

Testimony of

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Mr. Chairman and Members of this Committee, thank you for giving me the opportunity to address the important topic of international science and technology cooperation.

Scope

The Department of State (DOS) engages governments, business, universities, non-governmental and international organizations, and individuals from every region in the world to promote scientific cooperation and education. To accomplish this, DOS applies a suite of diplomatic tools including: formal bilateral science and technology (S&T) cooperation agreements that facilitate international collaboration by USG technical agencies, promotion and support of S&T entrepreneurs and innovators, scientist and student exchanges, workshops, conferences, meetings, public-private partnerships, seed funding for scientific programs and innovation activities, and production of educational materials, including films, websites, posters, and cards.

Our own activities and cooperation with other USG agencies cover a wide range of scientific topics, including alternative energies, health and medicine, environment and marine research, nanotechnology, space exploration, weather, seismology, and geology among many others. In carrying out its science diplomacy, DOS makes a special effort to include women, youth, and emerging leaders as beneficiaries, and in recent years, has supported programs focused on capacity building, entrepreneurship, outreach to scientific communities in Muslim-majority countries, and the developing world.

Bilateral S&T Cooperation Agreements

Science and science-based approaches make tangible improvements in people's lives. Strategically applied, S&T outreach serves as a powerful tool to reach important segments of civil society. Sound science is a critical foundation for sound policy making and ensures that the international community develops reliable international benchmarks. Science is global in nature – international cooperation is essential if we are to find solutions to global issues like climate change and combating emerging infectious diseases. International scientific cooperation promotes good will, strengthens political relationships, helps foster democracy and civil society, and advances the frontiers of knowledge for the benefit of all.

The Bureau of Oceans, Environment, and Science (OES) in DOS pursues such efforts through the establishment of bilateral and multilateral S&T cooperation agreements. There are now over forty of these framework agreements in place, or in various stages of negotiation, in every region of the world – from Asia and Africa, to Europe, the Middle East, and Latin America. These agreements:

- Strengthen bilateral, regional, and global cooperation
- Advance broader U.S. foreign policy goals
- Provide for protection and allocation of intellectual property rights and benefit sharing
- Encourage public and private engagement
- Foster science-based decision-making
- Facilitate the exchange of scientific results and access for researchers
- Address taxation issues
- And respond to the complex set of issues associated with economic development, security, and regional stability

These bilateral agreements have significant indirect benefits including contributing to solutions and initiatives that encourage sustainable economic growth, promoting good will, strengthening political relationships, helping foster democracy and civil society, supporting the role of women in science and society, promoting science education for youth, and advancing the frontiers of knowledge for the benefit of all.

The agreements are instrumental in advancing our diplomatic relationships with key countries. They bring leading U.S. government scientists together with foreign counterparts and policymakers to discuss the important role of cooperative scientific endeavors in advancing, for example, our understanding of key elements of the climate system. Through our bilateral relationship with Russia, to cite one such project, we have advanced the state of research on the impacts of climate change in the Arctic – a key system in which we are working to address important gaps in knowledge. In bringing senior officials together to discuss areas of common concern, the bilateral partnerships have helped to demonstrate how much we have in common and have thereby advanced our diplomatic relationships and helped us achieve our objectives.

Promotion of International Cooperation

The International Space Station Agreement and the International Thermonuclear Experimental Reactor (ITER) projects are multilateral projects the Department supports that have the promise of broadening knowledge, strengthening capabilities, and extending benefits to the United States and our international partners. Disseminating knowledge on the use of remote sensing capabilities in developing countries and negotiation of nanotechnology standards for emerging products and services in member nations of the Organization for Economic Cooperation and Development (OECD) are included in the wide range of subjects supported by DOS.

The Global Positioning System (GPS) is one of the greatest gifts of the American people to the world. OES works with the USG interagency community and foreign space-based satellite navigation providers to promote compatibility and interoperability of other provider's signals and services with GPS for the benefit of users worldwide. A GPS-Galileo Cooperation Agreement with the European Union and Joint Statements on GPS Cooperation with Japan, India, Australia, and Russia are producing tangible results such as common signal design and protecting United States national security interests.

OES works closely with the United Nations (UN) Office on Outer Space Affairs and other interested nations to form a voluntary International Committee on Global Navigation Satellite Systems (ICG) and related Providers Forum. This multilateral venue provides an opportunity for discussing and resolving spectrum compatibility and interoperability issues, considering guidelines for the broadcast of natural disaster alarms via Global Navigation Satellite Systems (GNSS), seeking ways to enhance performance of GNSS services, promoting GNSS use among developing countries, and coordinating work among international scientific organizations for GNSS applications worldwide.

