

TESTIMONY BEFORE THE HOUSE SCIENCE
SUBCOMMITTEE ON RESEARCH AND SCIENCE EDUCATION

HEARING ON THE ROLE OF
NON-GOVERNMENTAL ORGANIZATIONS AND UNIVERSITIES
IN INTERNATIONAL SCIENCE AND TECHNOLOGY COOPERATION

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Introduction

Chairman Baird, Ranking Member Ehlers, and distinguished members of the Subcommittee, thank you for this opportunity to discuss the role of non-governmental organizations and universities in international science and technology collaboration. I commend the leadership of this committee for developing these hearings to highlight the importance of engaging some of our most valued resources in the United States, our scientists and engineers, to help lead the world toward global solutions for global challenges to build peace and prosperity for all. The United States -- government, non-governmental organizations and universities -- must do more to engage our scientists and engineers in international collaboration.

I have had the privilege of testifying before this Committee on a number of occasions, including when I served as President of the National Academy of Engineering. It is a great pleasure to return today as a member of the Board of the Directors of the U.S. Civilian Research & Development Foundation (CRDF) and to share with you the experience that CRDF has accumulated over twelve years. During that time, CRDF has developed a world-class reputation as an effective and efficient implementer of global

science and technology collaborations and a solid partner with the U.S. government, private sector, and foreign governments and institutions. CRDF's programs have had direct benefits to American science objectives, but also to U.S. foreign policy, public diplomacy, national security, and competitiveness.

It is highly fitting that CRDF is testifying before the House Science Committee. It was this Committee, under the leadership of your former Chairman the late Congressman George Brown, that spawned the creation of CRDF in 1992. As you know, Chairman Brown was an ardent and articulate advocate of developing innovative efforts to build science and technology collaboration between the U.S. and other countries. He understood the benefits to the U.S. scientific community of high-quality international collaborations in the basic and applied sciences. He understood the value of international science and technology cooperation as an important tool to advance U.S. foreign policy and national security, specifically at that time with the countries of the former Soviet Union (FSU). Finally, he felt strongly about the role of NGOs in helping to build these partnerships, thus the establishment of CRDF. It is for this reason that CRDF gives an eponymous annual award for international science achievement - the George Brown Award for International Scientific Cooperation.

CRDF: HISTORY, MISSION, AND PROGRAM ACCOMPLISHMENTS

CRDF is a unique organization in that it is an independent, non-governmental organization created by the U.S. Congress to help advance U.S. science, foreign affairs and national security priorities. Based in Arlington, Va., with three support offices abroad, CRDF has grown to include a global staff of over 130 people working with more than 20 countries. Incorporated as a not-for-profit organization in the Commonwealth of Virginia, CRDF is governed by an independent Board of Directors whose fourteen members represent a cross section of American science, foreign policy, nonproliferation, academic and business communities. CRDF also routinely seeks advice from a group of preeminent experts, including a Nobel laureate in chemistry, who serve on CRDF's Advisory Council. CRDF's staff contributes experience in science, international affairs, program and project management, finance, grant administration, nonproliferation and policymaking. Many of our staff have lived, studied or worked overseas. The

scientific backgrounds of many of our foreign staff and their experience working in the science establishments of their own countries provide invaluable capabilities and credibility for successful implementation of CRDF's program activities.

CRDF's unique specialty is its ability to quickly and effectively implement international science and technology partnerships selected on scientific merit and mutual benefit, and executed with transparency, flexibility, and accountability. It partners and works closely with scientists and policymakers in the U.S. government, other NGOs, universities, foundations, and U.S. companies, as well as with key foreign governments and partners, successfully supporting international collaborative projects valued at over \$350 million. These projects include more than 3,000 grants that CRDF has made under its own programs, and over 1,200 separate projects that CRDF has administered on behalf of U.S. government agencies, universities and businesses supporting research and development projects overseas.

For its own programs, CRDF is extremely effective at leveraging the funds it receives with contributions from other sources, and has secured \$43 million in cost sharing, primarily from foreign government agencies, for 675 projects in ten countries. For example, under its Basic Research in Higher Education (BRHE) program in Russia, CRDF has obtained cost-sharing from Russian sources, including the Russian Federation Ministry of Education and Science, regional and local sources, and universities. These sources contributed 50% of the initial core grants, and then have increased their share, such that they now provide 70% of all program costs and by 2010, they will have assumed 100% of the program costs.

CRDF also works hard to advance the goal of science for diplomacy working in partnership with top scientific societies such as our colleagues here – AAAS and the NAS – as well as with other organizations to focus on how best to help policy makers better understand the unique resources of the U.S. scientific community in fostering and advancing U.S. foreign and national security priorities. Finally, given our success working with the countries of the former Soviet Union, CRDF has expanded its geographic focus across Eurasia, and into the Middle East, North Africa, and Asia. The model and methods developed with this experience can be successfully applied to many situations.

History

Sixteen years ago, Science Committee Chairman Brown, on the floor of the House of Representatives, introduced the “AmeRus Foundation for Research and Development Act” and explained that this bill would “establish an independent, endowed foundation which will identify and fund cooperative research and development ventures between engineers and scientists working in industry, academia, and defense in the United States and the former Soviet Union.” In October 1992, Congress passed the FREEDOM Support Act of 1992. Section 511 of that bill authorized the creation of the foundation. Three years later, the U.S. Civilian Research & Development Foundation was established, with initial funding from the Department of Defense through the Nunn-Lugar program and the National Science Foundation, to advance U.S. policy and security interests through international science collaboration.

