



International Security News

International Security Programs
Dori Ellis, Director

Focus on Collaborative Research and Development - Part 1



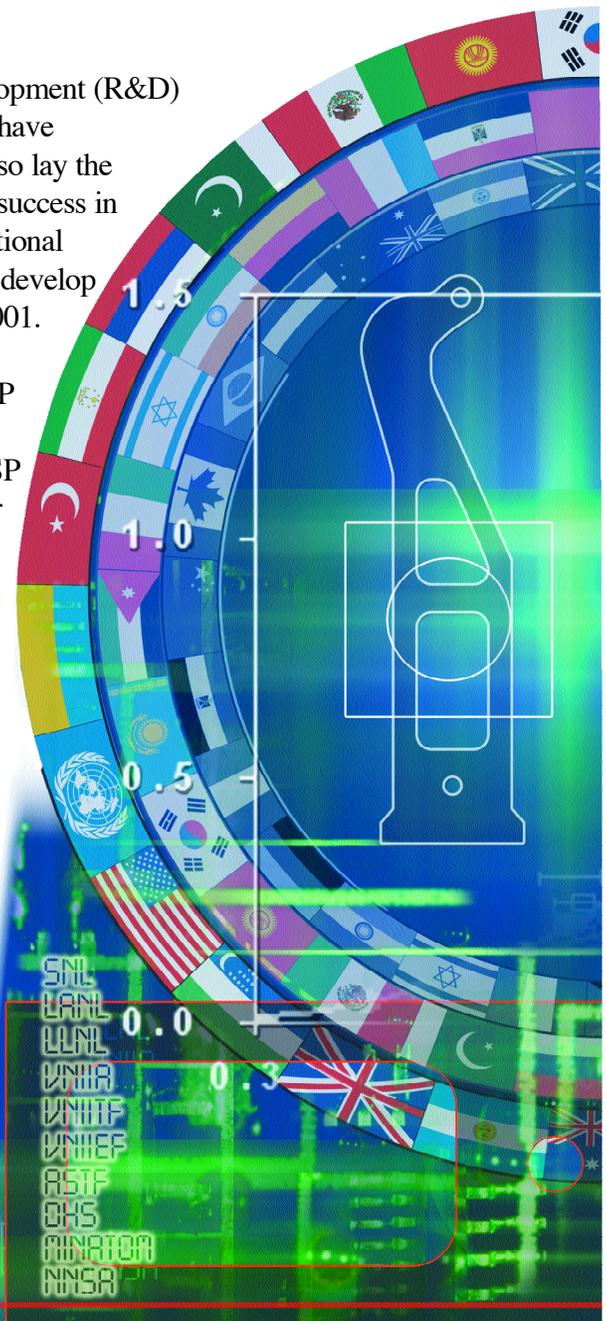
From the Director

International Security Programs (ISP) research and development (R&D) collaborations, many of which have existed for a decade or more, have benefits beyond technology development. These collaborations also lay the foundation for developing trusting relationships, which are key to success in global cooperation. In fact through these relationships, Sandia National Laboratories and the other national labs have been able to quickly develop combating terrorism collaboration in response to September 11, 2001.

The July 2003 issue of *International Security News* highlighted ISP work addressing nuclear material and weapon security. Through programs such as Material Protection, Control, and Accounting, ISP aggressively pursues collaborative opportunities to accomplish our nonproliferation and combating terrorism missions. The focus of the next two issues of *International Security News* is the essential R&D collaborations that ISP is engaged in throughout the world. Through these R&D collaborations, Sandians are working side-by-side with international colleagues to develop the next generation of technologies in support of nuclear material and weapon security.

Since R&D collaborations are long-range programs by their very nature, none of the projects highlighted could be accomplished without visionary sponsorship from government leaders and senior managers. Whether projects are undertaken to develop the next generation of technology to combat

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terrorism or designed to convert weapon technologies to peaceful commercial applications, R&D takes time. Several years are required to thoughtfully explore advanced monitoring technologies for nuclear warheads in storage or to retool and retrain weapons scientists to develop world-class, commercially viable medical devices.

New opportunities for R&D collaboration surface regularly. Two US/Russian initiatives were launched in April 2002 at the Sandia-hosted Lab Directors meeting. At that meeting, the directors and deputy directors of Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), and Sandia National Laboratories (SNL) met with their Russian counterparts from the All-Russian Scientific Research Institutes of Experimental Physics (VNIIEF), Technical Physics (VNIITF), and Automatics (VNIIA) to assess current collaborations and to suggest new ones. In attendance from the National Nuclear Security Administration (NNSA) were John Gordon, then NNSA Administrator, Linton Brooks, then Deputy Administrator for Defense Nuclear Nonproliferation, and Everett Beckner, Deputy Administrator for Defense

Programs. Russia’s Ministry of Atomic Energy (MINATOM) was represented by Lev Ryabev, Senior Advisor to the Minister of Atomic Energy, and Natalia Klishina from MINATOM’s international bureau. This group launched two R&D collaborations, one in basic science and technology and one in combating terrorism. The combating terrorism collaboration was highlighted in the May 2002 Bush/Putin *Joint Statement on Counterterrorism Cooperation*:

An important step in our joint cooperation will be a meeting of our scientists... We will seek to develop jointly new technology to detect nuclear material that can be used to manufacture weapons for purposes of terrorism.

— *Joint Statement on Counterterrorism Cooperation*
US President George W. Bush
and Russian President Vladimir V. Putin
May 24, 2002

R&D collaboration toward combating terrorism with Russia and other countries is also a high priority for the

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Engaging Iraq's Science and Technology Community

Abdalla Alnajjar
President, Arab Science and Technology Foundation
United Arab Emirates

As the postwar period in Iraq takes shape, rebuilding the power, communications, public health, and other infrastructure has emerged as an urgent priority. Assuring that Iraqi scientists are engaged in legitimate, transparent, civilian activities that support reconstruction and economic recovery is also a high priority.

The Arab Science and Technology Foundation (ASTF) and the International Security Programs' Cooperative Monitoring Center (CMC) at Sandia National Laboratories, under the auspices of the National Nuclear Security Administration (NNSA)/Office of Nonproliferation Policy (NA-241), have developed a proposal for a partnership for engaging the Iraqi scientific community. The proposed partnership includes ASTF, the InterAcademy Panel (IAP) – a consortium of 90 national academies of science, and the US. This effort will play an important role in broadening support for Iraqi science and also offers the possibility of significant additional sources of funding.¹

Overall goals for the program include

- Developing joint civilian science and technology (S&T) projects that engage Iraqi scientists in peaceful research and development activities
- Engaging Iraqi experts to rebuild key elements of the Iraqi infrastructure, including national power, communication, and water distribution systems and public health and scientific and research facilities
- Developing Iraqi business opportunities that capitalize on indigenous technological and scientific expertise and provide long-term sustainability to Iraqi S&T

The proposal consists of three phases:

Phase One involves review and documentation of the state of Iraq's S&T infrastructure. Surveying the Iraqi scientific infrastructure is essential to identify Iraqi technical experts, to establish contacts in the country, and to identify critical needs for S&T cooperation. The survey will identify potential Iraqi participants for a proposed Phase Two workshop designed to initiate a cooperative program.