OES also protects U.S. security and global economic growth by promoting global health. Global health policy is firmly grounded in a scientific understanding of the infectious, environmental and potential terrorist threats to public health worldwide. OES works with agencies throughout the U.S. government to facilitate policy-making regarding environmental health, infectious disease, health in post-conflict situations, and surveillance and response, bioterrorism, defense of the food supply and health security. OES works on global health with other U.S. government agencies, including the National Security Council, Homeland Security Council, Departments of Health and Human Services, Homeland Security, Agriculture, Defense, USAID, and intelligence agencies. OES also works with the United Nations (especially the World Health Organization) and other international organizations, the private sector, non-governmental organizations, and foreign governments.

DOS performs an important role in coordinating United States engagement in the scientific and technical organizations of the UN and other multilateral fora including the Arctic Council, the International Council for the Exploration of the Seas, and more. Often, the scope of scientific endeavors and research interests requires DOS, due to limited financial resources, to leverage its resources with other governments. For

example, with National Oceanic and Atmospheric Administration (NOAA) leadership and DOS cooperation, the United States hosted the First Earth Observation Summit in 2003, with 34 participating nations, to generate international support for creating a comprehensive Global Earth Observation System of Systems (GEOSS). This ambitious undertaking involves coordinating disparate Earth observation systems across the world in order to improve our collective ability to address critical environmental, economic, and societal concerns. The now 72 member governments, including the European Commission, and 46 participating organizations of the Group on Earth Observations (GEO) met in Cape Town in November 2007 to assess progress.

Other parts of the Department of State are similarly engaged in S&T related cooperation. For example, the bureaus under the leadership of Acting Under Secretary for Arms Control and International Security John Rood has, in cooperation with the Bureau for Near Eastern Affairs, have been focused on redirecting scientists through engagement in new programs, whether in the Middle East, North Africa or Central Asia. In Central Asia, cooperation is focused on post Soviet demilitarization of science infrastructure following the model of the Civilian Research and Development Foundation (CRDF) and the International Science and Technology Center (ISTC). Cooperation in Eurasia involves the Department of Energy, which since 1994 has funded over 650 projects at over 200 research institutes in Russia, Kazakhstan, Georgia, Armenia, and Uzbekistan under its Global Initiatives for Proliferation Prevention (GIPP) program to provide meaningful, sustainable, non-weapons-related work for former Soviet weapons of mass destruction scientists, engineers, and technicians through commercially viable market opportunities.

The GIPP program provides seed funds for the identification and maturation of technology and facilities interactions between U.S. industry and former Soviet institutes for developing industrial partnerships, joint ventures, and other mutually beneficial peaceful arrangements. The program involves the active participation of ten DOE national laboratories and the DOE Kansas City Plant. The national laboratories provide technical direction, project managements, and intellectual property management assistance. U.S. industry partners bring the resources and know-how to bring project results to market. Industry partners are engaged in specific projects through Cooperative Research and Development Agreements (CRADAs) with the participating DOE national laboratories. Cooperation also is underway with and USDA in the process of moving weapons scientists to civilian science roles. Cooperation is also conducted with DOD in nonproliferation as well as the destruction of nuclear missile silos.

The State Department's Public Diplomacy/Public Affairs section supports many activities related to S&T diplomacy, especially in its Education and Cultural Affairs bureau. Most effective have been visitors' programs and other exchanges, the Fulbright S&T scholarships, and more recently grant competitions for science and technology education and women's scientists mentoring programs. They have also provided seed money for a number of bilateral and multilateral efforts, most notably the 2007 Kuwait Conference of Women Leaders in Science, Technology, and Engineering.

To address trans-boundary environmental issues, and to support officers at U.S. embassies working on OES issues, the Department established 12 regional environmental Hubs, located in embassies around the world. The Hub concept is based on the idea that trans-boundary environmental problems can best be addressed through regional cooperation. The regional environmental officer's role complements the traditional bilateral Environment, Science, Technology and Health (ESTH) officers stationed in U.S. embassies in many countries of the world. Rather than dealing with a single country, Hub officers engage with several countries of a region on a particular issue, with the aim of promoting regional environmental cooperation, sharing of environmental data, and adoption of environmentally sound policies that will benefit all countries in that area. The Hubs work closely with other USG agencies and support their efforts by raising key issues at the diplomatic level. They also cooperate with non-governmental organizations on environmental activities within their region. In addition, there are ESTH officers working with the US Mission to the UN and the US Mission to the EU.

OES works closely with a number of USG technical agencies on the international aspects of climate change policy. Under OSTP leadership, OES has played a key role in the Intergovernmental Panel on Climate Change (IPCC) since its inception, through official contributions and key leadership positions in IPCC report development, as well as through the contributions of many U.S. scientists and experts. Other examples of DOS cooperation on climate issues include:

- Bilateral climate partnerships with 15 countries and regional organizations that, together with the United States, account for almost 80% of global greenhouse gas emissions. These partnerships now encompass over 400 individual activities with Australia, Brazil, Canada, China, Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama), the European Union, Germany, India, Italy, Japan, Mexico, New Zealand, South Korea, Russia, and South Africa. These partnerships now encompass over 400 individual activities.
- The Asia-Pacific Partnership on Clean Development and Climate, which focuses on acceleration and deployment of clean energy technologies, and includes Australia, Canada, China, India, Japan, the Republic of Korea and the United States.