Congressman Brown’s support for CRDF was bold. It came at a time of significant geopolitical change overseas and an economic downturn at home. The break-up of the Soviet empire, and the consequent need to secure the weapons of mass destruction and ensure economic stability in the successor states, dominated the U.S. foreign policy agenda. Congressman Brown recognized an historic opportunity for the United States to foster economic stability through support of science and technology cooperation. He argued that the scientists and engineers in the newly independent states would “...play a key role in determining whether the transition to an open and market-driven society will succeed...”

Arguing for support of foreign scientists and engineers during a period of economic downturn in the United States was not easy. Congressman Brown acknowledged the competing demands for budgetary resources and argued that the only “rationale approach” for this new foundation would be based on “mutual cooperation, collaboration and benefit”. The underlying model involved partnerships between scientists and engineers in the former Soviet Union and scientists and engineers in the United States. In other words, scientists and engineers from the United States would be directly involved in the cooperation and stand to benefit from the research, which would be selected based on merit and mutual benefit. The challenges and vision Congressman Brown articulated in 1992 in the former Soviet Union are as relevant today. They also are transportable to other countries and regions facing significant challenges that would benefit from more proactive international scientific engagement programs and initiatives.

CRDF Mission

Today, CRDF remains rooted in the basic principles and approaches outlined by the Science Committee sixteen years ago. CRDF has taken its successful track record in the FSU to implement its mission in other countries and regions globally. The CRDF mission is to:

- Provide cooperative research and development (R&D) opportunities that enable scientists and engineers to address critical security, economic, education and other societal needs worldwide.
- Advance peace and prosperity by funding civilian research and development projects that contribute to global nonproliferation objectives
- Promote the application of science and technology to economic growth through international partnerships and training that foster invention, innovation, entrepreneurship and the commercialization of technology
- Strengthen university research and education in science and engineering.

Program Components and Accomplishments

CRDF realizes its mission by designing and implementing a range of program activities that jointly meet donor requirements and respond to the needs in each country. CRDF currently is administering over *twenty programs* that address each of the four mission areas, as follows:

Research Collaborations

CRDF supports and funds high-quality collaborative research and development projects in the natural sciences. Research projects involving U.S. scientists and foreign counterparts are selected through merit-based competitions. CRDF has provided nearly 1,500 grants in support of collaborative research projects valued at more than \$78 million and involving approximately 8,000 scientists in 15 countries. Targeted research competitions have also been designed to address specific areas of priority to funders, including general biomedical research, HIV/AIDS research, anti-terrorism research, and this coming year, global climate change.

CRDF's flagship research collaboration program is the Cooperative Grants Program (CGP). This program provides up to two years of support for joint U.S. and foreign research teams in all areas of basic and applied research in the natural sciences. Such collaborations strengthen the quality of foreign research to collaborate more effectively with U.S. and

international partners, provide opportunities for junior researchers and female scientists, support the redirection of former weapons scientists to civilian research, and establish the background of knowledge and technology on which successful industry and business partnerships with U.S. institutions may be built. Historically, cooperative research grants have averaged about \$60,000 each but amounts can vary by the research program and the local context in which the awards are made. Grants to the foreign teams typically include individual financial support; equipment, supplies and travel support; and institutional support to the grantee institution; U.S. team expenses are generally confined to travel, supplies, and graduate student stipends.

Such cooperative research grants are extremely valuable in addressing global challenges that can benefit greatly from S&T solutions. One example, focused on disaster mitigation and earthquake hazard, is a CRDF grant to the Institute of Vulcanology and Seismology in Kamchatka, Russia, and Pennsylvania State University. This team improved the scientific understanding of the generation, transport, and deposition of dangerous explosive volcanic gravity flows of hot ash-gas mixtures. Using numeric modeling to simulate directed blast clouds of volcanic eruptions and validating the computer results against field and lab data has resulted in findings that are invaluable for volcanic hazard assessment worldwide.

Another successful CRDF grant, focused on biodiversity and agriculture, involves the Ketskoveli Institute of Botany in Tbilisi, Georgia, and the Missouri Botanical Garden who jointly established the first Caucasus Regional Seed Bank in Tbilisi. The seed bank is a living reservoir of biodiversity in the Southern Caucasus, one of the United Nation's designated world biodiversity hot spots. The seed bank includes many wild varieties of crops originally domesticated in the Caucasus, and examples of plants used as folk remedies, which are candidates for clinical study and use as effective medicines. Some species have already been successfully reintroduced into the wild. CRDF has literally dozens of such cases where joint research has yielded important findings, led to improved partnerships, or opened new areas for investigation.

Nonproliferation and Security

Since its inception, CRDF has worked to transition former weapons of mass destruction (WMD) scientists to civilian research. CRDF has been able to engage former weapons researchers in productive civilian R&D, converting former related facilities to civilian use, and upgrading security at civilian

facilities to prevent their misuse. Given CRDF's expertise and credibility in helping to transition former weapon researchers, the Department of State and Department of Defense continue to request CRDF's help in implementing a variety of threat reduction programs. Most are focused on biological weapons research and conversion of scientists and their associated facilities to civilian applications.