Survey team members will be chosen from the ASTF membership based on their expertise in relevant subjects, including information technology, water resources management, nonproliferation, public health, communications and energy infrastructure, and the basic sciences.

Before conducting the detailed survey, the team members will coordinate with US experts to establish clear goals and to plan the survey trip. With this coordination, the survey should take no longer than thirty days to complete. Upon completion, the survey team will provide briefings of the results, coordinate with other organizations that have conducted similar surveys, such as the IAP, and identify Iraqi participants for the Phase Two workshop.

Phase Two of the project will concentrate on convening a workshop in the region to establish collaboration and achieve international support. The workshop will bring together experts from Iraq, ASTF, the US and international scientific community, and potential funding organizations to establish priorities for S&T cooperation, develop a framework and road map for future activities, identify sources of funding, and establish follow-on activities to develop specific proposals.

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The workshop will be convened in an Arab country. ASTF and the CMC will jointly develop the program for the workshop. The proposal recommends that workshop participants include senior Iraqi S&T specialists, ASTF representatives, US representatives, representatives of the international scientific community, and representatives of international funding organizations. Prior to the workshop, the ASTF/CMC team will schedule meetings with prospective donors to clarify expectations and to solicit their active participation. The goals of the workshop are to establish

- Agreement on a framework mechanism for structuring and administering projects, including a 5-year roadmap and associated budget needs
- Agreed-upon priorities for collaborative efforts, including goals and success metrics
- Commitments for funding to cover the first two years' costs

Phase Three involves implementing the agreed-upon framework mechanism. Based on successful solicitation of additional funding from the US and other donor countries and organizations, contributions would establish and implement the framework mechanism and would initially fund selected high-priority projects. Establishing a neutral, merit-based mechanism for reviewing proposals and

selecting projects for funding will be an essential element of the framework.

Development of detailed proposals for high-priority topics could be achieved through follow-on workshops with Iraqi scientists in the region and by hosting Iraqi scientists at institutions in the United States, such as the NNSA national laboratories, or at other ASTF-affiliated institutions.

¹ This proposal received final approval in December 2003, and work is now in progress.



*Abdalla Alnajjar, United Arab Emirates
President of the Arab Science and Technology Foundation (ASTF)
CMC Visiting Research Scholar, July 28 – August 22, 2003
Topic: Role of Technology in Arab Development; hosted by Amir Mohagheghi, 6924*

Partnering with Israel on Contraband Detection



Sandia National Laboratories in the US and Soreq Nuclear Research Center in Israel are working together to develop and test a contraband detection portal. The work is progressing under a February 2000 agreement between the US Department of Energy (DOE) and the Israel Atomic Energy Commission (IAEC). Specifically, Task III of the agreement provides for collaboration between Israel and Sandia's Cooperative Monitoring Center (CMC) on assessment of monitoring technologies for regional security and cooperation.

In August 2000, Soreq and CMC staff conducted an assessment of commercially available and unclassified monitoring technologies for regional security and cooperation. The range of potential projects discussed included 1) combining explosive and radioactive material detection at a portal, 2) using communication networks to link portals, 3) establishing communication networks between physicians in the region for consultation, 3) cooperative epidemiology, 4) development of computer tools for on-site inspections, 5) remote monitoring to enhance safeguards, 6) physical security at nuclear facilities, critical infrastructure, and other facilities, 7) developing joint approaches for data security, 8) biological methods to remove heavy metals from water, and 8) desalination technologies.

The August 2000 bilateral discussions led to initiation of a project to assess procedures and monitoring technologies to detect the passage of small amounts of radioactive material and explosives through monitoring points, specifically portals. A system based on these technologies will be applicable for sensitive facility protection and border-crossing security. The project team is emphasizing the

detection of explosive and radioactive contraband on potential terrorists and smugglers, but such a portal could be configured to detect narcotics and chemical weapons as well.

Sandia developed the technology for an explosives detection portal and licensed it to Smith Detection Corporation (previously Barringer Corporation). The unit is a walk-through portal that collects a sample of airborne particulates from a subject in an enclosed walkway. The person is directed to enter the walkway



Sentinel II explosives detection portal
manufactured by Smith Detection Corporation

and stop in the center. Jets of air are directed at the subject, and a large volume of air is sampled from the walkway through a primary absorber. After the sample has been collected, the primary sampling absorber is isolated and the sample is transferred from the primary absorber to a smaller, secondary absorber. Once this transfer is complete, the unit then begins an analysis by transferring the concentrated sample from the secondary absorber into an ion mobility spectrometer. The entire process typically requires about ten seconds.

Sandia purchased Smith's second generation explosives detection unit, called Sentinel II, and tested it during the latter half of 2002. Results from the tests have been shared with the CMC's Israeli partners and are being evaluated. The next step in the project is to ship the portal to Israel for further development and testing. Soreq will add radiation detection to the portal, and the Israel Security Agency will perform an extensive field test at locations within Israel. Future plans include working cooperatively with the government of Jordan to test the portal at an official border crossing between Jordan and Israel.

Source: Amir H. Mohagheghi 6924, MS 1373, 505-844-6910, fax 505-284-5055, ahmohag@sandia.gov; Chuck Rhykerd 5848, MS 0782, 505-284-2602, fax 505-844-0011, clrhyke@sandia.gov

Wireless Networking at Joyo Reactor Japan



For several years, the International Atomic Energy Agency (IAEA) has been developing unattended and remote monitoring systems. The purpose of the monitoring systems is to maintain continuity of knowledge of nuclear materials inside member states' facilities. In light of the growing number of facilities requiring inspection, use of such monitoring systems is essential to maximize the effectiveness of the finite number of inspectors available to the IAEA.

One of the major cost burdens of the monitoring systems within nuclear facilities has historically been the cabling, involving

- high start-up costs during installation
- high inspection costs to ensure the cabling has not been tampered with
- high maintenance costs throughout the life cycle of the system

One method of reducing this cost burden is to develop systems based on wireless communications.

Wireless networking has potential for use in safeguards applications, although it was not originally designed for use in industrial applications or within nuclear facilities. Wireless networking also allows more freedom in sensor placements. Unfortunately, both a perceived lack of data security and a potential for interference with facility operational equipment have contributed to a major reluctance on the part of facility operators to employ wireless systems. Today's advanced technology has largely addressed these concerns.

Sandia National Laboratories is working with the IAEA and the Japan Nuclear Cycle Development Institute (JNC) to demonstrate data security and lack

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newly formed Department of Homeland Security (DHS). Working through the LANL/LLNL/SNL trilab initiative, Sandia's team is supporting the DHS Science and Technology Directorate in the development of new government-to-government agreements that will facilitate collaboration.

