of the Laboratory’s technical directorates are initial tenants in the first of five planned buildings. Construction began in the spring of 2000 and the first building was dedicated on March 24, 2001. Future expansion calls for a total of 300,000 square feet of office and light laboratory space for 1,500 researchers.

Strategic Goals and Future Directions

Vision

The Laboratory's partnerships with industry contribute to its scientific vitality and strength and have become an integral part of many Laboratory programs. These partnerships help the Laboratory achieve its mission objectives, develop strategic advantage for future programs, transfer technology to the private sector for commercialization, and provide regional economic development opportunities.

IBD will continue working to provide the Laboratory with an effective strategy for partnering with industry to enhance the Laboratory's ability to accomplish its missions, leverage programmatic resources, and enrich its core competencies through stimulating and challenging research opportunities for staff and programmatic benefits that may not otherwise be available.

Strategic Focus

External alliances for research and development (R&D) through universities and government laboratories have become increasingly important to U.S. industry as it continues to downsize internal R&D capabilities. For business, strategic partnerships have become a crucial weapon in the battle to gain competitive advantage. Likewise, major universities have built partnerships with industry to help ensure their future vitality and financial security. The Laboratory cannot afford to be isolated or self-sufficient in today's rapidly advancing world of science and technology. It must continue to pursue partnerships with other organizations of excellence that will provide appropriate competitive advantage for both program development and the

definition of future missions. More than 60 percent of the R&D conducted in the U.S. today is funded by the private sector. The Laboratory must continue to aggressively reach out and tap this large and valuable resource for the institution and its programs.

Over the past decade, the Laboratory has participated in partnerships with industry for two primary purposes:

- To strengthen its core competencies and
- To transfer technologies to the private sector for commercial applications.

IBD will continue to maintain its leadership by helping the Laboratory expand its efforts in these areas as well as guiding it toward

- Designing and implementing a strategy for embedding industrial partnering within all appropriate Laboratory programs. (The goal is to develop and deploy partnerships with industry as tactical tools in achieving programmatic mission deliverables wherever possible. Such partnerships must be mission-driven.)
- Identifying and prioritizing a few strategic thrust areas in which partnerships with industry are essential to realizing the vision of the Laboratory.

The Laboratory must continue to develop and nurture broad-based, multi-disciplinary, multi-program, long-term strategic industrial alliances for both existing and future missions.

IBD Contacts

IBD Office

Donna Smith, Division Leader (Acting)
505-667-9473, smith_d@lanl.gov

David Holmes, Chief of Staff
505-665-6747, dkh@lanl.gov

Lucille Calabaza, Ex. Office Administrator (Acting)
505-665-9719, lucillec@lanl.gov

Industrial Partnerships

Jerome Garcia, Program Manager (Acting)
505-665-4842, jgarcia@lanl.gov

Bruce Lamartine, Intellectual Property Team Leader
505-665-2366, lamartine@lanl.gov

John Mott, Licensing Team Leader (Acting)
505-665-0883, jmott@lanl.gov

Russ Miller, Agreements Team Leader
505-665-3809, russmiller@lanl.gov

Patty Montoya, Office Administrator
505-667-5126, patty@lanl.gov

Strategic Partnerships

Ken Freese, Program Manager
505-667-1928, kfreese@lanl.gov

Tony Beugelsdijk, Research Park Project Leader
505-667-3169, beugelsdijk@lanl.gov

Karon Stine, Office Administrator
505-667-7683, karon@lanl.gov

Regional Business

Dave Foster, Program Manager
505-665-1578, dfost@lanl.gov

Carole Travis, Office Administrator
505-665-6756, ctravis@lanl.gov

IBD Location

IBD offices are located at 2237 Trinity Drive in the Los Alamos townsite, adjacent to the Los Alamos Inn.

IBD Online

For more information about IBD and its services, phone 505-665-9091 or visit the IBD Web Site, <http://www.lanl.gov/partnerships>

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the University of California for the U.S. Department of Energy under contract W-7405-ENG-36. All company names, logos and products mentioned herein are trademarks of their respective companies. Reference to any specific company or product is not to be construed as an endorsement of said company or product by the Regents of the University of California, the United States Government, the U.S. Department of Energy, nor any of their employees. The Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

LALP-01-286
January 2002