For example, CRDF formed a collaborative project with *Vector*, a former biological defense research facility in Siberia. Highly trained American and Russian virologists collaborated to establish this critical effort to monitor migratory birds as they flew over Novosibirsk, in Siberia. American scientists now famous for their work on avian influenza provided the reagents to *Vector* that allowed the typing within 24 hours of the H5N1 outbreak. Today, the World Health Organization (WHO) is tapping into the capacity that CRDF built at *Vector* and specialists are considering this a model disease surveillance program for emerging threats.

This Russian flu surveillance project is an example of the type of contribution CRDF is offering to the U.S. State Department. A recent focus has been support for the State Department's Biosecurity Engagement Program (BEP), which reduces the risk of biological threats by collaborating with partner governments to develop biosafety and pathogen security standards that are consistent with national and international guidelines, norms and requirements. What is more, CRDF has demonstrated our ability to rapidly respond in difficult environments and transition scientists into meaningful civilian alternatives.

CRDF also recently completed a contract with the Defense Threat Reduction Agency (DTRA), where CRDF managed three Cooperative Biological Research (CBR) projects that engaged scientists from Uzbekistan and Kazakhstan in research that resulted in 19 abstracts presented at international conferences and two articles in peer-reviewed journals. The projects helped to build institutional research capacity; improve biosafety and biosecurity, and increase knowledge of local pathogens. Here is another example of how engagement of this kind brings these people and organizations into the broader international community with strong linkages to U.S. policy and practice.

Innovation and the Transition to Knowledge Economies

CRDF has supported a suite of programs to link foreign researchers and entrepreneurs with prospective U.S. industry partners or investors. CRDF introduced a pioneering industrial R&D collaborative program that matched CRDF's funding of \$11 million with \$13 million in funding from U.S. partner companies, such as 3M and General Electric. CRDF's "Next Steps to Market" program resulted in four new companies and six commercial partnerships with commercial sales throughout Eurasia and the United States.

As an example, a small U.S. small business based in California, SciClone Pharmaceuticals, working on compounds that address tuberculosis (TB), received funding from CRDF to work with *Verta*, a St. Petersburg, Russia-based institute. *Verta's* researchers had an alternative TB treatment compound that could be taken orally—a more globally viable delivery method. Notably, this collaboration provided the two dozen former biological-weapons scientists employed by *Verta* with an opportunity to transition their weapons expertise. The partnership has brought the world closer to a new TB treatment much more quickly than either SciClone or *Verta* could have done alone, while helping to advance US small business.

More recently, CRDF organized Eurasian Innovation and Investment Fora in Cleveland, Ohio and Fairfax, Virginia, to bring together promising Eurasian high technology entrepreneurs with potential U.S. partners in fields such as alternative energy and information technology. One of the participants in the Northern Virginia Forum was a Russian technology company, *Gravitonus*, which subsequently established a presence in the U.S. for its cutting-edge technology that helps persons with disabilities to use personal computers effectively. Company president and founder Dr. Alex Kosik, a spinal cord surgeon in Russia, wanted to persuade potential American investors to help him produce the Alternative Computer Control System (ACCS)—a special assistance device that is placed in a person's mouth and controlled by the tongue and biting action. Through partnership with CRDF and the Mason Enterprise Center at George Mason University, *Gravitonus* is now able to set up volume production, distribution, sales and marketing operations and customer support services in the United States. "CRDF has given us a great opportunity," says Kosik. "We feel that our R&D efforts are noticed. We see that CRDF cares. And it really helps us and inspires us to move forward." Such commercial bridge building accelerates the adoption of beneficial technologies in the U.S., creates employment, and

ultimately, may contribute to export sales from the U.S. as such products are developed and perfected.

Building New S&T Institutions

CRDF provides institutional support for scientific research centers, universities and grant-making organizations in order to promote scientific research and to nurture capacity overseas to allocate R&D resources on the basis of merit review. CRDF has established and funded *fifty* such institutions in nine countries throughout Eurasia, stretching from the Black Sea to the Sea of Okhotsk on the Pacific Rim. Four of these organizations – in Armenia, Azerbaijan, Georgia and Moldova -- help their respective nations gain experience in allocating scarce R&D resources based on merit-based competitions. Modeled on the U.S. National Science Foundation, these grant-making organizations help to build the necessary capacity for long-term development of science and for international collaboration. They also promote democratic values such as open competition through a transparent process employing the principle of merit review.

CRDF has also provided major state-of-the-art equipment and training to 21 competitively selected institutes across eight countries in Eurasia (Armenia, Azerbaijan, Georgia, Kazakhstan, Moldova, Russia, Ukraine, and Uzbekistan). These shared-use centers are utilized by nonprofit research and education institutions as well as the industrial research communities within the regions where the equipment is located. CRDF committed \$6.5 million towards equipment and supplementary grants. Eurasian governments and local institutions have provided additional support of roughly \$1 million to this program.

Advancing Research Capacity in Higher Education

With funding from the U.S. private sector and Russia, CRDF developed a unique partnership with Russia to introduce a new model for integrating research and education in Russian universities. Since 1998, the Basic Research and Higher Education (BRHE) program has established 20 Research and Education Centers at Russian universities to strengthen the university research infrastructure, develop new curriculum, engage students in research early in their careers, improve external linkages and foster the commercialization of technology. In 2005, the Russian Ministry of Education and Science validated the BRHE model when it independently established 15 new centers patterned after the BRHE program. In 2008, independent evaluators called BRHE “the Right Program, at the Right Time and with the

Right Process.” This model has recently been duplicated in five other countries, each of which has contributed substantial cost-share funding to their joint programs with CRDF.