A more recent opportunity for collaboration has arisen in postwar Iraq. Jointly, the leadership of the Arab Science and Technology Foundation (ASTF) and ISP have developed a concept for engaging Iraqi scientists and engineers in collaborative, peaceful research. As with the Russian collaborations developed over a decade ago, the proposed collaboration leverages the strong R&D relationships Sandia has nurtured over many years with colleagues in the region. The Iraqi-engagement concept is highlighted in this issue by our guest editorialist, Dr. Abdalla Alnajjar, President of ASTF.

Through the pursuit of both R&D collaborations and field deployment programs, the International Security

Center is able to maintain a balanced approach to our missions in nonproliferation and combating terrorism. Field projects ensure that the center's R&D is linked to the end-user community, and the R&D projects ensure that the technology gaps identified in the field are rapidly filled with superior technology. This balanced approach allows us to live up to the Science and Technology motto stated in the 2001 *Sandia Annual Report*, "Pursuing science with the mission in mind."

Dori

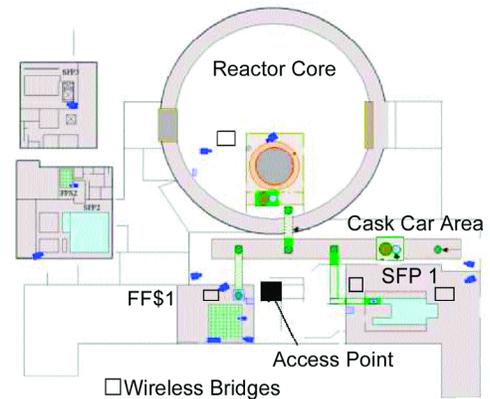
of interference in an actual nuclear facility, with the intention of alleviating concerns and gaining the confidence of facility operators worldwide. The Experimental Reactor Joyo facility at JNC is currently considering wireless solutions, specifically to allow the extension of the JNC's external network into areas that currently only allow internal network access and to allow for safeguards equipment installation.

Sandians from the International Security Center, Susan Caskey, Jason Coombs, and Jim Furaus (recently on fellowship to JNC), teamed with Yu Hashimoto and Masato Hori of JNC to perform a wireless site survey within the reactor area. The team used the IEEE (Institute of Electrical and Electronics Engineers, Inc.) 802.11 wireless specification, also known as Wi-Fi (wireless fidelity). The wireless survey showed that wireless networking using the 802.11 systems at 2.4 gigahertz is a possible solution to allow data transmission within the fresh fuel storage area, the spent fuel area #1, and the cask car area. Using a standard hardware Ethernet connection via a twisted pair connection or other cable already installed, wireless units can be installed within the reactor core and within the cask car area to allow wireless networking within the entire reactor area. The data rates calculated would allow multiple data transmissions and would allow for all types of Internet Protocol (IP) data.

Wireless networking using the 802.11 specifications provides more flexibility and lower cost installation for safeguards

applications than is provided by traditional wired networks. No single option is best suited for all installations, but with proper analysis, a site-specific wireless solution can be determined. By addressing security as a key element in the design phase, a wireless network could provide convenient and cost-effective networking within a nuclear facility where a wired network might not be feasible.

Source: Susan A. Caskey 6924, MS 1373, 505-284-5095, fax 505-284-5055, sacaske@sandia.gov; Heidi A. Smartt 6923, MS 1361, 505-844-3798, fax 505-284-5537, hasmart@sandia.gov



JNC Containment Area



SNL performing site survey

ISTC and STCU – Incubators for Good Ideas



Sandia National Laboratories provides technical support for two international science center programs that promote the nonproliferation of biological, chemical, and nuclear weapons of mass destruction technology. The science center programs, sponsored by the US Department of State (DOS), are intended to provide weapons scientists from countries of the former Soviet Union (FSU) with opportunities to redirect their talents to peaceful science with future commercial applications.

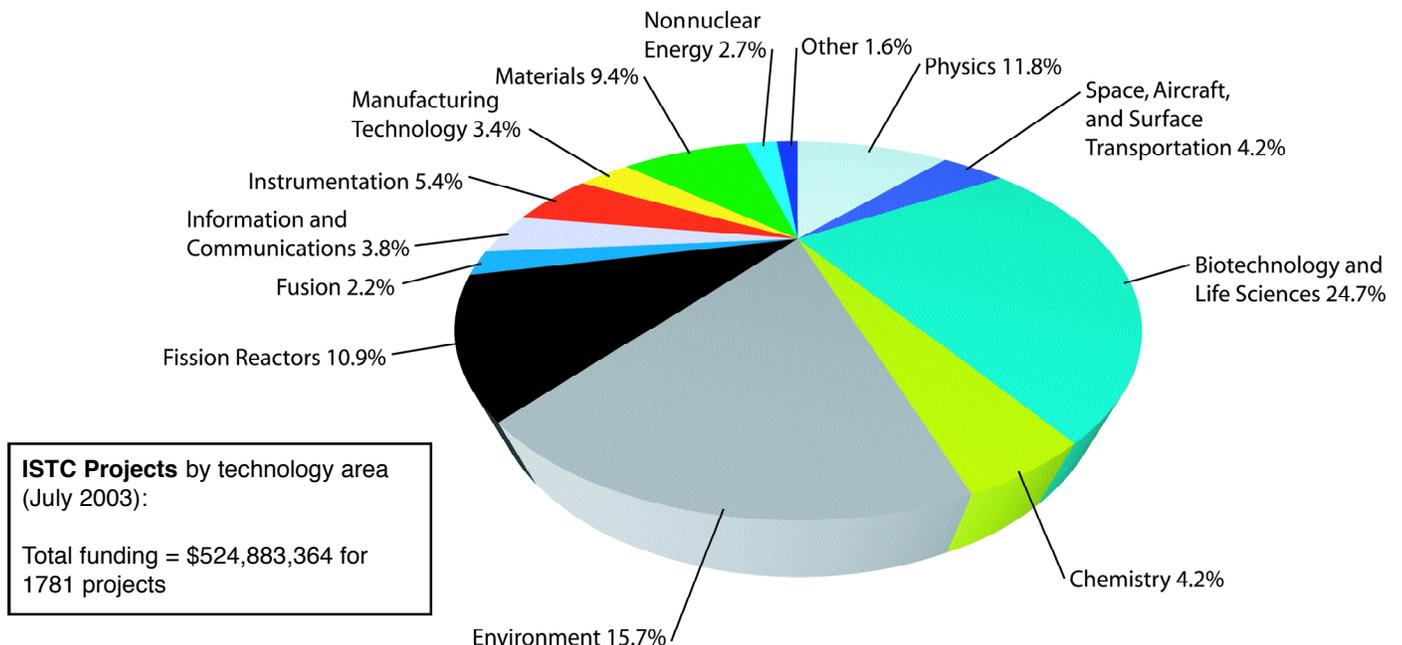
The science centers coordinate the efforts of numerous governments, international organizations, and private sector industries in this endeavor. The International Science and Technology Center (ISTC) is headquartered in Moscow and supports projects from Russia, Armenia, Belarus, Georgia, Kazakhstan, the Kyrgyz Republic, and the Republic of Tajikistan. The Science and Technology Center in Ukraine (STCU), with headquarters in Kiev, provides support for projects originating in Ukraine, Georgia, and Uzbekistan.