Oceanographic exploration in the 20th century has completely transformed our view of the deep ocean. Today, scientists know that the deep sea is teeming with life and that its biodiversity is comparable to the world's richest tropical rainforests. The advent of new exploratory technologies is leading to the discovery of ecosystems which are extraordinary in nature, often hosting species found nowhere else on the planet.

For the fishing industry also, the unreachable is now within reach. Advances in bottom fishing technology mean that it is now possible to fish the deep sea's rugged floors and canyons. This has led to an urgent call for action within the international community to ensure that deep-sea bottom fishing on the high seas is monitored and regulated to protect these unique and fragile areas. The Department of State, in collaboration with NOAA, has facilitated science and technology partnerships enabling more effective fishery regulation to achieve sustainability.

Outreach to the Muslim S&T Community

OES is finalizing S&T cooperation agreements with Kazakhstan and Azerbaijan that will enable an increase in the scope of S&T cooperation in the region. Funding, and how we successfully leverage the ability of those countries to finance science exchange, will largely determine the pace of activities in terms of new programs.

U.S. S&T capability remains one of the most admired aspects of American society around the world, and this is particularly true in predominantly Muslim countries. Public opinion polling indicates that people view American science and technology more favorably than American products, our education system, or even our freedom and democracy. Young people under thirty find American S&T particularly appealing.

Secretary Rice recognizes the promise S&T offers both to advance American national interests and to promote the freedom and dignity of others. S&T empowers everyone to raise themselves up by developing their own human and intellectual capacity. This empowerment gives hope – a natural enemy of extremism.

In July 2005, Secretary Rice approved a strategic initiative, put forward by Under Secretary of State for Democracy and Global Affairs Paula Dobriansky, to increase U.S. outreach to countries in the Middle East, North Africa, and South Asia. The goal of this strategy is to enhance our relationships and to foster development in those countries by engaging more fully with their science and technology communities, reaching out to women and youth, and increasing collaborative S&T activities and exchanges. In approving this strategy, the Secretary recognized the promise of science and technology to both advance American national interests and promote the freedom and dignity of others. Science and science education can play an important role in fostering dialogue, increasing innovation, and addressing poverty.

A wide variety of outcomes have resulted from the implementation of this strategy.

1. We have recently concluded S&T agreements with Algeria, Morocco, Libya, and Jordan. We are now finalizing agreements with Kazakhstan, Saudi Arabia, and Azerbaijan. We've raised our S&T relationship with Pakistan to a higher level. With Pakistan and Egypt we have the only two government-to-government S&T funds still in existence.
2. Under Secretary Dobriansky hosted a "Conference of Women Leaders in Science, Technology, Engineering, and Mathematics" in Kuwait in January 2007. The Conference brought together 270 women scientists and leaders from 18 Arab countries and Turkey, including a 31-member U.S. delegation that included university presidents, CEO's and an astronaut, to build the capacity of Muslim majority and developing countries by focusing on women scientists as a key human resource.
3. Following the Kuwait Conference of Women Leaders in Science, Technology, Engineering, and Mathematics, Under Secretary Dobriansky approved a body of robust new science partnerships in a wider array of Muslim-majority countries. We have leveraged resources with others to begin dozens of new engagements which

focus on the transformative aspects of science diplomacy, including conferences, workshops, training, educational materials, e-education, science films, technology accelerators, sustainable laboratory design, and a host of other engagements.

4. The S&T cooperation agreement with Libya was the culmination of a multi-year, multi-faceted effort to acknowledge Libya's historic decision to renounce nuclear weapons. By forging a new, positive relationship through science engagement, we hope to enhance our bilateral relationship and to advance peace and stability.

The suite of agreements which now exist between the United States and the North African countries of the Maghreb enables the United States Government and the non-governmental science community to pursue a vigorous science dialogue with these countries, and permits their science establishments to reciprocate, both bilaterally and regionally, as a group. The United States Government will use these instruments to forge new relationships at the government-to-government level. But the true vibrancy of a more normalized relationship with Libya comes from the academic and private sector. We already have significant new programs to illustrate how this effort is paying off:

