Testimony Regarding Draft Legislation
on the
Coordination of International Science Partnerships

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to the

Subcommittee on Research and Science Education
Committee on Science and Technology
U.S. House of Representatives

March 24, 2009

Mr. Chairman and Members of the Committee, I am pleased to testify on the draft legislation to enhance international cooperation in science and technology that can strengthen the domestic STEM enterprise and US foreign policy goals.

My name is Gerald Hane and I was the Assistant Director for International Strategy and Affairs for the Office of Science and Technology Policy under Neal Lane at the end of the Clinton Administration. In that position I reported directly to Dr. Lane and was the principal OSTP coordinator for the Committee on International Science, Engineering and Technology (CISET). I was with OSTP from the beginning of 1995 to the beginning of 2001 and during that time I also had responsibilities in the area of commerce and security. Currently I am a consultant to venture companies and investors interested in trans-Pacific partnerships as well as in the area of science and technology policy.

In my current work I see firsthand both the fast rise of science and technology capabilities internationally, particularly in Asia, and the expanding possibilities for win-win cooperation. In the past few years, for example, I have organized four science missions to China as part of assessments of the World Technology Evaluation Center, and in every case the senior US scientists found at least one major surprise in which researchers or institutes in China were defining the scientific frontier. In all cases they were impressed by the fast rate of development of the science enterprise there. In the venture capital world, Asia, and again China in particular, has been a hot spot of growth activity.

Ensuring the reestablishment of responsibility for strategic international cooperation in the National Science and Technology Council (NSTC) is an important step toward strengthening the ability of the US government to more effectively leverage rapidly advancing resources and expertise in other countries and to accelerate the speed of discovery.

In my testimony, I would like to focus on issues of execution and go directly to the questions posed in the hearing charter. There are three things that the agencies need if they are to move ahead to more fully exploit the benefits of international cooperation in S&T: mission, money,

and motivation. I will incorporate these themes in my discussion as I attempt to respond to the questions for this hearing.

Question 1. What are the respective roles of the Department of State and the science agencies, such as the National Science Foundation, the Department of Energy and the National Institutes of Health, in international science and technology cooperation? How does each agency set its priorities for S&T cooperation? What is the role of the Office of Science and Technology Policy in fostering international S&T cooperation and in coordinating federal activities?

The agencies are typically careful about defining their use of international cooperation in science and technology in manners consistent with their missions, and consistent with the priorities established by their leadership. Representatives of these agencies can speak in much greater detail about their missions, priorities and activities, but the approaches have clearly differed among the S&T agencies. For example, the Department of Defense and the National Institutes of Health, together accounting for the bulk of federal research and development, are the most active in seeking the best R&D partners around the globe and have major international programs that involve substantial direct funding of international researchers. Prior to NIH doubling which began at the end of the Clinton Administration, one estimate from NIH was that perhaps 5 percent of their research budget at that time funded international researchers, bearing in mind of course that NIH has major visiting researcher programs.

The National Science Foundation appears to be restrengthening its international partnerships to take advantage of this global rise in S&T capabilities spanning Asia, the Middle East, Africa, and Latin America as well as traditional partners in Europe. The Partnerships for International Research and Education (PIRE) is one program that has resonated well in the academic research community, maintaining a high standard of research while catalyzing collaborations often in parts of the world where S&T links with the US have not been well established.

The Department of Energy must engage in international cooperation if it is to effective address the global challenges in energy and climate. However, in the past, DOE has been among the more reticent agencies regarding entering the international arena, particularly in energy efficiency and renewable energy. There has been a perception that international projects open doors to criticism and budget cutting.

Other agencies, such as the US Geological Survey, have been restrained in international cooperation by their interpretation of the domestic focus of their mission. Yet data and technologies developed by USGS such as geographic information systems are highly complementary to efforts abroad, with applications that range from disaster mitigation to biodiversity management to humanitarian relief in regions of conflict.

The Office of Science and Technology Policy has responsibilities to advise the President and Vice President and to lead in the development of S&T policy priorities and strategies that will advance the President's goals. However the staff size of OSTP is small and limited by its budget which has been flat over many years.