In addition to helping the former weapons scientists redirect their talents into other areas, the science centers also assist the FSU countries to develop self-sustaining programs as they transition into

market-based economies. About 24,000 Russians have been engaged through the ISTC program since 1992, and almost 6000 former weapons scientists from Ukraine have been engaged through the STCU.

The science centers are incubators for good ideas: Former weapons scientists submit research proposals to the science centers for funding consideration. Each proposal, usually for a project from one-to-three years in length, is reviewed by DOS science advisers and other experts to assess the technical merit and the feasibility of the project as well as potential commercial applications that could result from the project. Collaborators from the US, France, Canada, Germany, Japan, and other countries are identified to work with the former weapons scientists to provide for a mutually beneficial exchange of ideas and to mentor and integrate the scientists into the international scientific community. Often, the projects propose innovative solutions to current technical challenges. In many cases, potential industrial partners or other funding agencies that may have specific interest in the outcome of the projects are identified. A Partner Program provides opportunities for private industry, scientific institutions, and other governmental or

ISTC and STCU continued on page 9



DOE/NNSA Sponsors Groundbreaking Venue for FSU Technologies

The Department of Energy's (DOE) National Nuclear Security Administration (NNSA) sponsored a Partnerships for Prosperity and Security exhibition-conference in Philadelphia, November 5-6, 2003. This is the first forum of its kind to foster peaceful economic partnerships and energy security between the US and the former Soviet Union. At the exhibition, world-class scientists and engineers from Russia, Ukraine, and Kazakhstan unveiled innovative technologies, many of which have been previously inaccessible to US companies.

Sandia National Laboratories, Numotech, Spektr Conversion, LLC, and MCC Technologies promoted various joint projects at the Partnerships for Prosperity and Security exhibition-conference. Among the projects promoted by Spektr were the Numobag, the generic total contact seat, the back support system, the oxygen concentrator, and the universal leg. MCC Technologies promoted its tank cleanup pump.

The two-day conference at the Pennsylvania Convention Center featured 140 high technology products ready for commercialization in diverse industries, including nuclear fuel and reactors; coal, petroleum and gas; and hydrogen technology. Attended by prominent officials and industry leaders from the US and the former Soviet Union (FSU), the conference follows significant strides in recent months to enhance the energy dialogue between the US and Russia, to deepen the partnership between the two countries' fuel and energy sectors, and to encourage investment. The exhibition-conference was produced by the United States Industry Coalition (USIC).

Source: Partnerships for Prosperity & Security <<http://www.partnershipforprosperity.net/newsroom.php>>

ISTC and STCU continued from page 8

nongovernmental organizations to fund research at FSU institutions via the ISTC or the STCU. A number of projects have successfully developed into commercial applications or have solved important scientific/technical problems.

Sandia supports the science centers in several important ways. First, Sandia provides the State Department with a science adviser to review incoming proposals. Gloria Chavez, FSU Cooperative Initiatives Department 6927, is currently serving in this capacity. The science adviser reviews hundreds of proposals annually, selects appropriate technical reviewers, makes recommendations for collaborators, and tries to integrate with Sandia program interests, if appropriate. The science adviser then summarizes the proposals and makes recommendations for funding or improvements to the proposals.

The Sandia science adviser is one of five advisers DOS has designated at the national laboratories. The advisers work as a team in proposal evaluation and funding recommendations. They participate in DOS-sponsored ISTC and STCU governing board

meetings which result in the final selection of projects and also provide follow-up or auditing assistance to DOS, as requested. The Sandia science adviser also acts as a point of contact or interface between Sandia and the DOS Science Centers Program Office.

Sandia also supports the science centers by providing qualified technical collaborators for projects of interest to Sandia. Sandia currently participates in more than 120 projects through the science centers in areas as diverse as treaty verification, transportation, advanced electronic prosthetics, wind power, pharmaceutical development, photovoltaics, batteries, and environmental programs.

Good ideas that are given a chance and assisted in development by the science centers can become commercial successes and provide long-term solutions to employment problems faced by former weapons scientists.

Source: Gloria Chavez 6927, MS 1374, 404-845-8737, fax 505-844-2193, gechave@sandia.gov



Many departments at Sandia National Laboratories have a hand in the National Nuclear Security Administration's (NNSA) Russian Transition Initiative (RTI), formerly the Nuclear Cities Initiative and the Initiatives for Proliferation Prevention (IPP). The primary nonproliferation goals of RTI include reducing the size of the three nuclear weapon enterprises in Sarov, Snezhinsk, and Zheleznogorsk and finding non-weapon-related employment for the highly skilled workers there. Since its inception in the early 1990s, Sandia's RTI team has been actively engaged in finding creative ways to accomplish these goals. A medical-device manufacturing joint venture between a US company and a private Russian company in Snezhinsk is the latest example of success.

This unique joint venture builds on relationships among the key players developed over several years. (See inset on page 12 for participant details.) Dr. Robert Felton, President of Numotech, Inc., sought out Sandia when he needed engineering expertise to complete his company's development of an oxygen therapy device for burn victims, the Numobag. As Sandians Mark Vaughn, Engineering and Manufacturing Software Department, and Keith Miller, Structural Dynamics Engineering Department, designed a simple and inexpensive improvement for the Numobag, they introduced Numotech to the RTI program as a potential source of highly skilled labor for the team. The Sandia/Numotech team developed several highly technical project proposals for consideration by the IPP, a subelement of RTI. (See inset on page 13 for product descriptions.)

With NNSA's endorsement, the Russian collaborator on these projects was an entrepreneurial startup in the city of Snezhinsk, called Spektr-Conversion, LLC. In late 1999, Snezhinsk's All-Russian Scientific Research

Institute of Technical Physics (VNIITF) created an organization responsible for conversion activities and staffed the organization with over 350 employees. When VNIITF closed the doors to this enterprise after one year, about 40 dedicated engineers decided to stay with the fledgling effort and determined to make a go of the company on their own. By the fall of 2000, Spektr-Conversion, LLC, was formed. As a new enterprise in a closed nuclear city, the equivalent of an American company town, the 40 die-hards were fighting an uphill battle, often working without pay in buildings without heat and completing maintenance and construction tasks on the weekends.



Spektr employees

The IPP projects were instrumental in providing a framework that allowed Spektr to develop into a profitable company. As the IPP projects gained traction, Sandian Ray Shaum, Intelligent Systems and Robotics Center Administrative Support Department, worked with Margot Mininni of the Nuclear Cities Initiative (NCI) subelement of RTI to spearhead the business infrastructure development for Spektr. These efforts included facility expansions, office equipment and furniture, telephones, Internet access, large manufacturing equipment, accounting software, marketing plans, Web sites, and training.

As the Numotech-Spektr-Sandia relationship matured, Numotech introduced its Wall Street investment bankers, M. R. Beal, to the team. M. R.

