U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY

HEARING CHARTER

Impacts of U.S. Export Control Policies on Science and Technology Activities and Competitiveness

Wednesday, February 25, 2009
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building

Purpose

On Wednesday, February 25, 2009 at 10:00 am in room 2318 Rayburn House Office Building, the Committee on Science and Technology will hold a hearing to review the impacts of current export control policies on U.S. science and technology activities and competitiveness and to examine the findings and recommendations of the National Academies study, *Beyond "Fortress America": National Security Controls on Science and Technology in a Globalized World*.

Witnesses

Lt. General Brent Scowcroft (Ret.)
Co-chair, National Academies Committee on Science, Security and Prosperity, and President and Founder, The Scowcroft Group

Mr. A. Thomas Young
Co-chair, Center for Strategic and International Studies Working Group on the Health of the U.S. Space Industrial Base and the Impact of Export Controls, and Lockheed Martin Corporation (Ret.)

Dr. Claude R. Canizares
Vice President for Research and Associate Provost, Massachusetts Institute of Technology

Maj. General Robert Dickman (Ret.)
Executive Director, American Institute of Aeronautics and Astronautics

Issues

Some of the issues the hearing will explore include:

- What are the implications and unintended consequences of current export control policies for the conduct of United States government and commercial science and technology activities and national security?
- How does U.S. export control policy affect U.S. scientific and technological competitiveness?
- What are the principal findings and recommendations of the National Academies report, *Beyond "Fortress America": National Security Controls on Science and Technology in a Globalized World*, as they relate to the conduct of U.S. government and commercial science and technology activities and U.S. global science and technology competitiveness?
- What is required to implement the National Academies' report recommendations and what are the most significant challenges in doing so?
- U.S. export control policies have an impact on the conduct of the U.S. commercial space industry and government civil space activities. What particular issues and unintended consequences do the current export control policies present for U.S. civil and commercial space activities, including space-based research and human spaceflight activities? How serious are those issues and what must be done to address the unintended consequences?
- What are the most critical issues relevant to U.S. civil government and commercial space activities that should be considered in any potential review of U.S. export control policies?
- What effect, if any, do the unintended consequences of U.S. export control policies have on U.S. leadership in space in the near-term and long-term?

INTRODUCTION

The Cold War sparked the United States to make historic investments in scientific research and development that could serve our national security needs, including the support of university, government, and industrial research institutions. Those Cold War investments created a robust science and engineering workforce, drove innovation, fueled economic growth, and established the United States' preeminence in science and technology.

The Soviets, however, sought access to U.S. technologies for potential military applications. In response, the U.S. instituted mechanisms aimed at preventing the transfer of certain U.S.-developed components, systems, and information to the Soviet Union and other adversaries. These national security controls include the classification system, export controls, limitations on the transfer of knowledge about technologies, visa controls, and measures to restrict the dissemination of certain government-funded research that could threaten national security.

Export controls, which are the focus of this hearing, are directed by the Arms Export Control Act of 1968 and the Export Administration Act of 1979. The Arms

Export Control Act governs the export of components and systems that are listed as defense articles; the Department of State administers the International Traffic in Arms Regulations (ITAR), which are the regulations to implement the Act. The U.S. Munitions List (USML) comprises the list of defense articles regulated under the ITAR; and that list includes such categories of items as tanks and military vehicles, aircraft and associated equipment, military electronics, optical and guidance and control equipment, toxicological agents, and spacecraft systems and associated equipment. ITAR also controls technical data, including data for the design and development of defense articles, and defense services, which are "*The furnishing of assistance (including training) to foreign persons, whether in the United States or abroad in the design, development, engineering, manufacture, production, assembly, testing, repair, maintenance, modification, operation, demilitarization, destruction, processing or use of defense articles*" [International Traffic in Arms Regulations, Section120.9(a)(1)].

The Export Administration Act governs the export of dual-use items—those that have military and as well commercial applications—including software and technology. The Act is implemented through the Export Administration Regulations (EAR), which are administered by the Department of Commerce. The EAR controls the export of dual-use items on the Commerce Control List, including software, hardware, and other systems subject to the EAR. The EAR also controls "*Any release of technology or source code subject to the EAR to a foreign nation. Such release is deemed to be an export to the home country or countries of the foreign national*." [EAR Part 734] These "deemed exports" include technology or software released through

> "*(i) visual inspection by foreign nationals of U.S.-origin equipment and facilities*;
> (ii) *oral exchanges of information in the United States and abroad; or*
> *(iii) the application to situations abroad of personal knowledge or technical experience acquired in the United States*." [EAR Part 734]

The Export Administration Act has "*lapsed several times*", according to the National Academies report, *Beyond "Fortress America",* and presidential authorities have sustained EAR requirements by using the International Economic Emergency Powers Act of 1977, "*on the grounds that the expiration of the act poses an 'unusual and extraordinary threat to the national security, foreign policy and economy of the United States'*," according to the report.