In order to more effectively define and in particular execute Presidential priorities, the National Science and Technology Council (NSTC) is an invaluable asset. The value of the NSTC derives from the fact that it is a body to which the most senior member of each department or agency also belongs, so each participant is a part of the NSTC and the incentives for participation are more clearly aligned with department and agency leadership.

Question 2. If OSTP reconstituted a Committee on International Science, Engineering and Technology (CISET) under the National Science and Technology Council, what should be the unique role and responsibilities of that committee? What lessons can be learned from the previous CISET of the 1990's? Does the draft legislation being considered appropriately describe the purpose and responsibilities of an effective CISET?

The draft legislation captures well the principle roles of CISET. CISET plays a role in the areas in which strategic coordination of international S&T activities can enhance the ability to achieve policy goals set by the President and Congress. Roles that CISET can play include the following:

- Developing interagency strategies for international cooperation in science and technology to address strategic and scientific priorities.
- Developing of a more strategic approach to working with other nations in meeting common challenges.
- Coordinating the activities among various agencies to better ensure the effective use of resources.
- Validating priority areas of attention for planning and budgeting within each of the agencies.
- Enabling scientists to identify and assess international challenges and to propose interagency solutions.
- Creating a means to, with a collective position, engage with the Office of Management and Budget and National Security Council to ensure appropriate support.

- An Example - CISET Emerging Infectious Diseases Initiative

The CISET Emerging Infectious Diseases Initiative provides one illustration of how this process can work effectively. The need was identified by the public health and medical communities, the strategy for the US government's response was developed by CISET, and the principals of the working group provided the leadership to strengthen the resources needed to execute the strategy.

Momentum for this initiative was catalyzed by a report of the Institute of Medicine in 1992, *Emerging Infections, Microbial Threats to Health in the United States*, led by Josh Lederberg. This report built on prior IOM studies of this area and made specific recommendations for actions that should be taken across numerous federal agencies. The principles of CISET – the OSTP Associate Director for National Security and International Affairs, Jane Wales, the Under

Secretary for Global Affairs, Tim Wirth, and the Deputy Administrator of USAID, Carol Lancaster, directed the formation of a Working Group to examine the issue. This Working Group on Emerging and Reemerging Infectious Diseases was chaired by the Surgeon General, David Satcher.

CISET issued the report of this working group in 1995. Although CISET could have proceeded directly to develop the strategy, the CISET principals felt that an even higher level of engagement would be useful to solidify commitment to the importance of this issue as well as to gain the needed resources.

CISET principals thus used the report and its recommendations as the basis for a Presidential Decision Directive (NSTC-7) in 1996. NSTC-7 became the cornerstone for subsequent work in this area, with the PDD directing the formation of a Task Force on Emerging Infectious Diseases co-chaired by the Surgeon General and the Associate Director of OSTP and charged with developing a government-wide strategy to address the global threats of emerging and reemerging infectious diseases.

At that time, there was a movie, *Outbreak*, starring Dustin Hoffman, which portrayed a fictional outbreak of the Ebola virus. It was reported that Dustin Hoffman received over $8 million for this role. The entire budget of the Centers for Disease Control to address global emerging infections was about $5.6 million.

As a result of a subsequent year of work, the CISET task force developed a multi-year, budget specific plan for addressing this area. The clear articulation of this strategy strengthened support for the initiative with the administration and Congress. Budgets were increased over time, with the CDC's FY 2001 budget for infectious diseases increasing to $182 million of which emerging infectious diseases was a principal theme.

Parenthetically, I should note that even with the backing of a PDD, full cooperation is not ensured among all members of the agencies. In an early OMB meeting one examiner resisted the initiative noting that he had never heard that emerging infectious diseases were a substantial problem. When the issue of countering bioterrorism was raised as a potential benefit, another OMB staff member objected that making such connections was exploiting alarmism. When the US Senior Official to APEC was encouraged to raise this in that forum, he replied that he did not see the significance of the issue.