Specialized Programs

Over the years CRDF has designed and implemented numerous specialized and general training programs to address a wide range of global needs, including training in bioethics, peer review and scientific proposal writing, English language for scientists, research management, and grant administration. CRDF has also employed information and communications technologies to facilitate these programs. For example, in August 2007 CRDF conducted training for the 7 original participating institutions of the Iraqi Virtual Science Library. CRDF serves as the Secretariat for this program, which allows Iraqi academic faculty and students to access current scientific literature. Following the training, the number of registered users grew by more than 200 new users per month and continues to expand.

Program Support Services

CRDF places a high priority on accountability and transparency in implementing and managing its grants. CRDF has a dedicated department that focuses solely on the effective administration of all aspects of award management. The department oversees CRDF's network of international banking agreements, in-country support contractors, and international travel agencies and equipment vendors. The department also oversees all compliance and legal issues associated with project implementation from export controls to bioethics to taxation to intellectual property. Extensive payment distribution systems provide for the efficient and transparent disbursement of project funds and equipment to grantees from \$100 payments to individual students working on projects to multi-million dollar equipment purchases. In addition, the department oversees CRDF's project audit functions and conducts regular site visits and audits to ensure the highest level of assurance that resources are directed to their intended recipients and effectively utilized for the intended result.

The systems developed for the management of CRDF's international grants have proven very effective and, as a result, CRDF utilizes these mechanisms to support almost 200 U.S. Government, university, for-profit company and NGO organizations in the financial and administrative management of their own international projects and activities. A list of customers under GAP Services is attached at Appendix A.

ROLE OF CRDF AS AN NGO AND COORDINATION WITH THE U.S. GOVERNMENT

The Congressional sponsors of CRDF believed strongly in the potential contribution of a non-governmental mission to international science and technology cooperation. They cited the successful precedents of the three nongovernmental foundations that the United States and Israel established in the mid-1970: the Binational Industrial Research and Development (BIRD) Foundation; the Binational Agricultural Research and Development (BARD) Foundation; and the Binational Science Foundation (BSF). They were aware of previous efforts in the late 1970s to develop a major NGO to advance global scientific collaboration to advance development that was never realized. Finally they understood that there are times when an independent NGO --working in partnership with the U.S. government -- can help implement programs more effectively. Over the years as CRDF's reputation has grown, it has received more calls for help from the U.S. government. Its strengths – as well as its limitations -- as an NGO are listed below:

Strengths as an NGO

As an NGO, CRDF has been able to operate quickly and flexibly in responding to emerging opportunities. For example, just a month after the events of 9/11, CRDF launched an initiative to engage U.S. and Eurasian scientists in collaborative research to reduce the effects of terrorist acts on civilian populations. CRDF supported a series of 11 workshops where hundreds of scientists gathered to focus on research to detect, protect, and treat in the case of a terrorist event. Some \$1.5 million was committed to follow on grants to these teams of scientists, with funding from several U.S. government agencies.

In 2004, while the U.S. government was developing plans for science initiatives with Iraq, CRDF organized an orientation visit to Washington, DC for a group of six Iraqi scientists. CRDF introduced them to scientists in U.S. government agencies, local universities and businesses. Many of those scientists have subsequently participated in research projects with U.S. counterparts.

As an NGO, CRDF can seek and negotiate cost-shared programs with foreign counterparts. As mentioned earlier, CRDF has secured \$43 million, primarily from foreign government agencies, for 675 projects in ten countries. These cost-shares expand the scope and impact of CRDF programs in-country and set the stage to transition from cost-sharing to exclusive host-country funding.

CRDF is able to leverage resources of multiple organizations as well. For example, CRDF's Cooperative Grants Program leverages funding from the State Department, National Science Foundation and National Institutes of Health, to support collaborative research projects between U.S. scientists and their counterparts in Eurasia. CRDF's premier university initiative, the Basic Research and Higher Education Program, leverages funding from the John D. and Catherine T. MacArthur Foundation, the Carnegie Corporation of New York, the Russian Ministry of Education and Science and regional governments in Russia to support twenty Research and Education Centers at Russian universities.

Another strength of CRDF is its ability to quickly engage specialized expertise for program design and implementation. CRDF has developed a network of more than 40,000 scientists and engineers who conduct merit review of proposals submitted to CRDF; participate in review panels or site visit teams; advise CRDF on program design and implementation; and provide specialized expertise. CRDF works closely with key U.S. science and engineering organizations and societies to ensure that we tap the best expertise for existing or new programs. We have also partnered with the Arab Science and Technology Foundation in the United Arab Emirates (UAE) on workshops and other programs to promote science collaboration between U.S. and Arab scientists. CRDF has formed partnerships with the King Abdullah University of Science and Technology (KAUST) and the Qatar National Research Foundation (QNRF) to provide CRDF's expertise in implementing science and technology cooperative programs, building organizational capacity in information technology, database administration, peer review and grant administration support.