What these controls mean in practice is that an institution such as a company or university may need to apply for an export control license to export controlled hardware or software (for example as part of an international space research mission or sale of a product or components abroad). The institution may also need to obtain a license to share designs, conduct training related to the controlled item, or discuss information about the item with a non-U.S. citizen who is abroad or working in the U.S. Export control licenses, especially ITAR licenses, require a significant review and interagency approval process that may take months.

During the late-1990s, the implementation of export control policies tightened in response to findings about the unintentional transfer of controlled defense technologies and information to China. Since those changes, the time required to approve ITAR licenses, in particular, has put stress on the federal agency systems for processing licenses and on the applicants for those licenses. In 2007, the Government Accountability Office (GAO) commented that the time required for processing export licenses "*increased from a median of 13 days in 2002 to 26 days in 2006*." And by late 2006, "*State's backlog of applications reached its highest level of more than 10,000 open cases*." The time involved in obtaining Technical Assistance Agreements (TAAs), which are required to discuss ITAR-controlled technologies, has also increased.

These delays mean that commercial companies may lose the opportunity to respond to a bid while waiting for a license, and that government projects may be delayed and incur cost increases. Other impacts of export controls pertain to researchers who may not be able to discuss ideas or research equipment with foreign colleagues at an international conference for fear of inadvertently transmitting controlled information. Failure to comply with the ITAR and EAR can carry fines and criminal penalties. The later sections of this charter provide additional examples of the unintended consequences of the policies and the challenges in implementing them.

A large number of organizations have made statements, released positions, led studies, and issued recommendations for improvements to the export control system. Some of those institutions include The Aerospace Industries Association, the Space Enterprise Council of the U.S. Chamber of Commerce, the Universities Space Research Association [an association of 102 universities], the Space Foundation, the Association of American Universities, the Council on Governmental Relations, the Center for Strategic and International Studies, and the Coalition for Security and Competitiveness [which includes the Aerospace Industries Association, American Association of Exporters and Importers, American Electronics Association, The Association for Manufacturing Technology, Business Roundtable, Chamber of Commerce Space Enterprise Council, Coalition for Employment Through Exports, Electronic Industries Alliance, General Aviation Manufacturing Association, Government Electronics and Information Technology Association, Industrial Fasteners Institute, Information Technology Industry Council, National Association of Manufacturers, National Defense Industrial Association, National Foreign Trade Council, Satellite Industries Association, Space Foundation and U.S. Chamber of Commerce.]

The Department of State has taken some steps to increase the efficiency of processing export control licenses. However, a 2007 GAO report commented that "*Despite efforts to improve efficiency, State's median processing times of license applications have been increasing since 2003*." In January 2008, the Bush Administration issued U.S. Export Control Reform Directives to "*ensure the*

United States' export control policies and practices support the National Security Strategy of 2006, while facilitating the United States' continued international economic and technological leadership" , according to a release issued by the White House Office of the Press Secretary. A fact sheet released by the State Department's Bureau of Political-Military Affairs noted that the directives included making additional resources available to handle defense trade licenses, upgrading an electronic licensing system, and improving dispute resolution and enforcement.

During the 110th Congress, the House passed H.R. 5916, the Security Assistance and Arms Export Control Reform Act, which directed the President "*to conduct a comprehensive and systematic review and assessment of the United States arms export controls system in the context of the national security interests and strategic foreign policy objectives of the United States*", among other provisions. However, the bill never became law. During the 110th Congress, the House also passed H.R. 6063, the NASA Authorization Act of 2008, which was introduced by Rep. Mark Udall, chairman of the Subcommittee on Space and Aeronautics, Committee on Science and Technology. H.R. 6063 directed the Office of Science and Technology Policy to carry out a study of export control policies related to civil and commercial space activities. The House-passed provision did not make it into law. Other legislation on export controls was introduced during the 110th Congress but was not acted upon.