The CISET task force strengthened coordination between the agencies and provided a jumpstart to the government's response to infectious disease in bioterror after 9/11. A solid foundation was thus laid for the rapid increase in funding that occurred in the post 9/11 environment. The issue also became and remains a key theme of the APEC Leaders Meeting.

- Other CISET Initiatives

At the time of the end of the Clinton Administration, there were CISET working groups which were beginning to address a range of issues.

- Water – a working group was formed to investigate ways that strengthened international cooperation in S&T could better help the US address both our own water challenges as well as our foreign policy priorities. This work emerged from grassroots activities organized through the Sandia National Laboratory. This work was also designed to support US contributions to the growing international policy dialogue over water.

- Genetically Modified Organisms (GMOs) – GMOs were just emerging on a large scale at that time and the global debate was intense. This effort arose from professors and industry many of whom felt that the benefits and risks of GMOs as known by science, were being lost in the high volume politicized debate. Also, the emergent InterAcademy Council comprising academies of sciences in numerous countries was taking up the GMO issue as one of the first that they wished to address.

- S&T and capacity building – This initiative emerged from the international AID community. In USAID there are generally speaking two factions, one which gives priority to longer-term capacity building partnerships such as those involving S&T, and the other, currently more powerful faction, that emphasizes attention to emergencies and immediate challenges of the moment. PCAST took this up as an issue and recommended that the President issue an executive order to reinvigorate US commitment to the longer-term capacity building advantages of S&T. Unfortunately time ran out prior to the full approval of the executive order.

- Natural disasters – The initial effort in this area emerged from disaster research and mitigation community. There was a sense that monitoring, research and response capabilities were uncoordinated both domestically and internationally, weakening the US capability to respond. This became overshadowed by a disaster initiative out of the Vice President's office, although it is relevant to note that the lower level, interagency planning for more coordinated and strategic domestic R&D yield approval from OMB of more than$100 million in new support.

- Green Chemistry – This was a bit different as here we were fortunate to have on staff someone who by his mid-30s was being honored as the "father of green chemistry," Paul Anastas, who is now a professor at Yale. But here too, I think he would agree, defining the importance of the problem and potential for solutions came from the work of those in the field.

- International Technology Transfer. This group focused on US government policies in an attempt to better ensure consistency in the US approach to international technology transfer from its laboratories.

Each of these initiatives, like the emerging infectious disease initiative, came from the relevant community, "bottom up." Each of these initiatives also had some level of bipartisan support.

There is also the example of the seed of the National Nanotechnology Initiative. This concept was first put forth by a group of scientists from various agencies in a meeting that I chaired on international cooperation in materials research. At the time there was no other NSTC activity dealing with materials science, so this was the one route available for agency research managers

to share views. The scientists at the meeting, including Dr. Michael Roco from NSF, noted that there was growing informal, interagency interdisciplinary cooperation in nanotechnology enabled in part by new tools, but that there was no formal ability to coordinate and better connect this work. This seed from a discussion in the international context mushroomed into the eventual National Nanotechnology Initiative.

- Regional and Bilateral Strategic Support

CISET can also be used as a means of defining and coordinating US interests in regional and bilateral forums. Regional forums such as the Asia Pacific Economic Cooperation (APEC) Forum, Organization of Economic Cooperation and Development (OECD), and Summit of Americas (SoA) can provide opportunities to advance US interests in international S&T cooperation in multilateral settings. Similarly, CISET can facilitate the development of joint strategies of cooperation with key partners, which target the leveraging of key facilities and areas of expertise. One such bilateral strategy was developed with Japan, for example.

- Lessons Learned

CISET works well when there is a process for drawing upon the research community broadly to identify and assess opportunities, using its interagency forum to develop a government strategy, and calling on its leaders to bring about the necessary support to effectively address the policy. When CISET has struggled in the past, I believe that one reason was the lack of such an operationalized system.

Just as the quality of US science is built from the bottom up, advancing on the work of those who know well the frontiers, defining where the frontiers of S&T can be best advanced through international cooperation is effectively done drawing on this bottom-up web of expertise. Tapping the knowledge and capabilities of the agencies and their laboratories, universities and non-profit organizations, and industry are equally critical in identifying which challenges can be effectively advanced through international S&T.