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Robotic System for Humanitarian Demining

The United Nations estimates that 100,000,000 landmines are buried in 70 countries around the world. On the average, 1,000,000 new landmines are placed each year, while current demining efforts remove only 100,000 landmines per year. Landmine casualties since 1975 have averaged 26,000 annually, with 300,000 children maimed during this time.

In an effort to address the landmine problem, RTI has accepted a proposal for a project to integrate and adapt an affordable robotic vehicle capable of operating on a variety of terrains and able to detect and mark metallic or nonmetallic landmines with the use of sensors meeting United Nations standards for humanitarian demining. The RTI project, Robotic System for Humanitarian Demining Operations, teams Sandia with Stolar Horizon and Spektr-Conversion, LLC.

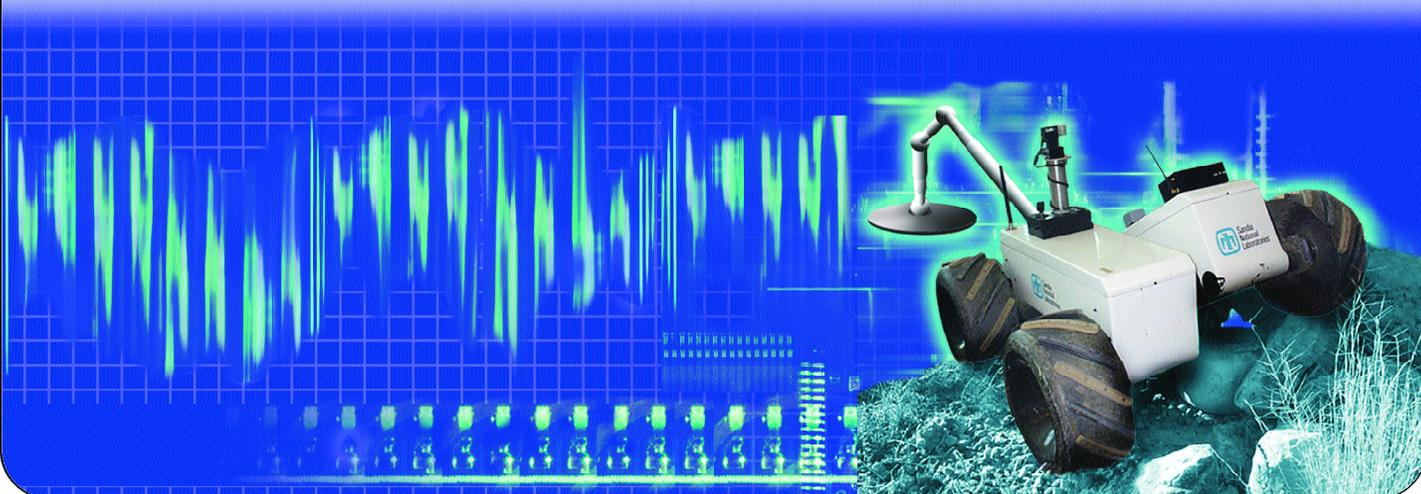
Experts from Sandia's Intelligent Systems and Robotics Center will provide their expertise in mobile robotic vehicles, manipulator arms, and systems integrators to guide the development of this mobile, lightweight robotic vehicle and integrated manipulator arm and sensor. The project will begin with adaptation and improvement of a Sandia RATLER™. The vehicle will be teleoperated, will be able to operate on a variety of terrains, and will employ sensors and a robotic arm to locate, identify, and mark landmines.

Imaging plastic landmines is a challenge to current demining efforts. To address this problem, Stolar Horizon will contribute its unique technology for imaging plastic landmines. Stolar Horizon will bring to the table a proprietary Electromagnetic Wave Detection and Imaging Transceiver (EDIT) with an x-y tracking device that can be used to detect and image both metallic and nonmetallic land mines, with low false alarm rates and a proven high probability of detection. The project will also provide an opportunity for EDIT software enhancements.

Spektr scientists will provide the manpower and technical engineering effort to design, develop, fabricate, assemble, and test the integrated robotic vehicle, arm, and sensor. Spektr will also provide technical expertise and effort to assist Stolar Horizon to perform software and integration enhancements to the EDIT sensor.

Successful development and integration of an economical mine detection vehicle has significant commercial potential for production of vehicles and sensor components in Russia. When a prototype vehicle has been tested and qualified by the United Nations, production and assembly lines in Russia will be developed in anticipation of manufacturing the vehicle.

Source: Jennifer F. Gilbride 2113, MS 0479, 505-845-8383, fax 505-844-4756, jfgilbr@sandia.gov



Beal provided the critical financial insights needed to bridge the gap between technology development and market profitability. As the team continued to mature, M. R. Beal investigated potential funding for a joint venture through the Overseas Private Investment Company (OPIC). The OPIC evaluators were impressed with the work and the teaming relationships. Believing that the joint venture has a good chance for success, OPIC has authorized up to \$25 million in political risk insurance and \$10 million in loans to the venture.

Both Russian and US government officials have been enthusiastic supporters of the joint venture and this business model. At the Partnerships for Prosperity and Security exhibition-conference in Philadelphia held November 5-6, 2003, US Secretary of Energy Abraham and Russia's Minister of Atomic Energy Rumyantsev

formally announced the establishment of the joint venture. (See related article on page 9.) Secretary Abraham highlighted Sandia's contribution to the establishment of the joint venture and presented a plaque to Sandia expressing his appreciation for

Swords to Plowshares continued on page 13



The Players

 Spektr-Conversion, LLC is an industrial design and engineering firm providing technical expertise and services for application in the oil, automotive, and medical technology sectors.

Numotech, Inc., a Delaware Corporation headquartered in Northridge, California, is a development-stage medical devices company targeting the wound care industry. Numotech specializes in research, design, manufacture, and marketing of wound care treatment and prevention products for advanced-stage wounds.

 M. R. Beal & Company offers investment banking, financial advisory, and broker dealer services to municipalities, state governments, and corporations. M. R. Beal is headquartered in New York City, with offices in Sacramento, Chicago, Dallas, New Orleans, and Washington, DC

Overseas Private Investment Corporation (OPIC) helps US businesses invest overseas, fosters

economic development in new and emerging markets, complements the private sector in managing the risks associated with foreign direct investment, and supports US foreign policy. By expanding economic development in host countries, OPIC-supported projects can encourage political stability, free-market reforms, and US best practices.

 United States Industry Coalition, Inc. (USIC) is a nonprofit association of American companies and universities that are active participants in our nation's long-term nonproliferation efforts with the former Soviet Union.

NNSA Russian Transition Initiatives (RTI) (NA-245): Cindy Lersten was recently appointed to serve as the program director of this nonproliferation program geared to the reemployment of WMD scientists in Russia and former Soviet Union countries.

Sandia's "vital role in realizing the first US-Russian joint venture in the closed city of Snezhinsk" and for Sandia's "commitment to US nonproliferation efforts in Russia."

Concurrently with forming the joint venture, Spekr continued to pursue the higher levels of excellence required to compete in the international medical device manufacturing marketplace. To this end, on July 31, 2003, Spekr successfully passed the audit for quality system conformity with international standards for ISO 9001:2000 and ISO 13485:96. Spekr is one of five enterprises in Russia to possess these two certificates simultaneously and obtained these certifications more quickly than any other Russian enterprise. These quality standards increase the efficiency of the organization and will be used in the joint venture manufacturing facility.