In addition, during his campaign, then-candidate Barack Obama issued a white paper, "Advancing the Frontiers of Space Exploration," in which he stated that he would "*direct a review of the ITAR to reevaluate restrictions imposed on American companies, with a special focus on space hardware that is currently restricted from commercial export*." His paper also stated that he would revise the licensing process, without impact to American national security, to ensure that American aerospace supplier companies are competitive in the global market.

THE CHANGING ENVIRONMENT

The geopolitical landscape has changed dramatically since national security controls were put into place. Advances in communications technologies have facilitated the growth of a global marketplace of goods and ideas. In addition, science and technology, which is increasingly international, has become a primary agent of the nation's national and economic security. Recently, studies sponsored by both government and non-government institutions have called for reexamining national security controls in light of their impacts on our global scientific, technological, and economic competitiveness.

In its January 2007 report, the GAO identified the export control system as a new high risk area. In July 2007 the GAO released a report in which it found that

"*Given the importance of the system in protecting U.S. national security, foreign policy, and economic interests, it is necessary to assess and rethink what type of system is needed to best protect these interests in a changing environment*." And in January 2009 the GAO reported on the status of the government's progress in implementing GAO recommendations. Their report, *Ensuring the Effective Protection of Technologies Critical to U.S. National Security Interests*, found that

> "*Over the years, GAO has identified weaknesses in the effectiveness and efficiency of government programs designed to protect critical technologies while advancing U.S. interests. Since this area was designated high risk in 2007, the agencies responsible for administering these programs, including the Departments of Commerce, Defense, Justice, State and the Treasury, have made improvements in several areas. However, vulnerabilities continue to exist, and agencies have yet to take action to address GAO's major underlying concern, which is the need for a fundamental re-examination of current government programs to determine how they can collectively achieve their mission and to evaluate the need for alternative approaches*."

The need for new approaches to the export control system was the thrust of the recently released National Academies report, *Beyond "Fortress America": National Security Controls on Science and Technology in a Globalized World*. The report considered the multiple dimensions of national security controls including "*the changing requirements of national security from the Cold War era, the impact of economic globalization on the U.S. economy, the impact of the globalization of science and technology on the U.S. economy and on its S&T leadership….*"

The National Academies report took a broad look at dual-use export controls—those technologies that may have both commercial and military applications—and science and technology competitiveness. The National Academies committee also considered visa policies given the importance, as discussed in the report, of the U.S. being engaged in science and technology internationally and learning from the best and brightest outside the U.S. The report did not address the classification system, existing statutes, or policies that may prohibit technology transfers to a particular nation. In addition, the committee did not make recommendations on multilateral export control regimes or consider how individual agencies manage and administer export control regulations. The report specifically focused on issues that could be addressed through Executive authority.

In general, the report recommends significant changes to foster "*openness and engagement*" and that would require the government to provide a "*rational basis*" for restrictions on dual-use items planned to be exported. The report recommends that the President make some structural and policy changes by

issuing an Executive Order under the authority of the International Economic Emergency Powers Act of 1977. According to the report, the Act allows the President to "*structure the regulatory framework of the dual-use export controls system*."

The National Academies committee, co-chaired by John L. Hennessy, President, Stanford University and Lt. General Brent Scowcroft (ret.),former National Security Advisor, concluded:

> "*As a nation, we cannot, and should not abandon well-conceived efforts to keep dangerous technology and scientific know-how out of the hands of those who would use this knowledge to create weapons of mass destruction and other, equally dangerous military systems. However, these represent a very narrow and limited set of goods, technology, and knowledge. Our former unilateral strategy of containment and isolation of our adversaries is, under current conditions, a self-destructive strategy for obsolescence and declining economic competitiveness. A strategy of international engagement is a path to prosperity that can be coupled with a smarter approach to security using an adaptive system of government regulation and incentives. The committee recommends the issuance of an Executive Order that implements the recommendations it has outlined as one of the first orders of business in January 2009*."

Some of the elements of the Order would include:

- Establishing a process for removing every item on a control list after 12 months unless there is a strong case for keeping it;
- An economic competitiveness exemption that "*eliminates export controls on dual-use technologies where they, or their functional equivalents, are available without restriction in open markets outside the United St*ates";
- Establishing a coordinating center for export controls that would receive license applications, determine the appropriate jurisdiction for those licenses (i.e. Commerce or State), ensure the efficient processing of licenses, and manage an appeals process;
- Creating an independent export license appeals panel; and
- Ensuring support for excluding fundamental research from export controls.