CISET should not rely on just the ideas of those at the top. When this happens, the options tend to shrink and the options more limited.

A practical factor which seemed to affect CISET in the mid-1990s was an emphasis on working groups formed to support the bilateral priorities of the Vice President. The Vice President led several high priority bilateral initiatives intended to strengthen peaceful development and bilateral ties with such countries as Russia, China, Ukraine, South Africa, and Egypt. Supporting the S&T components of these initiatives was a substantial activity of CISET. Although a certainly worthy use of CISET's role, this shifted the focus of CISET away from broader issues-oriented work.

Question 3. Can CISET serve an important function absent additional funding for S&T cooperation? Does creation of CISET ensure active participation and support from the science agencies and from the Department of State? If not, what other steps must be taken to make CISET an effective coordinating body? Are any of those steps legislative?

- Funding and Process

Initiatives often require resources, therefore additional funds for S&T cooperation would certainly be of value in assessing options and executing strategies defined through CISET, particularly by accelerating the initial phases of assessment, planning and development.

The State Department is chronically short of funding and virtually no funding support seemed to exist to organize discussions of issues and approaches. The S&T agencies are thus typically approached to support funding for any activities even at the earliest stages of discussion, but it wastes a good deal of time and effort in OSTP to explain to the right agency representative the reasons actions support their respective agency missions, and then for the agency to find appropriate accounts. Launching discussions and assessments of issues in a more timely manner would help all S&T agencies more effectively engage in strengthening the links between S&T and foreign policy.

- Agency Participation

One reason that agencies will participate in the NSTC process in general, including the CISET process, is because of the value in the overall budgeting process.

A typical process for gaining additional funds is to have workshops or forums with governmental and nongovernmental representatives to discuss and define challenges and solutions, much as one would explore new challenges in S&T in general. Funds for this step are typically very difficult to achieve as there are few if any line items in agency budgets for this purpose. Despite NIH's vast budget, for example, I found NIH to be the most difficult agency with which to work regarding workshop support for interagency, international priorities, due at least in part to a lack of appropriate accounts.

Next is the interagency planning process to develop a strategy of action and to list the resources necessary to execute the actions. After multiple prioritization exercises, the strategy is submitted to the CISET and NSTC principals for review. If approved, the next step involves budget requests to OMB, agency by agency, which brings us to a point still 16 months away from getting budget if successful.

From this point, each agency must articulate to OMB and then to Congress the value of the effort within the context of its own agency priorities. Here CISET can assist by defining the bigger picture within which the agency's contribution is an important part, and this seems appreciated by both entities. With both OMB and Congress, CISET can help to explain the necessity of various elements to achieve an overall government-wide goal.

Regarding the State Department, staff members are quite vigilant about the department's role as the lead agency for US government foreign affairs. The Department is typically willing to have a representative participate in international S&T issues, with their main limitation being budget.

- Other Steps

Designating a non-profit center or FFRDC. If enhanced support for international cooperation were available, the necessary bottom up process of identifying solutions and proposing paths forward through research, workshops and forums can be executed much more efficiently. Such a fund might be best managed in conjunction with a non-profit organization such as the Civilian Research and Development Foundation (CRDF) which has extensive experience executing cooperative programs abroad and can act quickly. Or, perhaps a Federally Funded Research and Development Center (FFRDC) might be formed at such an existing organization to provide for a closer administrative link to government priorities.

Clarify Mission and/or Oversight. Regarding other legislative change, Congress could amend authorizing legislation or oversight measures to explicitly include agency development and execution of international science and technology strategies as well as priority participation in CISET to ensure an effective US government-wide response.

The US Geological Survey has advanced such tools as Geographic Information Systems, valuable in a wide range of uses from agriculture to disaster mitigation to humanitarian relief, yet USGS is often hamstrung for directly supporting or engaging in international activities. Adjusting its mission statement would be helpful.