- Two U.S. universities have teamed up with the University of Tunis to conduct a North Africa – wide workshop on nano-structured materials and nanotechnology.
- Scientists from the United States and across North Africa, and around the world, came together in Libya for a conference which that country hosted on solar and other alternative energy technologies.
- Some 3,000 delegates attended the Washington International Renewable Energy Conference (WIREC 2008). Morocco, Algeria, and Tunisia were present along with many government, civil society, and private business leaders from around the world.
- This month mayors and other municipal leaders from American cities came together in Chicago for the U.S.-Arab Cities Forum. They will share their insights on attracting global investment, poverty eradication, clean energy technologies, and new approaches to providing clean water to their people.
- Later this spring, Stanford University and NASA's Goddard Space Flight Center will install monitoring devices at Libyan universities in Tripoli and Benghazi that will enable graduate students to join in an international assessment of high atmospheric disturbances.
- The Fulbright Academy of Science and Technology brought together Fulbright Scholars and alumni for an annual meeting in Boston in late February 2008 that included a number of students from the Middle East and North Africa. A few of these individuals received Fulbright Grants. OES will be working with

institutions here in the United States and in the Middle East to increase the number of Arab students studying the sciences in the United States.

5. OES supports a variety of science-based educational programs in the Islamic World. One, a Boston-based, educational non-profit NGO, translated its website, www.greenscreen.org with OES support into Arabic and French. Teacher guides and other educational materials focus on developing student skills in multiple subject areas, including science, mathematics, and environment themes. These materials provide step-by-step, how-to instructions on carrying out student projects and scientific experiments to be undertaken in the classroom. The Greenscreen web portal allows students to share their science-writing and create linkages with peers domestically and overseas. Thus far, top countries accessing the site have been the United Arab Emirates, Libya, Tunisia, and Kuwait.

Stimulating Growth of the S&T Private Sector in the Middle East

The public and private sectors in the United States are respected for sharing S&T advances and best business practices with the world. The American way of doing business and our earnest efforts to apply honest, best practices in business and institutional partnerships reinforces our attraction to the Islamic World. Our public and private sector S&T communities are perceived as reliable, non-controversial, and beneficial to Islamic society.

Technology business accelerators provide entrepreneurs with reliable partners, provide financial means to create market-ready products from prototypes, assist in developing business plans, and attract venture capital interest. The guiding principles of technology business accelerators make them especially attractive to countries that want a sense of ownership of the program rather than just being beneficiaries of traditional foreign assistance programs. OES is advocating introduction of business technology accelerators that can provide the United States and cooperating countries with opportunities to create partnerships that build S&T-based private sectors and strengthen public institutional ties.

OES is currently working with Jordan, Egypt, Morocco, Algeria, Tunisia, and Libya on the development of technology business accelerators and hopes to expand this program to partner countries in other parts of the world. Elsewhere, OES has on-going dialogues with South Africa and Vietnam regarding accelerators and has raised the subject in meetings with the OECD and APEC. Since the promotion of technological entrepreneurship is of great interest to many partner countries, discussions on accelerators are frequently associated with recently signed bilateral agreements on S&T cooperation.

Business focuses aggressively on market drivers for selecting technologies that can be developed into business opportunities. It applies proven processes and practices to speed up growth of technology-based enterprises that are regionally focused and globally competitive from the outset. Business strives to overcome traditional barriers to success including lack of access to capital and to markets firstly by attracting investment and

secondly by using innovative proactive marketing and business development processes in key markets. Finally, U.S. and local business partners assertively infuse the appropriate know-how to ensure their success by transferring their knowledge and advocating its adoption.

U.S. and host country business partnerships are desirable as a means of sustaining S&T programs because they are guided by the following principles:

- They are host country-owned and backed by U.S. public and private partners.
- They are business initiatives.
- They involve stakeholders from both the governmental and private sectors.
- They are guided by both technology policy and business development components, frequently have links to bilateral S&T agreements, and have goals that aim to strengthen the underlying legal, regulatory and policy framework supporting S&T business sector development.
- They offer opportunities for stakeholders to commercialize research undertaken at local universities and government agencies.
- They create long term independence through extensive knowledge transfer and local capacity building and infrastructure for S&T business creation and growth.

One case in point that illustrates how S&T cooperation is integrated into our diplomatic activities in the Middle East is in the case of Egypt. A wide array of joint United States-Egyptian S&T research activities that have occurred have been funded under our bilateral S&T agreement. In addition to the more tangible and pragmatic S&T benefits observed, both countries have benefited from the cultural understanding and goodwill these relationships foster. The agreement continues to play a significant role in a very important bilateral relationship for the United States. Egypt plays a key role in helping to ensure a stable Middle East.

Establishing Priorities for S&T International Cooperation

The role of the DOS in international S&T collaboration is to advance the objectives of the USG, the academic community, and U.S. commercial interests. The State Department's power rests in its ability to lay the appropriate ground rules for engagement at the government-to-government and international level, to serve as a catalyst, and to use its convening authority effectively. In its role as "chair" for USG international science engagement, OES convenes USG interagency working groups on S&T cooperation with specific countries. These groups are composed of representatives from over 20 USG agencies that have on-going, past or planned activities in those countries. Most interagency meetings are discretionary and called when S&T policy coordination is necessary. There are several every week over the course of the year.