The complete list of report recommendations is included in Attachment A and a list of the members of the study committee is provided in Attachment B.

While the National Academies report addressed the broad and interrelated issues of national security controls, economic security, and science and technology competitiveness, certain sectors of scientific research and commercial activity are particularly affected by the export control system. All satellites are export-controlled by the ITAR, and the implications of the regulations has been a matter of concern for the industries, universities, and other institutions that are involved in commercial and civil space activities. A

number of studies have examined the unintended consequences of export controls on the U.S. civil and commercial space sectors, and the results of those studies and the issues they raise are detailed in later sections of this charter.

Questions related to the National Academies report include such things as what, in specific terms, would be involved in implementing the National Academies' recommendations? At what point after an Executive Order is in place should we expect to see improvements in the export control system? What, specifically, does the recommended Executive Order address? What, if anything, is missing from the Order? What areas does Congress need to address? How would implementing the recommendations mitigate the impacts raised in specific sectors such as civil and commercial space? What is the outlook if the National Academies' recommendations are not implemented?

NATIONAL SECURITY

The National Academies report, "*Beyond "Fortress America" National Security Controls on Science and Technology in a Globalized World*", stated in the first finding of the report:

> "*Designed for the Cold War when the U.S. had global dominance in most areas of science and technology, the current system of export controls now harms our national and homeland security, as well as our ability to compete economically*."

The report also states:

> *"…the export control system enforced in the U.S. today has failed to evolve with changing global conditions, and now produces significant harm to U.S. military capability, to homeland security, and to the nation's economic competitiveness."*

The Department of Defense (DoD) examined the impact of export control policies on the health of the U.S. space industrial base and issued a report in 2007. The report, *Defense Industrial Base Assessment: U.S. Space Industry Final Report*, which will be discussed in later sections of this charter, states that "*The National Security Space Industrial Base (NSSIB) is critical to U.S. success in developing and deploying national security space assets*." As part of the conclusions, the report states that: "*To maintain and enhance the U.S. competitive position in the global market, ITAR processes need to be frequently reviewed and adjusted, as appropriate*."

In response to direction in P.L. 109-364, the "John Warner National Defense Authorization Act for Fiscal Year 2007", the Institute for Defense Analyses

produced a report, *Leadership, Management, and Organization for National Security Space*. The report, which was prepared by an Independent Assessment Panel chaired by Mr. A. Thomas Young, was accompanied by a letter to the Honorable Carl Levin, Chairman, Senate Committee on Armed Services that in part stated:

> *"Today, U.S. leadership in space provides a vital national advantage across the scientific, commercial, and national security realms. In particular, space is of critical importance to our national intelligence and warfighting capabilities. The panel members nevertheless are unanimous in our conviction that, without significant improvements in the leadership and management of NSS [national security space] programs, U.S. space preeminence will erode to the extent that space ceases to provide a competitive national security advantage."*

The Independent Assessment Panel (IAP) referenced a study by the Center for Strategic and International Studies (CSIS) on the health of the U.S. space industrial base, and noted that "*The IAP supports the recommendations of the CSIS panel to revisit the ITAR and relax those aspects that are counterproductive to U.S. competitiveness*." The findings of the CSIS study are discussed in later sections of this charter.

CONTROVERSIES ABOUT EXPORT CONTROL REFORM

According to the Congressional Research Service report, *The Export Administration Act: Evolution, Provisions, and Debate*, as updated on January 15, 2009, debate on export administration legislation tends to involve a conflict between national security and commercial concerns:

> "*These concerns are not mutually exclusive…. For example, nearly everyone favors reform of the current system, yet no one considers themselves opposed to national security. Generally, however, many who favor reform of the current export control accept the business perspective that such reform would assist U.S. business to compete in the global marketplace. Others view the issue more from a national security perspective. To this group, reform should be concerned less with the abilities of U.S. industry to export and more with the effective controls placed on potential exports to countries that threaten the security of the United States, terrorists, violators of human rights, and proliferators of weapons of mass destruction. From these different perspectives, controversies arise regarding the controllability of technology, the effectiveness of multinational regimes, the bureaucratic structure of the licensing process and the impact of export controls on the U.S. economy*."