As an NGO with on-the-ground support offices in Russia, Ukraine, Kazakhstan, and soon in Azerbaijan, CRDF has the staff expertise and resources to offer flexible solutions to meet customer needs. For example, our Russian office staff has provided support to the National Science Foundation's Arctic programs division in the implementation of their programs with the

Russian Federation, working with Russian government agencies and research institutes to coordinate work in the Arctic region. Through our GAP program, CRDF has assisted over 200 organizations who work in the FSU to implement more than 1,200 projects by providing flexible and accountable project management services.

As an NGO, CRDF offers potential partners overseas a U.S. counterpart that is not part of the U.S. government. Because CRDF is a non-governmental, non-profit organization, it is often seen as a neutral partner in developing program initiatives between the US and its foreign counterparts. CRDF has been able to fulfill this role while maintaining U.S. policy objectives. Moreover, CRDF can invest the time and resources needed to build the relationships and trust that are so necessary to engaging foreign scientific communities in new programs of cooperation with the United States.

As an NGO, CRDF's mission is broad. This breadth enables CRDF to offer a wide range of program implementation strategies for multiple customers. As of July 1, 2008, CRDF is implementing over 20 programs for more than thirteen sponsors and customers. In addition, our GAP program currently is implementing 350 projects for over 100 customers. Other organizations, including U.S. government agencies and non-governmental entities, are supporting activities related to one or more of CRDF mission objectives. However, CRDF is unique in its combination of mission objectives and capability to implement across a wide range of issues and countries.

Limitations as an NGO

While CRDF has achieved remarkable success in its twelve years of operation, its forward progress is constrained by the absence of multi-year funding. CRDF was originally envisaged as an endowed foundation that would operate similar to the foundations that the U.S. established with Israel. That endowment did not materialize, and hence, CRDF must constantly seek new funding for all of its program activities and to maintain its core staff capabilities. In almost all cases, that funding is secured on an annual basis, which limits the ability of CRDF to develop long-term program strategies with partners overseas. CRDF also needs to retain some flexibility in designing its programs as needs on the ground can evolve over time and outpace the ability of governmental agencies to respond in a timely way.

Coordination with the USG

CRDF coordinates its work closely with the United States government, which has been the primary source of funds for CRDF program activities. For example, in 2007 federal expenditures accounted for over \$18 million, out of almost \$25 million, in CRDF activities. The federal expenditures include funds from the Departments of State, Defense, and Energy, the National Science Foundation and the National Institutes of Health. Overall, the largest single source of funds has been the State Department's FREEDOM Support Act funds, which have declined from a high of \$15 million in 2002 to \$5.7 million in fiscal year 2007, with further reductions expected in fiscal year 2008.

As CRDF's primary funder, the Department of State continues to request CRDF help in implementing its programs. CRDF works closely with a number of the Department's geographic and functional bureaus to advance international science collaborations on behalf of the Department. However, the significant decrease in FSA funding has significantly impacted the type of programming and impact that CRDF can exert. The decline in FSA funding reduces CRDF's ability to respond quickly to new opportunities in priority countries and to take advantage of cost-sharing offers from foreign partners. CRDF has annually been included in the House and Senate foreign operations appropriations report, and in recent years the Congress has urged the Department of State to expand funding for CRDF from other accounts beyond the FSA.

CRDF works with a number of other U.S. government agencies, helping them advance their global research interests. For example, with funding from NSF supplemented by other agencies, CRDF has supported over 1,000 collaborative research projects between U.S. scientists and counterparts in Eurasia and Eastern Europe. The projects cover multiple disciplines, such as biology, chemistry, physics, engineering, math, IT, and geology and are selected based on merit review. Additionally, on behalf of NSF, CRDF manages a small number of bilateral programs primarily in Russia and Eurasia which include Arctic area research, fellowship and exchange programs, and support for international conferences in various scientific disciplines. NSF-funded CRDF programs have benefited from annual cost-sharing from the governments of Russia and Ukraine.

With funding from NIH, CRDF has engaged scientists around world in cooperative research projects with U.S. partners to investigate high-priority topics in global health, including: disease prevention, treatment, and surveillance; innovative cancer diagnostic methods; and new approaches to HIV/AIDS, tuberculosis, and hepatitis C. In particular, CRDF manages several international programs in public health, primarily in infectious disease prevention and monitoring, centers of excellence for public health education, and in research on HIV/AIDS. CRDF's support for HIV/AIDS research entered a new phase in 2008 with the HIV/AIDS Research Public Health Centers of Excellence program. This program, jointly funded by the Russian Ministry of Education and Science, funds two US-Russian interdisciplinary consortia to apply international best practices to HIV/AIDS research in Russia. The centers are focusing on pressing research needs in Russia, TB co-infection and behavioral factors in HIV transmission, and providing a model for future interdisciplinary public health research centers in HIV and other global health threats, such as tuberculosis, heart disease, and substance abuse.

For the Department of Energy, CRDF has provided logistical and financial support for a number of engagement programs between DOE and its international counterparts, primarily in Russia. Finally, for DoD through the Defense Threat Reduction Agency (DTRA), CRDF has managed science engagement programs with a number of institutes in Eurasian countries that have had biological weapons capabilities or histories, supervising their transition to civilian applications, research, and commercialization.

CRDF routinely submits proposals for work to U.S. government agencies and if selected, operate under a federal grant or contract. CRDF complies with all applicable rules and regulations as a grantee/contractor and reports regularly to the sponsoring agency on the progress of the work. CRDF maintains regular contact with the policymaking community and Congress to keep them updated on the progress of CRDF work and new opportunities that may be of interest to government sponsors.