Our outreach program to the Muslim world is indicative of the Department's broad interest in seeing S&T being used as a way to build bridges, promote development, and enhance U.S. scientific progress and capacity. Each year the DOS reviews its priority objectives with each of the regional bureaus to ensure that science and technology is advancing American national and foreign policy interests and promoting the freedom and dignity of others. This is followed up with detailed discussions at the bureau leadership level. Input from our missions abroad is factored into these deliberations, through the review of mission-specific strategic planning documents.

DOS also participates on various joint subcommittees of the National Science and Technology Council including the Joint Subcommittee on Ocean Science and Technology, and attends meetings of the National Academy of Sciences and National Research Council's Studies Boards. DOS finds such mechanisms useful conduits to gather and disseminate information on international S&T policies and collaborative programs.

Interagency S&T coordination is achieved on both a country-by-country and regional basis. For example, the scientific response to the need for a tsunami early warning system in the Indian Ocean and Caribbean basins, the implementation of a U.S. strategy on GPS, or the mobilization of "big science" programs, such as the International Thermonuclear Experimental Reactor or the International Space Station, require coordination along thematic lines and on a regional basis. Building science collaboration that addresses individual national concerns and aspirations requires a more intensive effort toward coordination of agency programs on a bilateral basis, while concomitantly implementing the strategic vision put forward by the Secretary of State.

Working with USG Technical Agencies

We enjoy close collaboration with the technical science agencies, including the Office of Science and Technology Policy (OSTP), the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), the United States Agency for International Development (USAID), the National Institutes of Health (NIH) within the Department of Health and Human Services (HHS), the National Institute for Science and Technology (NIST), the Department of Energy (DOE), and the Environmental Protection Agency (EPA).

OSTP

The Office of Science and Technology Policy (OSTP) plays an instrumental role in defining interagency programmatic priorities and broad budget guidelines for the many global science challenges we face. OSTP Director Dr. Marburger also serves as our "Science Minister" on some bilateral S&T cooperation committees, and in some meetings with S&T Ministers from the international community. His team leads the U.S. delegations to the IPCC as well. The State Department promotes OSTP's R&D Priorities for 2009 through its international partnerships. The 2009 R&D priorities "encourage

interdisciplinary research efforts on complex scientific frontiers and strengthen international partnerships to accelerate the process of science across borders.”

NSF

NSF works with DOS to promote S&T cooperation with a number of countries or regions. These include:

- The U.S.-Egypt Joint Fund Program, where NSF manages nearly half of the entire portfolio of proposals for research and workshops.
- The U.S.-Pakistan Commission on Science and Technology, where the Director of NSF is the U.S. Co-Chair. NSF recently funded a linkage from the Global Research and Education Network node in Singapore to Karachi, Pakistan, where it connects with the large and developing Research and Education network in that country.
- NSF participated in an assessment trip in the fall of 2003 followed by a number of workshops, notably one on digital libraries in Rabat, Morocco in January 2007, and one on nanotechnology in Tunisia in March 2008. The workshops are scheduled to be broadcast via Digital Video Conferencing (DVC) to other countries in the region.
- NSF staff worked with OES on developing collaboration with Jordan, with a visit of a staff member in January 2006 and a two-month science fellowship by another NSF staff member at the Embassy in Amman. A new NSF funded workshop on nanotechnology is scheduled for the fall of 2008 in collaboration with the Government of Jordan. That workshop is also scheduled to be broadcast via DVC to other countries in the region.

NOAA

In fulfilling their mission to understand and predict changes in Earth’s environment and conserve and manage coastal and marine resources to meet our Nation’s economic, social, and environmental needs, NOAA undertakes science and technology collaborations globally. NOAA’s science and technology cooperative efforts range across their capabilities, and in many cases link to their contributions to the Global Earth Observing System of Systems. Activities include collection of data on the Earth’s atmosphere and oceans, weather forecasts, severe storm warnings and climate monitoring, fisheries management, coastal restoration and supporting marine commerce.

Examples of NOAA’s recent cooperation through bilateral science and technology agreements include:

- NOAA’s National Environmental Satellite, Data, and Information Service (NESDIS) participated in a bilateral meeting with Brazil that has led to enhanced

cooperation and data exchange for Earth observations. Key areas of cooperation include regional cooperation on Earth observations, data dissemination (especially via GEO-NETCast), continuity of moderate-resolution space-based land observation, satellite navigation signals and Global Positioning System (GPS) applications, weather and climate forecasting, the Pilot Research Moored Array in the Tropical Atlantic (PIRATA) network, research on the ionosphere and magnetic anomalies, Earth Observation space projects, satellite reception and dissemination, and training on the use and application of Earth Observation data.