ISSUES AND UNINTENDED CONSEQUENCES RELATED TO SCIENCE AND TECHNOLOGY COMPETITIVENESS

Overarching Findings of National Academies Report

The National Academies report identifies a number of specific findings that argue for revamping the current export control systems:

- "*U.S. national security, including the protection of the homeland, is not well served by the current controls.*
- *The single technology base that today supports both U.S. commercial and military capabilities is constrained from expanding into new fields and from applying new scientific developments.*
- *Entire international markets are denied to U.S. companies because they are forbidden to ship their technologically sophisticated products to foreign countries.*
- *Obsolete lists of controlled components prevent U.S. companies from exporting products built from prior generation technologies not likely to harm national security.*
- *U.S. scientists are hobbled by rules that prevent them from working with world-class foreign scientists and with advanced laboratories located overseas, making it less likely that valuable discoveries and inventions will occur in the U.S.*
- *The government's rules are driving jobs abroad—knowledge-intensive jobs critical to the future of the U.S. economy.*
- *The government's rules are accelerating the development of technologies in capable research centers outside the U.S*."

Impeding the Exchange of People and Ideas

The health of the U.S. science and technology depends on the free exchange and transport of "*people, ideas, materials, and equipment*," as described in the National Academies report. Increasingly, science and technology competitiveness is dependent on having the ability to draw on the talent and capabilities of non-U.S. persons.

According to the report,

- "…*with increasing frequency, important discoveries are made by scientists who work in teams and who have access to the best work going on in scientific centers around the world and state-of-the-art instrumentation*."

- "*Similarly, in a world in which breakthroughs can happen anywhere, being competitive requires being aware of—and capitalizing on—developments in other places…"*

- "*A new scientific breakthrough, or a newly developed technological capability, can stimulate additional research in laboratories around the*

world. Although science does depend on the ability of researchers to validate previously published results, the scientific reward system—and the allocation of competitively awarded resources—strongly favors the first to publish. Speed is equally critical in bringing high-technology products to market."

U.S. visa policy governs our ability to benefit from non-U.S. scientific talent. The policy uses lists that identify certain areas of academic research, particular countries of concern, and specific research activities that require applicants to undergo special review. Visa policies were tightened after 9-11. Although "*the most draconian rules affecting graduate students were ameliorated*" the report notes, "*significant barriers still remain for scholars and researchers seeking visas to attend conferences or for other short-term professional trips in the United States*."

In light of the challenges and implications of export control and visa policies for carrying out fundamental research, the National Academies report finds that:

> "*The best practices that underpin successful competition in research and technology advancement* [freedom of inquiry, freedom to pursue knowledge at the scientist's own discretion, freedom to collaborate without limitation, pluralistic and meritocratic support of science, and freedom to publish] *are undermined by government regulation that restricts the flow of information and people participating in fundamental research*."

These impediments can have negative effects on the competitiveness of the U.S. scientific infrastructure within the global environment. For instance, the report notes that:

- "*Breakthrough discoveries in science often come when supporting advancements in related fields have occurred in sufficient numbers or new types of instrumentation have become available. If one researcher or laboratory 'misses' a new advance, it is likely that a competitive researcher elsewhere will make the discovery soon thereafter*."

- "…*export controls and 'deemed export' rules make U.S. universities less able to attract the most capable foreign researchers or to retain some of the most creative faculty members. Important discoveries may be hindered, or may simply occur elsewhere*."

- "*Licensing requirements inevitably lead to delays, and they may deter or even eliminate the spontaneous discoveries that arise from serendipitous interactions and spur-of-the moment collaborations, most of which are impossible under 'deemed export' rules*."

- "*The best foreign universities now have the research equipment and infrastructure to compete with the best U.S. research universities for students and researchers. Where limitations exist on foreigners studying or working in the U.S. system, foreign universities are well positioned to extend competing offers*."

Implications for America COMPETES Act

The issues noted above have implications for the nation's innovation and competitiveness and the types of actions directed in the America COMPETES Act [P.L. 110-69], which has as its three primary goals: 1) increasing research investment, 2) strengthening educational opportunities in science, technology, engineering, and mathematics; and 3) developing an innovation infrastructure. The National Academies report, *Rising Above the Gathering Storm*, which provided the basis for the Act, recognized the impacts of export controls and recommended that the current system of "deemed exports" be reformed:

> "*The new system should provide international students and researchers engaged in fundamental research in the United States with access to information and research equipment in US industrial, academic, and national laboratories comparable with the access provided to US citizens and permanent residents in a similar status… In addition, the effect of deemed export regulations on the education and fundamental research work of international students and scholars should be limited…*"