THE FUTURE: HOW CAN THE USG WORK WITH NGOS AND THE US SCIENTIFIC COMMUNITY TO PURSUE FOREIGN POLICY GOALS AND GLOBAL CHALLENGES?

The Time is Right

Never has CRDF's vision, "international peace and prosperity through international science collaboration," been more relevant than it is today. The U.S. science and technology enterprise is the best in the world. U.S. leadership in science and technology is recognized globally. According to the Gallup World Poll conducted over 6 years and which covers 40 majority Muslim countries and 90% of the global Muslim population, the single most admired aspect of the West among Muslims around the world is technology. When asked what the West can do to improve relations with the Muslim world, the most frequent response after the resounding call for the West to respect Islam, is for the Western nations to help Muslim countries with capacity building and technology transfer.¹

American scientists and engineers represent an incredibly valuable, but underutilized, resource in U.S. foreign policy. With adequate support and incentives, U.S. scientists and engineers can reach out to societies around the world and apply "smart power" through international science and technology cooperation. Secretary of Defense Robert Gates and others have argued for more effective use of U.S. "smart power" to invest "in the global good -- providing services and policies that people and governments want but cannot attain in the absence of American leadership"². We need to engage our leaders to utilize our scientists and engineers to reach out to counterparts around the world and engage in long-term science and technology projects that find collaborative solutions to common problems in health, environment, energy and agriculture.

Today's most vexing problems are global in nature and are not limited to the geographic boundaries of any one country. So, too, the capability to

¹ Statement by Dalia Mogahed, Senior Analyst at Gallup and Executive Director of the Gallup Center for Muslim Studies; author of the book "Who Speaks for Islam?: What a Billion Muslims Really Think" (Gallup Press, March 2008).

² Center for Strategic and International Studies (CSIS), "Implementing Smart Power: Setting an Agenda for National Security Reform," a statement by Richard L. Armitage, President, Armitage International, and Dr. Joseph S. Nye, Jr., Distinguished Service Professor, Kennedy School of Government, Harvard University, before the Senate Foreign Relations Committee, April 24, 2008.

solve technical problems resides around the world. The best approach to solving global problems is to involve global teams of scientists and engineers. By contributing to the solution of these problems, the U.S. engenders gratitude and trust. By collaborating in their solution, the U.S. builds capacity and hence leverages our efforts. Scientists and engineers tend to share values that transcend cultures, thus facilitating more rapid trust relations. This is very important as a diplomatic tool – to reach out to global partners in ways that diplomats cannot. In many developing countries, the technical leadership is tied into the political leadership more so than in developed countries. This too can be an important avenue to encourage sound political decision-making.

The U.S. Government's Role

The U.S. government must significantly expand its support for international science and technology cooperation. It should begin by articulating a clear policy statement endorsing international cooperation as a key component of U.S. foreign policy and assistance, national and economic security, and a priority for U.S. research and development agencies. The White House should increase attention to international science and technology cooperation and reestablish a high-level, interagency committee to coordinate U.S. government efforts.

The U.S. government should promote an environment that is conducive to international science and technology by routinely reviewing policies and procedures that affect the implementation of international science and technology cooperation. The appropriate U.S. government agencies should work to reduce barriers to cooperation, such as the difficulty of obtaining visas.

The U.S. government should increase the resources allocated to international science collaboration. For example, international program offices at federal R&D agencies should be allocated additional resources to explore and expand international cooperation. Seed funding should be made available for “start-up” activities under the intergovernmental science and technology agreements that the U.S. signs with foreign counterparts. These agreements are often signed with great fanfare but do not live up to expectations, particularly for our foreign counterparts, because there generally is no funding to pursue concrete activities. U.S. foreign assistance programs should increase their attention to science and technology for capacity building overseas.

The U.S. government should increase its partnerships with non-governmental organizations to initiate and implement international science and technology cooperation. NGOs offer the speed, flexibility and responsiveness needed to pursue new opportunities and to execute constantly evolving policy and programmatic priorities of U.S. government agencies. NGOs have the ability to get “on-the-ground” quickly and develop the relationships and trust needed to initiate new partnerships, often in difficult circumstances. At the same time, NGOs are able to work with transparency, openness and accountability overseas, and to foster the same in our partners.

Catalyzing a New Global Initiative

Most importantly, the U.S. government should launch a strategic, new global initiative to catalyze, broker, amplify and scale up science and technology cooperation for the benefit of the United States and its partners around the world. This new initiative should be a global public-private partnership with the U.S. taking the lead in challenging other governments and private donors to match the U.S. contribution. Patterned after other public-private partnerships, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, this new global science initiative would engage scientists internationally to encourage critical scientific and technical advances that address global challenges including infectious disease, food security, energy alternatives and vanishing ecosystems; to reach young scientists and support a robust research and educational infrastructure; and to build mutually beneficial economic partnerships. It would facilitate greatly expanded international science and technology cooperation as well as enhance institutional capacity in the developing world. Nations with a strong, stable science and technology base are better participants in the global economy, develop indigenous solutions to national problems, and contribute to ongoing international collaborative efforts.