- NOAA, along with the Deputy Secretary of Commerce, participated in a visit to Libya in 2007, setting the stage for cooperation on integrated watershed management to prevent impacts on coastal ecosystems from land based sources of pollution.
- Several NOAA offices recently participated in a bilateral meeting with South Africa, and are discussing opportunities for further collaboration to improve climate change models and fill gaps in oceanic and atmospheric data collection in the South African region.

USAID

USAID plays a significant role in integrating the products of S&T to meet the challenges of economic, environmental, and social development. USAID supports research primarily in the areas of agriculture and health and is directed towards applied problems. The technologies and results from research and development supported by other federal agencies and the private sector is, however, integrated across the Agency's work in areas such as information technology, infrastructure, climate change, energy, clean water, environmental management, social safety nets and education. Among federal Agencies, USAID has the unique mandate for applied work on the ground in more than seventy developing countries.

USAID leverages the expertise of U.S. universities, private companies, and other federal agencies in partnerships with governments, research institutions, and the private sector in developing countries. In recent years, USAID funding cuts have greatly scaled back the Agency's support for training in science and technology compared to the 1980s. The Agency still supports modest programs of capacity building as integral to its agricultural research and higher education development programs.

USAID is seen as an international leader in areas such as agricultural biotechnology, contraceptives research, nutrition, vaccines, and the application of geospatial information to climate analysis and response. USAID is one of the only donors to support the development of improved crops using modern biotechnology, providing broader access to this technology by scientists, and eventually small farmers in Africa and Asia. USAID is also a major donor to the Consultative Group on International Agricultural Research (CGIAR), a network of research centers in developing countries which formed the basis of the Green Revolution.

Rising international food prices due to rising food demands threatens the welfare of the world's poor. USAID's leadership in the CGIAR will be a critical component of an international effort to raise productivity and meet this growing food demand. USAID's program to apply geospatial information technology to improve disaster response, weather forecasting, and monitoring of fires, ocean tides, and air quality in Central America was highlighted as an early accomplishment under GEOSS and is now expanding with USAID support to Africa.

USAID invests in bilateral scientific cooperation between the U.S. and Pakistani research and engineering communities. A series of some 40 cooperative R&D efforts, involving several hundred researchers and students on both sides, focus on areas that contribute to broader USAID development objectives in public health, agriculture, water and the environment, education and other sectors. The program, implemented by the National Academy of Sciences, is a true bilateral partnership, with USAID funding U.S. research partners and the Government of Pakistan funding the Pakistani scientists and engineers. All of this activity is implemented under the auspices of an S&T cooperation agreement negotiated by OES.

NIH/HHS

Over the past several decades, the NIH has supported research and research training programs that have resulted in the growth of a worldwide community of global health scientists. Many of these NIH-trained and/or NIH-funded scientists are making remarkable scientific advances and discoveries, becoming worldwide leaders in the medical research enterprise. Life expectancy and prosperity are generally increasing across the developing world, in part due to the success of biomedical advances directly or indirectly supported by the NIH.

NIH's Fogarty International Center is specifically dedicated to advancing global health by supporting and facilitating medical research conducted by U.S. and foreign investigators, building partnerships between U.S. and health research institutions worldwide, and training the next generation of scientists to address global health needs. Although significant advances have been made through the efforts of the NIH, there are still many unknown global health research questions that need to be answered, before we can adequately address the immense challenges from infectious diseases, and the growing global burden of non-communicable diseases. These questions are particularly relevant given the increasing incidence of infectious and non-communicable diseases in low and middle-income countries, where science diplomacy could be most helpful for the United States.

Because the United States is a melting pot of immigrants from every continent, we can make substantive gains in our own nation's health only through a better understanding of the predilection for diseases from ancestral populations abroad. Moreover, as life expectancy and the prevalence of life-style related chronic diseases increase in most foreign countries, the research questions that are most relevant in the

United States are those that are also relevant in foreign countries, often with large populations such as India or China, wherein research findings conducted through collaborative work with U.S. and foreign investigators can more quickly lead to biomedical breakthroughs. For many reasons, the future health and well-being in the United States will be increasingly dependent on strengthening existing, and developing new international research collaborations.

NIH's extramural support for health research conducted by foreign investigators is estimated at more than \$500 million per year. Additionally, the NIH Visiting Program provides intramural research opportunities for non-citizen scientists to train and conduct collaborative research at the NIH. Annually, more than 3,000 foreign scientists from over 100 countries worldwide conduct research in the basic and clinical science laboratories on the NIH campus in Bethesda, Maryland, and in several field units around the country.