If this is difficult for jurisdictional reasons, then perhaps the Committee, with its sole or shared jurisdiction on most government R&D programs can clarify that strategies to advance R&D for their agencies missions should be defined with a global scope, to leverage growing global assets.

Furthermore, any oversight of R&D programs such as those called for through the Government Results and Performance Act (GPRA) might be amended to ensure that performance evaluations also include the considered use of international S&T.

Question 4. How else might OSTP and/or the science agencies play a greater role in bringing S&T to bear on foreign policy?

- Focus and Authority in Leadership

One challenge is ensuring energetic and focused leadership for CISET. In reviving CISET at the end of the Clinton Administration, the Director of OSTP, Neal Lane decided to co-chair this working group with the Under Secretary of State for Global Affairs, Frank Loy. The OSTP Director does not typically chair NSTC committees. However Dr. Lane made this decision recognizing that high level commitment would be needed to reenergize CISET in a timely manner and to gain the commitment of both higher level agency and department policymakers as

well as staff. This decision was key to successfully reenergizing CISET at the end of that administration.

Under the Clinton Administration there were four associate directors of OSTP but five NSTC Committees. One Associate Director co-chaired the Committee on National Security and CISET. This is not an impossible situation, but the reality is that any Associate Director has very limited time. Those who want to accomplish something in the few years of tenure at OSTP will be highly focused. Thus achieving the high level of attention needed can be a challenge.

Congress does not provide for five Associate Directors. However, there may be other possibilities. The Director of OSTP could, for example, create a position of Deputy Director for International who, with appropriate staff, could work across all parts of OSTP and also run the CISET process. When building new issues with diverse constituencies, rank and authority are extremely important.

- Better Integrating S&T into Decisionmaking Process

There are some issues in which the S&T agencies might better assist with in-kind resources, or which could be aided by a center or FFRDC in this area. Examples would include dealing with

- visa issues and foreign researchers,
- export controls, and
- international technology transfer.

CISET should play a more active role in bringing the civilian S&T agencies and the diplomacy and security focused agencies such as the Departments of State, Homeland Security and Defense, closer operationally. Clear areas of possibility are visa approvals and export controls.

Although the situation with visa approvals for foreign scientists is much improved over the post-911 period, there are still numerous stories of seemingly excessive delays. A major part of the reason is lack of staff and expertise in the approving agencies. The S&T agencies may be able to substantially facilitate this process by drawing on the wide range of experts in their networks. Some system that will enable a more expedited and informed review of the science and technology aspects of visa applications seems to be worthy of consideration.

Regarding export controls, an ongoing concern of the academic science community is the lingering use of the “sensitive but unclassified” classification of academic research. The Bush Administration reaffirmed the position of the National Security Decision Directive 189 issued by the Reagan Administration in 1985, exempting basic academic research from this restriction, but stories of overly ambitious application still emerge.

At an operational level, more classified export control review often occurs in a black box and may benefit from the input and analysis from a wider body of scientists. The dual-use export control list managed by the Department of Commerce is one that requires an ongoing understanding of the state of technology abroad for any restrictions to be effective. The munitions control list managed by the Departments of State and Defense might also benefit by enriching the set of evaluators to achieve for a more timely review of restrictions placed on

research or commercial technologies.

Summary

In summary, CISET can facilitate the effective planning and execution of international cooperation by ensuring agencies see this use of R&D as part of their mission, and by developing strategies to meet common missions through international S&T. CISET can offer a cross-governmental strategy that is coordinated in actions and budgets, which assists in gaining support from OMB and Congress.

CISET benefits when ideas and analysis come from the bottom up, drawing on the large pool of expertise through the governmental and non-governmental sectors. CISET principals can provide the higher level leadership that is often critical when pursuing change.

In order to strengthen CISET's contribution to international cooperation in R&D and its contribution to foreign policy, agencies missions and oversight could be adjusted to clarify this priority.

Finally, in order to facilitate faster action, more thorough analysis of options, and the more considered integration of S&T and foreign policy, a center or FFRDC might be formed to bring together the many capabilities needed to address this complex but increasingly important issue area.