CRDF as a Global Partner for the Future

With over a decade of strong support from both public and private donors, CRDF has developed a potent and unique capability to implement international science and technology cooperation. CRDF's many successes validate the vision that the leadership of this Science Committee articulated in 1992. CRDF has demonstrated that Congressman Brown was right when he argued for the creation of a non-governmental organization to help

achieve U.S. foreign and national security policy objectives through international science and technology cooperation that benefits both the United States and its partners overseas.

The global environment in which CRDF operates has changed dramatically since CRDF began in 1992. New opportunities to collaborate in science and technology are emerging rapidly as countries focus attention on building knowledge-based societies. The demand for science-based solutions to complex global challenges in health, energy, agriculture, economic well-being and security is high. Meeting such challenges requires international science and technology collaboration that brings together the best minds and innovative approaches to find mutually beneficial solutions. It is in the U.S. interest to encourage such collaboration. CRDF also sees many opportunities to continue its record of success in other regions where science cooperation can make a positive contribution to U.S. policy, especially in the Middle East and in South Asia.

CRDF will continue to work in partnership with the U.S. government, foreign partners and other NGOs to develop international science and technology cooperation that builds on CRDF proven models and addresses high priority opportunities or needs. For example, through its higher education and research initiative, CRDF will work to establish and integrate scientific research more effectively into university programs overseas and to develop opportunities to engage foreign students and young researchers – the next generation of scientists – into productive, long-lasting collaborations with the U.S. partners.

CRDF will continue to develop program initiatives to engage scientists and engineers in the Middle East and other Muslim countries in collaborations that generate new knowledge, apply research to address priority needs in health, agriculture, water and energy; and build capacity for education, research and economic development through science and technology. A high priority will be collaborative research programs that encourage U.S. scientists to identify and partner with foreign scientists on mutually beneficial, competitively selected projects. Together, these joint research teams can address common problems while developing long-lasting relationships of trust and collaboration.

CRDF will continue to work with new science and technology institutions overseas to develop mechanisms and procedures that promote

merit-based selection of projects and opportunities for collaboration with U.S. scientists. Building on its successful experience managing the Iraqi Virtual Science Library, CRDF will work with others to help bring this type of digital library resource to other countries. A number of countries have expressed a desire for CRDF's assistance to partner with them on creating and maintaining access to scientific literature, research databases, and other similar tools. These activities stimulate collaborative research, allow access by scientists to a wider community of scholars, and ultimately contribute to a more open flow of information. CRDF sees a major opportunity for positive public diplomacy in stimulating and funding such programs to broaden access to scientific knowledge and norms as practiced in the U.S. research community.

CRDF will continue to pursue collaborative approaches to address global energy issues. This fall, CRDF will begin a new initiative in climate change research. With cost-shares from CRDF's international partners, CRDF will support international teams researching ways to measure and reduce the impacts of this global problem from a variety of scientific disciplines, including biology, chemistry, physics, geology, and engineering. This builds upon CRDF's track record of supporting international collaborative projects that have studied solar energy, improved the potential and marketability of fuel cells, and explored sustainable energy. U.S. industry partners on these projects have included Shell, ConocoPhillips and GE. As an example, CRDF supported researchers from Armenia and the California Department of Water Resources to evaluate the energy capacity and wood yield potential of fast-growing poplar trees as a promising source of power and as a remedy for some of Armenia's heavily deforested regions.

CRDF's work in addressing energy-related issues was noted by the ranking member of the Senate Energy and Natural Resources committee, Senator Pete Domenici, in his remarks regarding CRDF's ten year anniversary: "The Civilian Research & Development Foundation has amassed a very solid record of helping the U.S. Government achieve its foreign and national security policy agendas. By using science collaborations to advance peace and sustainable prosperity, we can best address the complex energy challenges that we face globally by uniting the talents of all the world's brightest minds. CRDF is uniquely positioned to help enable these international collaborations that will benefit all of us in the energy field and elsewhere."

In conclusion, CRDF's unique expertise and track record have been tested with great success in the countries of the former Soviet Union. They are now being expanded slowly into other countries and regions. CRDF is working hard to help make the case for expanded partnerships to advance science for diplomacy and security. In partnership with AAAS, the NAS, Brookings, and others, CRDF is working hard to help raise awareness regarding science for diplomacy. We commend this Committee for taking the lead here on Capitol Hill and we look forward to working with you and our partners here and in the government to make this dream that George Brown had a global reality.

APPENDIX A: CRDF GAP Services Customers

A service of the U.S. Civilian Research & Development Foundation (CRDF), GAP Services assists organizations seeking to engage the science, technology and engineering communities overseas. For ten years, GAP Services has helped companies work internationally by facilitating more than 1,000 individual projects, valued at over \$190 million; and been a solution for more than 200 organizations, including 38 corporations of varying size and scope.