Likewise, we work closely with the Departments of Agriculture, Energy, Interior, and Health and Human Services on related research, and climate change, that permeates all of our S&T relationships, from the ITER fusion energy large-scale collaborative project to a widespread interest in biofuels and other renewable energy sources. Clean coal R&D is a major interest in China and India. In all these areas, we work closely with these agencies to promote S&T cooperation with our foreign partners. All of these agencies and others are important members of our technical working group that convenes frequently to assess new S&T agreements and programmatic activities.

Additionally, we encourage initiatives such as the National Nuclear Security Administration's unique partnership arrangement between its Cooperative Border Security Program (CBSP) and Jordan's Royal Scientific Society (RSS) and Cooperative Monitoring Center in Amman, Jordan (CMC-A). CBSP partnered with RSS in 2002 to establish the CMC-A. The CMC-A is a forum in the Middle East for regional experts and officials to explore and adapt technology-based methodologies and solutions for enhancing regional cooperation on security and security-related issues. It assists official and technical experts in the Middle East to acquire cooperative monitoring concepts and technology-based skills and tools necessary to assess, design, analyze, and implement projects related to Nonproliferation, Border Control, Strategic Trade Control, Public Health, and Environmental Security. CBSP is working directly with the CMC-A to help establish cadres of technical specialists and experts in the focus areas of Nonproliferation, Border Control and Strategic Trade Control.

EPA

EPA's Office of International Affairs supports several major international partnerships and initiatives that build the capacity of other countries to address key environmental threats and that help to reduce the risk of trans-boundary transport of pollutants to the United States. EPA works closely with DOS, US AID, and other USG partner agencies to advance work under these partnerships. EPA's efforts include:

- The Partnership for Clean Fuels and Vehicles (PCFV), which EPA launched during the 2002 World Summit on Sustainable Development. This multilateral

partnership seeks to eliminate the use of leaded gasoline worldwide, reduce the level of sulfur in fuels, and promote the use of cleaner vehicle technologies. Technical and policy cooperation under PCFV helped move countries in sub-Saharan Africa to phase out the refining or importing leaded gasoline as of 2006, thus significantly reducing the exposure of 767 million people (42% of whom are children) to this toxic substance. As of March 2008, only 16 countries in the world still used leaded gasoline. The Partnership has also designed and implemented diesel retrofit technology projects in some of the world's largest and most polluted cities. These projects are designed to build support for introducing low-sulfur diesel fuel and demonstrate the emissions reductions that can be achieved in older vehicles with retrofit technologies combined with low-sulfur fuel.

- EPA has played a key role in developing and implementing the UNEP (United Nations Environment Program) Global Mercury Partnership. This Partnership, which began in February 2005, promotes the protection of human health and the global environment by reducing or eliminating mercury releases to air, water, and land from the use of mercury in products and processes as well as by reducing unintentional releases from combustion and processing of fuel and ores. Under the Partnership, EPA leads global work on mercury in chlor-alkali production and in products, and is also active in work on small-scale gold mining and cooperates with scientists in other nations on mercury fate and transport research and analysis. Under EPA's chairmanship, the multilateral Arctic Contaminants Action Program (ACAP) Working Group of the Arctic Council has helped Russian chlor-alkali production facilities reduce consumption and release of over 2 tons of mercury. In the small-scale gold mining sector, EPA helped West African miners who use mercury to amalgamate gold learn adopt inexpensive (less than \$5.00), locally constructed hand-held retorts which can reduce mercury releases. By the end of 2007, miners using these retorts had captured more than 24.5kg of mercury. EPA also helped develop a low-cost, locally manufactured technology to capture mercury emissions from vent hoods during small-scale gold processing in gold refining shops; this technology is capable of keeping 80-90% of the mercury emissions from this process out of the atmosphere, thereby reducing demand for new stocks of mercury. This technology, piloted in Brazil, can be adapted for use in shops in over 55 countries which further refine gold from artisanal miners in the field.
- EPA's technology transfer and training efforts under the ACAP Working Group of the Arctic Council have substantially reduced the trans-boundary transfer of Persistent Organic Pollutants (POPs) to the Arctic. EPA has led efforts to inventory, analyze, and safely store of over 3000 metric tons of obsolete and prohibited pesticides from the Arctic and sub-Arctic regions of Russia, thereby preventing the potential transport of these chemicals to the U.S. Arctic. It has also implemented a model cleaner production program at one of the world's largest emitters of air pollutants, Norilsk Nickel Company, located in the Russian Arctic. This technology cooperation project has resulted in annual reductions in

fresh water consumption by 7.9 million cubic meters; reduction of waste discharge by 3.4 million cubic meters; reduction in electrical energy use by 14.9 million kWh; and reduction in discharge of heavy metals and their oxides into the atmosphere by 850 tons. EPA also led the creation of the *Indigenous Peoples Community Action Initiative* within ACAP, a model environmental justice and indigenous community empowerment program. This ACAP initiative has enabled indigenous communities in the Arctic Rim countries to manage their local sources of hazardous contaminants, and has already resulted in removal and safe storage of over 1.1 tons of PCBs and POPs pesticides from five indigenous villages in Alaska and northern Russia. The State Department provided funding to this initiative.