The creativity, enthusiasm, and diligence of Sandia's RTI team have been a key element to success. In addition to Ray Shaum, Leslie Rettinger, Teena Morris, Judy Wade, Jim Rea, Jack Jackson, and Lada Osokina provide the critical programmatic skills necessary to work across departmental and organizational boundaries. Talented technical Principal Investigators Deepesh Kholwadwala and Elaine Hinman-Sweeny of the Engineering and Manufacturing Software Department have joined Mark Vaughn and Keith Miller in executing exciting new collaborations.

Pioneering efforts in every venue and on all fronts by this joint venture team proves that with patience, vision for the future, and a willingness to secure a win for all parties, real success is possible. The telling mark of success, however, will be when several hundred VNIITF employees transition from weapons work to producing world-class products in the new joint venture. By that act, the US-Russian RTI program will turn the swords of nuclear weapons into the plowshares of superior medical devices.

Source: Leslie Rettinger 6929, MS 1371, 505-284-5252, fax 505-844-8119, laretti@sandia.gov

Products

Numobag: A portable, disposable plastic chamber that attaches at the patient's chest and applies an oxygen bath at a constant low pressure, the Numobag has been clinically verified to promote healing of pressure sores and many other diseases characterized by open wounds.



Generic Total Contact Seat (GTCS): A motorized, battery-powered wheelchair cushion clinically verified to help heal pressure ulcers, GTCS is the only seat approved as a Regulatory Class II medical device by the FDA. This high-tech wheelchair seat cushion automatically varies pressure on the buttocks and thighs of quadriplegics and allows those formerly confined to bed to increase the time spent sitting up, consequently increasing productivity.



Back Support System (BSS): A complement to GTCS to provide comfort and reduce fatigue for wheelchair-bound patients, BSS does not directly contact the spine but instead uses air bags to support surrounding musculature. Food and Drug Administration approval is pending.



Oxygen Concentrator: The oxygen concentrator, which provides 100 percent oxygen from the atmosphere for immediate use, functions as a complement to the Numobag or as a stand-alone product. Eliminating heavy, bulky oxygen tanks makes new treatment opportunities and uses in nonmedical fields possible.



Universal Leg: The world's first low-cost, high-tech lower leg prosthesis is intended for use in developing countries where access to prosthetic devices is essentially nonexistent due to costs. This innovative approach to prosthetics will be available at a fraction of the cost of current prosthetics.

IPT Reaps Benefits of ISO Certification

The International Procurement Team (IPT) of Department 10257 is collocated in the International Programs Building with International Security Center 6900. The IPT, which specializes in providing contracting and related value-added international business and strategic support services, was recommended for ISO 9001:2000 certification in July 2003.

The International Organization for Standardization, referred to as ISO, is a nongovernmental federation of national standards bodies from 140 countries. ISO, established in 1947, promotes the development of standardization and related activities to aid the international exchange of goods and services and to bolster cooperation in intellectual, scientific, technological, and economic activity. ISO's work results in international agreements that are published as international standards: documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics to ensure that materials, products, processes, and services are fit for their purpose.

The IPT sought ISO certification as one way to improve its business management systems — a fully integrated, well-understood, data-driven system that enables delivery of products and services that meet customer requirements. ISO 9001:2000 is currently the most internationally recognized and respected quality certification available. This latest version of ISO 9000 is used by companies seeking a management system that provides confidence their products conform to established or specified requirements. The rigors of an ISO-certified system provide for a quality, excellence, and continuous improvement model. The certification additionally requires internal and external audits of the system as well as other assurance model features. All of these aspects of an ISO-certified system provide benefits shared by the certified organization, its customers, and its stakeholders.



The IPT is a customer-driven support organization and views customers as integral partners in achieving results that add strategic value to Sandia objectives and the programs of its sponsors. In achieving ISO 9001:2000 certification, the IPT anticipates many enhancements in its ability to serve its customers. Identifying the most efficient process based upon customer needs and then being held responsible for continuous improvement efforts impacts the way the IPT performs its core business functions. Additional focus with suppliers and other stakeholders in order to best achieve results for an integrated overall work process is another important aspect of the benefits of an ISO certified process.

Source: Todd Dunivan 10257, MS 1376, 505-284-5455, fax 505-844-5771, tpduniv@sandia.gov

Longworth Sworn in as NNSA Deputy Administrator



On July 30, 2003, Secretary of Energy Spencer Abraham administered the oath of office to Paul M. Longworth to be the deputy administrator for defense nuclear nonproliferation of the National Nuclear Security Administration (NNSA). NNSA

is a semiautonomous agency that carries out the national security responsibilities of the Department of Energy (DOE), maintaining the US nuclear weapons stockpile, promoting international nuclear nonproliferation, and providing the US Navy with safe and effective nuclear propulsion.

Longworth had previously served as the senior policy advisor for national security and the former Soviet Union for Abraham. President Bush nominated Longworth to be deputy administrator on April 25, and he was confirmed by the Senate on July 21.

Longworth said his main concerns as deputy administrator will be to continue promoting the

administration's nonproliferation priorities. Those priorities include preventing the proliferation of weapons of mass destruction through securing and reducing nuclear materials worldwide and improving transborder security to keep dangerous weapons and materials from reaching the hands of US adversaries or entering the US.

Longworth, who has over seventeen years of experience in national security, nuclear, and environmental issues, has served in the executive and legislative branches of the federal government and in the private sector. Prior to coming to DOE, Longworth served as a professional staff member on the Senate Armed Services Committee, where he was responsible for defense nuclear matters, including nuclear weapons, radioactive cleanup, fissile materials disposition, and naval nuclear propulsion programs. He has also worked for the Senate Environment and Public Works Committee, the Center for Strategic and International Studies, and the DOE Office of Science and Technology.

Source: <http://www.usnewswire.com/>

Dori Ellis Named *Woman of Achievement*

Dori Ellis, Director of International Security Center 6900, formerly 5300, was named a 2003 Radiochemistry Society (RCS) *Woman of Achievement*. In presenting the award, Dr. Faraj Ghanbari, Defense Nuclear Materials Stewardship Department 6926, cited Ellis' leadership in international cooperation toward reducing the threat of terrorism and of proliferation of weapons of mass destruction (WMD). Ellis' support for and contributions to the first International Workshop on the Radiological Sciences and Applications (IWRSA) held in Albuquerque on June 16-18, 2003, were also referenced. The workshop, sponsored by RCS and chaired by Ghanbari, comprised the theme "Issues and Challenges of Weapons of Mass Destruction Proliferation." Attendees included 70 international experts from ten countries who delivered 23 oral presentations and participated in seven discussion sessions.

RCS is an international scientific professional organization whose members specialize in both applied and fundamental radiochemistry, nuclear sciences, and environmental concerns. The RCS was formed through the collaborative efforts of many scientists and professionals with the vision of establishing an international resource that provides governments, agencies, and individuals with technical support and guidance on issues dealing with radiochemistry, radiometric measurements, medical isotopes, and national and international security issues.