Business and Industry

3M
Advanced Thermal & Environmental Concepts, Inc
Altria
Aquila Technologies Group, Inc.
Biomedical Sciences Research Laboratories, Inc
Compaq Computer Corporation
Conoco, Inc.
Converting Systems, Inc
Corium International, Inc
Cortana Corporation
Curative Technologies Corporation
Diversa Corporation
Dupont Agricultural and Nutrition
Dupont International
Ener1, Inc
Glaxo Wellcome Experimental Research, SA
Huntsman Petrochemical Corporation
Hypres, Inc
Icon Genetics, Inc
Integrated Micro Sensors, Inc
Intel Corporation
Ionwerks, Inc
MagiQ Technologies
Manufacture Française des Pneumatiques Michelin
Michelin Research Asia
Nuclear Fuel Industries
Optech International
Pathfinder Exploration LLC
Proteus, Inc
Samsung SDI Co, Ltd
Schlumberger Technology Corporation
ScintiTech, LLC
Shelly International Exploration and Production, B.V.
Syntroleum Corporation
Thorium Power, Inc

Educational Institutions

Baylor College of Medicine
Boston College
California Institute of Technology
Case Western Reserve University
Clemson University
Colby College
Colorado State University
Columbia University
Cornell University
Emory University
Hampton University
Howard University
Johns Hopkins University
Knox Grammar School (Australia)
Leiden University Medical Center (The Netherlands)
Massachusetts Institute of Technology
Medical College of Wisconsin, Center for AIDS Intervention Research
Medical University of South Carolina
Mount Sinai School of Medicine
New York University
Northwestern University
Politecnico di Bari (Italy)
Ravenswood School for Girls (Australia)
Tel Aviv University (Israel)
Texas A&M University
Texas Tech University
Thomas Jefferson University
Tufts University
University of Alabama, Birmingham
University of Alaska, Fairbanks
University of Arizona

University of California, Berkeley
University of California, Los Angeles
University of California, San Diego
University of California, San Francisco
University of Cincinnati
University of Connecticut Health Center
University of Delaware
University of Geneva (Switzerland)
University of Houston
University of Illinois, Urbana Champaign
University of Kentucky
University of Leicester (United Kingdom)
University of Massachusetts, Amherst
University of Minnesota
University of Montana
University of Nebraska
University of North Carolina, Chapel Hill
University of Oklahoma Health Sciences Center
University of Oregon
University of Pennsylvania
University of Pittsburgh
University of Queensland, Pyrometallurgy Research Centre (Australia)
University of Rochester
University of Texas, Austin
University of Washington
University of Wisconsin, Madison
Uppsala University, Svedberg Laboratory (Sweden)
Washington University
Yale University School of Medicine

Nongovernmental Organizations, Private Research Institutions & Professional Societies

Acoustical Society of America
American Geophysical Union
Armenian Research Council
Associated Universities, Inc./National Radio Astronomy Observatory
Bavarian Research Center for Knowledge-Based Systems (Germany)
Boston Medical Center
Bridgeport Hospital
Danish Space Research Institute (Denmark)
Dibner Institute for the History of Science and Technology
Fox Chase Cancer Center
Fred Hutchinson Cancer Research Center
Home-Start International
Howard Hughes Medical Institute
Human Frontier Science Program
Institut Francais du Petrole (France)
International Consortium for Research on the Health Effects of Radiation
International Union of Geodesy and Geophysics Commission on Geophysical Risk and Sustainability (Australia)
John D. and Catherine T. MacArthur Foundation
Joint Oceanographic Institutions
Juvenile Diabetes Research Foundation International
Ludwig Institute for Cancer Research (Switzerland)
Max Planck Institute for Physics (Germany)
Missouri Botanical Garden
National Academy of Sciences
NATO Science Programme (Belgium)
New York Community Trust
Paleontological Society
Research Foundation of the State University of New York
Research Triangle Institute
Roswell Park Cancer Center

Russian American Nuclear Security Advisory Council
San Diego State University Foundation
Spencer Foundation
Stanley Medical Research Institute
United States Industry Coalition
University of Georgia Research Foundation
Vital Spark Foundation
World Health Organization
World Wildlife Fund

U.S. Government Agencies

Defense Threat Reduction Agency
European Office of Aerospace Research and Development, Air Force Office of Scientific Research
NASA Kennedy Space Center
National Institute of Standards and Technology
National Oceanic and Atmospheric Administration
Alaska Fisheries Science Center
Atlantic Oceanographic and Meteorological Laboratory
Environmental Technology Laboratory
Geophysical Fluid Dynamics Laboratory
National Climatic Data Center
Office of Global Programs
Naval Research Laboratory
Office of Naval Research
U.S. Department of Agriculture
USDA, Forest Service Research
U.S. Department of Energy
U.S. Department of Energy Laboratories
Argonne National Laboratory
Brookhaven National Laboratory
Idaho National Engineering and Environmental Laboratory
Kansas City Plant
Lawrence Berkeley National Laboratory
Lawrence Livermore National Laboratory
Los Alamos National Laboratory
National Energy Technology Laboratory
National Renewable Energy Laboratory
Oak Ridge Institute for Science and Education
Oak Ridge National Laboratory
Pacific Northwest National Laboratory
Princeton Plasma Physics Laboratory
Sandia National Laboratories
U.S. Department of Health and Human Services
Agency for Healthcare Research and Quality
Centers for Disease Control and Prevention
National Center for Health Statistics
National Institutes of Health
National Cancer Institute
National Institute of Allergy and Infectious Diseases
National Institute of Child Health and Human Development
National Institute on Alcohol Abuse and Alcoholism
National Institute on Drug Abuse
Office of International and Refugee Health
Office of Global Health Affairs
U.S. Department of the Interior
U.S. Fish and Wildlife Service
U.S. Geological Survey
U.S. Department of State BioIndustry Initiative
U.S. Environmental Protection Agency
Office of International Activities