- EPA Partnered with Norway and the Russian Federation in building Russian capacity to treat low-level liquid radioactive waste from decommissioned naval submarines, which ultimately facilitated Moscow's decision (May 2005) to formally accede to London Convention ban on ocean disposal of all radioactive waste (October 2005). Through this technical cooperation effort, Russia completed design, construction and testing of the first cask conditioning system for long-term safe storage of highly radioactive spent nuclear fuel from decommissioned Russian submarines. This project allows safe transport of spent nuclear fuel away from the Arctic and Far Eastern coasts and helps meet the joint U.S. and Russian objectives under the Strategic Arms Reduction Treaty.

Nongovernmental Partners

We are fortunate to have very constructive relationships with the American Association for the Advancement of Science (AAAS), as well as the National Academies of Science (NAS). The Academies of course, play a vital role in informing us of the state of the science in key international issues, as well as in identifying emerging science issues. NAS has also been extremely generous helping to host bilateral S&T discussions, most recently with Viet Nam. Similarly NAS has been helpful in choosing the scientists that participate in the Jefferson Fellows program, managed by Dr. Nina Federoff. NAS is also able to access some communities that DOS cannot reach. NAS is actively working to build ties to the Iranian scientific community. In some case, NAS has been able to convey key messages to overseas audiences.

A NAS delegation, for instance, was able to speak for the American scientific community to the government of Libya on the issue of the Bulgarian nurses who were accused of intentionally infecting children with HIV. NAS made the compelling argument that American scientists and health professionals would be reluctant to work in a country where science was misused to imprison foreign collaborators. Along the same lines, NAS has been very active in strengthening counterpart Academies abroad. It was instrumental, for instance, in helping its South African colleagues in the production of an objective assessment of the causes and appropriate treatments of AIDS. NAS has also provided valuable information tools to US embassies, such as the multi-language website

(www.drinking-water.org) and a CD on providing safe drinking water, and free access to all NAS reports and publications to all users in developing countries.

The AAAS has been no less helpful. We are working together to organize an APEC workshop on linking research to innovation. AAAS has also worked with some of the posts in Africa to distribute our science on a stick to science institutes in Africa. This program puts content from Science magazine on USB drives for countries with limited internet broadband access. State has participated in the AAAS annual meeting at senior levels. Dr. Federoff gave the keynote speech this year. The AAAS also co-sponsored the 2007 “Conference of Women Leaders in Science, Technology, Engineering, and Mathematics” in Kuwait and has been a valuable advocate in the importance of S&T in diplomacy. Finally, the AAAS Diplomacy Fellowship, also managed by Dr. Federoff, is a crucial contributor to the Department’s science literacy.

We have been the beneficiaries of the work being done by others as well. Ambassador Harnish and I have participated, for example, in several events organized by the science and technology program of the Saban Center at the Brookings Institute. While we are collaborating with AAAS and NAS fairly closely, we could interact more with the private sector, academia, and a variety of other nongovernmental organizations.

Conclusion

S&T is universally perceived as apolitical. This inherent characteristic makes S&T an excellent means for engaging societies, such as those in the Middle East, where the United States has become progressively more unpopular. While there has been no definitive study on the topic of what makes science diplomacy effective, we have learned through years of engagement that some of the key elements are:

- finding areas that break new ground, sometimes in a neglected area of science or development
- finding areas that are educationally and developmentally transformative, that are highly motivational for the participants
- finding areas that address core developmental issues of poverty and human development
- finding areas that promote sustainable uses of natural resources
- finding programs that stimulate job creation and private sector investment
- finding collaborative projects that bear tangible results

The appeal of American science and technology creates a more favorable atmosphere in which to explain other American policies and interests. S&T allows the United States to engage in mutually beneficial dialogue with foreign nations, and creates a foundation for international exchange of ideas, scientists, data, and students. Science education provides opportunities for upward mobility for youth worldwide. S&T empowers individuals, in America and around the world, to find dignified, independent solutions to pressing social, economic, and environmental problems.

We are proud of the work we are doing to strengthen our S&T ties with other nations. Nonetheless, there is a lot more that could be done to further harness the soft power of S&T. Last month, the Secretary of State's Advisory Committee on Transformational Diplomacy recommended that the DOS "expand its investment in Science, Engineering, and Technology expertise, presence, and global engagement. This includes expanding the Department's engagement in global science, engineering, and technology networks through exchanges, assistance, and joint research activities addressing key issues." I look forward to hearing from the Committee how we might work together to broaden our international cooperation on science and technology.

Thank you for this opportunity to testify and I would be pleased to respond to any questions you may have.