Source: Faraj Ghanbari 6926, MS 1371, 505-284-2041, fax 505-284-9088, fghanba@sandia.gov



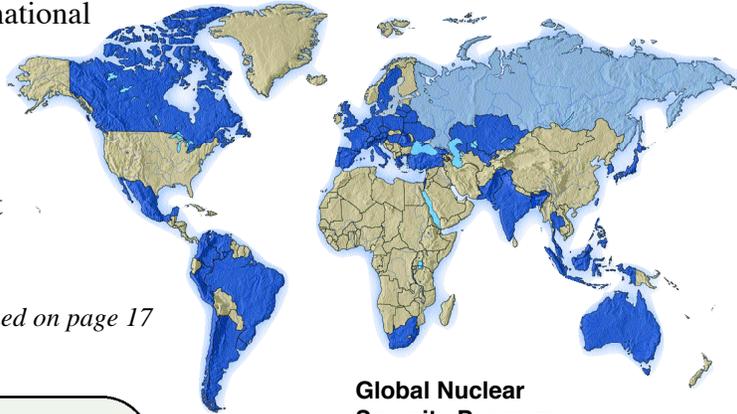
Dr. Faraj Ghanbari, IWRSA Chairman, presents the RCS *Woman of Achievement* Award to Dori Ellis.

NNSA Establishes Global Nuclear Security Program

Sandia National Laboratories has been supporting DOE's various global nuclear security efforts since 1974. Under these programs, Sandia has assisted in security efforts by identifying and/or implementing security improvements in over 50 countries, indicated in blue on the map below.

The DOE's National Nuclear Security Administration (NNSA) has recently reorganized many of these programs to form the Global Nuclear Security Program (GNSP) under the Office of International Safeguards (NA-243). The GNSP works to improve nuclear security systems in all non-nuclear-weapons states, working cooperatively with governments worldwide and the International Atomic Energy Agency (IAEA) to strengthen physical protection measures at nuclear facilities. The program exercises its mandate through the following efforts:

1. Participation in the IAEA's International Physical Protection Advisory Service (IPPAS) missions
2. Bilateral cooperation to ensure facilities with US-origin nuclear materials are protected from theft or diversion



GNSP continued on page 17

Global Nuclear Security Program

Protection of Non-US-Origin Material

Sandia is actively engaged in providing nuclear security assistance to non-nuclear-weapons states on a bilateral basis. Sandia has provided 15 countries with assistance under NA-243's program, including Belarus, Bulgaria, the Czech Republic, Georgia, Hungary, Indonesia, Kazakhstan, Latvia, Lithuania, Poland, Portugal, Romania, Serbia, Ukraine, and Uzbekistan. Sandia is involved in plans for upgrades to sites in at least five additional countries in fiscal year 2004, including Bangladesh, Greece, and Indonesia.



Integration of sensors, cameras, access controls, response force and other physical security system elements

Protection of US-Origin Material

Visits to assess the security of nuclear material provided by the US to other countries began in 1974 after the terrorist attack at the Munich Olympics. This requirement was codified in the 1978 Atomic Energy Act, which mandates adequate security of US-origin nuclear material provided to other countries for peaceful purposes. To date, the NNSA has performed over 140 visits to over 40 countries, covering all continents except Antarctica. Sandia has participated in the majority of these visits.



Terrorist at Munich Olympics, 1972

3. Bilateral cooperation with facilities with non-US-origin nuclear material to ensure their material is protected from theft or diversion
4. Extensive support to the development of the IAEA's physical protection training courses, guidance documents, and international regulations and policies

As a participant in these efforts, Sandia is actively engaged in securing nuclear materials and preventing the proliferation of nuclear weapons.

Source: John Matter 6923, MS 1361, 505-845-8103, fax 505-284-5437, jcmatte@sandia.gov

Training and Guidelines

Sandia is actively engaged in training students throughout the world in nuclear security topics. The primary forum for this training is the International Training Course (ITC), an intensive three-week training course in nuclear security that is sponsored by the IAEA and DOE. Since 1978, Sandia has trained over 400 students from over 60 countries in courses held in Albuquerque, New Mexico. ITC-18 is scheduled to be held in Albuquerque on October 17 through November 5, 2004.



Training and Guidelines

In addition, Sandia trains international students in regional training courses that are similar to the ITC and are held outside the US in countries such as the Czech Republic, China, Brazil, Australia, and Mexico. Other international courses include Design Basis Threat Development, Insider Analysis, and Vital Area Identification.

These courses give Sandia the unique opportunity to meet with high-level security experts to share ideas on nuclear security and to positively influence the security culture of other countries.

In the area of regulatory development, Sandia has provided significant technical advice to the IAEA. Sandia played a key role in the revision of IAEA recommendations for physical protection, Information Circular 225/Revision 4 (Corrected), *The Physical Protection of Nuclear Material and Nuclear Facilities*, and continues to provide advice and assistance on the development of

technical documents, such as IAEA TECDOC 967 (Revised) *Guidance and Considerations for Implementation of INFCIRC/225/Rev.4 The Physical Protection of Nuclear Material and Nuclear Facilities* and TECDOC 1276 *Handbook on the Physical Protection of Nuclear Materials and Facilities*.

International Physical Protection Advisory Service (IPPAS)

IPPAS was established by the IAEA in 1996 to assist its member states in the evaluation and improvement of their physical protection systems. An IPPAS mission is only performed at the request of an IAEA member state. To date, the IAEA has conducted 26 IPPAS missions to 19 countries. Physical protection experts from Sandia National Laboratories have led or participated in 21 of the 26 missions. Many of these missions have led to recommendations for, and implementation of, additional security upgrades to nuclear facilities.



IPPAS mission to Mexico, December 2003

Visiting Research Scholar Program

Sandia National Laboratories' International Security Programs (ISP), in cooperation with the University of New Mexico (UNM), sponsors a Visiting Research Scholar Program that brings together visiting policy experts and Sandia's technical experts to conduct research. The multidisciplinary research and analysis program was established in 1997 by the ISP's Cooperative Monitoring Center (CMC). The UNM Institute for Public Policy contributes its management expertise, assisting with recruitment, administration, and project oversight.



Amir Mohagheghi and Annie Sobel hosted (l to r) Ms Sahar Jreisat, Jordan, Ms Nour Nasser, Palestine, and Mr. Eli Gordon, Israel, from July 14 through August 29, to study Middle East cooperative surveillance of infectious disease (MECIDS).

Each year the CMC hosts a small number of scholars for three to six months to conduct research into the role of technology in supporting cooperative security. Specific areas of research interest include nonproliferation, cooperative monitoring,

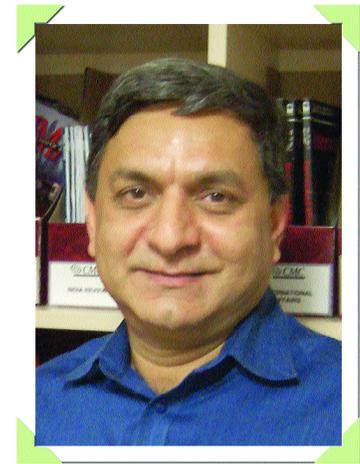


Michael Vannoni is currently hosting Duk-Ho Moon, South Korea, to study nuclear monitoring in Korea.



Jennifer Koelm hosted Ravi Vohra (at right) of India, and Hasan Ansari (at left) of Pakistan, from May 19 to September 5, 2003, to study maritime security.

transparency, confidence building, environmental issues, and arms control verification. Applicants are selected through a competitive process that considers mutual areas of interest between the individual researcher and the CMC, periods of availability, and project proposals.



Michael Vannoni hosted Feroz Khan, Pakistan, from January 14 through August 29, 2003, to study missile control in South Asia.

Participating scholars are hired as temporary employees of UNM during their residency, and they have full access to university research libraries and support facilities. The CMC provides office space, computers, communications, and administrative support. The CMC staff works closely with scholars to provide technical information and assistance.

Visiting Scholars continued on page 19

Arab Science and Technology Foundation

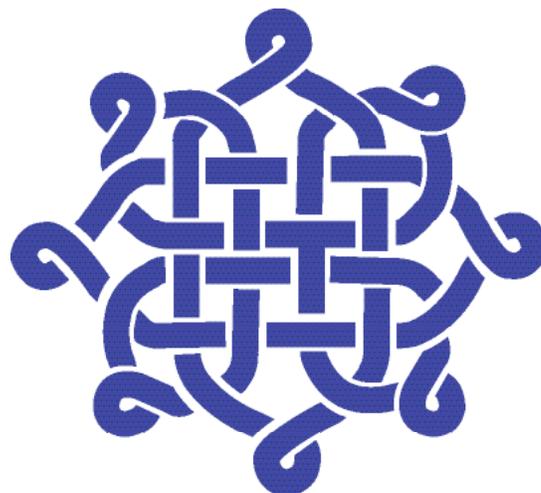
A Resolution by 50 Arab scientists participating in the April 2000 *Symposium on Scientific Research Outlook in the Arab World and the New Millennium: Science and Technology* (SRO 2000) established the Arab Science and Technology Foundation (ASTF). Arab scientists and researchers from inside and outside the Arab world as well as representatives of Arab and international science institutions were involved in establishing the foundation. Dr. Abdalla A. Alnajjar, Director of the Research Center at the University of Sharjah in the United Arab Emirates, serves as president of ASTF, which includes members from 21 nations.

The ASTF is an independent, nongovernmental, nonprofit organization with a mission to encourage and support excellence and innovation in scientific and technological research in the Arab countries. ASTF also promotes coordination and cooperation among scientists and scientific organizations for the sake of applying knowledge to the service of sustainable development in the Arab countries. Toward these ends, ASTF has established the following activities:

- offering research grants to Arab scientists
- sending Arab scientists on assignments to renowned research centers
- supporting, establishing, and equipping scientific centers of excellence in Arab countries

- developing a database of Arab scientists working inside and outside the region
- setting up the Internet Portal for Science and Technology, which links websites, networks, and databases of institutions inside and outside the Arab world
- publishing reports that identify developments and trends in science and technology worldwide that affect the vital interests of Arab countries
- organizing conferences dedicated to important issues for the Arab world, such as water, energy, food, information technology, knowledge management, and the brain drain

Source: <http://www.astf.net>



Visiting Scholars continued from page 18

By bringing together policy experts and technical experts, the CMC and UNM seek to stimulate innovative ideas, promote discussion of new initiatives, and contribute to the literature about arms control, monitoring and verification technologies, and cooperative security.

Source: <http://www.cmc.sandia.gov/Links/about/about-mainframe.htm>

Amir Mohagheghi hosted Dr. Abdalla A. Alnajjar, United Arab Emirates, from July 28 through August 22, 2003, to study the role of technology in Arab development. Alnajjar, Director of the Research Center at the University of Sharjah in the United Arab Emirates, serves as president of the Arab Science and Technology Foundation (ASTF). (See Guest Editorial on page 3.)



Acronyms

ASTF	Arab Science and Technology Foundation (United Arab Emirates)	MINATOM	Ministry of Atomic Energy (Russia)
BSS	Back Support System	NA-241	Nonproliferation Policy Division of the Office of Nonproliferation and International Security (DOE/NNSA)
CMC	Cooperative Monitoring Center (SNL)	NA-243	International Safeguards Division of the Office of Nonproliferation and International Security (DOE/NNSA)
CTR	Cooperative Threat Reduction	NA-245	Russian Transition Initiatives Division of the Office of Nonproliferation and International Security (DOE/NNSA)
DHS	Department of Homeland Security (US)	NCI	Nuclear Cities Initiative (RTI)
DOE	Department of Energy (US)	NNSA	National Nuclear Security Administration (DOE)
DOS	Department of State (US)	OPIC	Overseas Private Investment Company
EDIT	Electromagnetic Wave Detection and Imaging Transceiver	R&D	research and development
FSU	former Soviet Union	RATLER™	Robotic All Terrain Lunar Exploration Rover
GNSP	Global Nuclear Security Program	RCS	Radiochemistry Society
GTCS	Generic Total Contact Seat	RTI	Russian Transition Initiative (DOE/NNSA)
IAEA	International Atomic Energy Agency (Vienna, Austria)	S&T	science and technology
IAEC	Israel Atomic Energy Commission	SNL	Sandia National Laboratories (US)
IAP	InterAcademy Panel	SRO	Scientific Research Outlook
IEEE	Institute of Electrical and Electronics Engineers, Inc.	STCU	Science and Technology Center in Ukraine (Kiev, Ukraine)
IP	Internet Protocol	UNM	University of New Mexico (Albuquerque, NM, US)
IPP	Initiatives for Proliferation Prevention (RTI)	US	United States of America
IPT	International Procurement Team (SNL)	USIC	United States Industry Coalition, Inc.
ISO	International Organization for Standardization	VNIIA	All-Russian Scientific Research Institute of Automatics (Moscow, Russia)
ISP	International Security Programs (SNL)	VNIIEF	All-Russian Scientific Research Institute of Experimental Physics (Sarov, Russia)
ISTC	International Science and Technology Center (Moscow, Russia)	VNIITF	All-Russian Scientific Research Institute of Technical Physics (Snezhinsk, Russia)
IWRSA	International Workshop on the Radiological Sciences and Applications (June 2003)	Wi-Fi	wireless fidelity
JNC	Japan Nuclear Cycle Development Institute	WMD	weapons of mass destruction
LANL	Los Alamos National Laboratory (US)		
LLC	Limited Liability Company		
LLNL	Lawrence Livermore National Laboratory (US)		
MCC	Mining and Chemical Combine		
MECIDS	Middle East Consortium on Infectious Disease Surveillance		

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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.

SAND2004-0180P



PUBLISHED BY:
Sandia National Laboratories
International Security Programs
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