Using Lists to Control Exports

Using lists such as the Commerce Control List and the U.S. Munitions Control List, according to the National Academies report, are ineffective ways to control technology transfer because the technologies and information on the lists are, in many cases, available for sale on the open market from non-U.S. sources. The lists can also have the effect of advancing indigenous science and technology capabilities and competitiveness elsewhere. For example, the report notes that foreign nations may use the lists to prioritize research and development investments, because they anticipate that U.S. companies and institutions may face challenges in exporting those controlled technologies abroad. The case of U.S. commercial communications satellite development exemplifies this point. As a result of ITAR hurdles, Europe began to develop satellite components itself and to produce satellites that do not use U.S.-developed technologies rather than purchase the components, which are ITAR-controlled, from the U.S.

The lists also affect how U.S. researchers make decisions on the type of research they pursue. The National Academies report notes that "*Some avoid research in areas that are affected by federal controls out of an apprehension that significant work may not be published or that students or researchers needed for first-rate laboratories will not be available. Breakthroughs will thereby be thwarted*."

The recommendation from the National Academies is to: "Apply 'sunset' requirements to all items on export control lists that are controlled unilaterally by the U.S., and require findings to be made every 12 months that removing controls on an item would present a substantial risk to national security."

Fundamental Research Exemptions

In 1985, President Reagan issued National Security Decision Directive (NSDD) 189, which recognizes that "*our leadership position in science and technology is an essential element in our economic and physical security*" and "*The strength of American science requires a research environment conducive to creativity, an environment in which the free exchange of ideas is a vital component*." To that end, NSDD 189 states:

> "*It is the policy of this Administration that, to the maximum extent possible, the products of fundamental research remain unrestricted. It is also the policy of this Administration that, where the national security requires control, the mechanism for control of information generated during federally-funded fundamental research in science, technology and engineering at colleges, universities and laboratories is classification*."

During the late-1990s, however, the implementation of export control policies tightened in response to findings about the unintentional transfer of controlled defense technologies and information to China, and those changes raised questions about the fundamental research protections under NSDD 189.

In 2001, former National Security Advisor Condoleezza Rice reaffirmed the Directive, and in 2002 the State Department modified the ITAR as it applies to defense articles developed at U.S. universities for use in fundamental research. Section 123.16(10) of the ITAR states that:

> "*Port Directors of U.S. Customs and Border Protection shall permit, without a license, the permanent export, and temporary export and return to the United States, by accredited U.S. institutions of higher learning of articles fabricated only for fundamental research purposes*".

The exemption includes several conditions, including:

- "*The export is to an accredited institution of higher learning, a governmental research center or an established government funded private research center located within countries of the North Atlantic Treaty Organization*" or that have been designated as a non-NATO ally.
- "*All of the information about the article(s), including its design, and all of the resulting information obtained through fundamental research involving the article will be published and shared broadly within the scientific community, and is not restricted for proprietary reasons or*

> *specific U.S. government access and dissemination controls or other restrictions accepted by the institutions or its researchers on publication of scientific and technical information resulting from the project or activity…"*

Despite the attempts to address the matter, the fundamental research exclusion "*has not had the effect of precluding all such restrictions*" according to the National Academies report. The Council on Governmental Relations and the Association of American Universities has conducted surveys of U.S. research universities to gauge the problem of restrictive clauses on research. According to their report, *Restrictions on Research Awards: Troublesome Clauses 2007/2008,* issued in July 2008,

> "…*federal agencies are expanding the type of controls they impose in award terms and conditions and are using more sophisticated (and varying) technical language and approaches for implementing restrictions that affect university research projects. Particularly alarming is the spread of restrictive award terms by federal agencies beyond contracts to federal assistance mechanisms, such as grants*."

Universities maintain that the export control regulations are confusing with respect to fundamental research, especially given that research usually involves participation by non-U.S. persons in American universities or abroad, and interactions with them may be considered exports.

The National Academies committee *"recommends that the Fundamental Research Exemption be maintained, adhered to, and properly implemented. Universities and other research institutions have worked under this regime successfully and have in place the necessary mechanisms to comply with the exemption."*

ISSUES AND UNINTENDED CONSEQUENCES FOR U.S. GOVERNMENT CIVIL AND COMMERCIAL SPACE ACTIVITIES

Commercial and civil space activities make significant contributions to the economy and the nation's science and technology capabilities. In 2008, global sales for U.S. aerospace companies totaled $204 billion of which $33 billion was for the U.S. sales of space systems, according to the Aerospace Industries Association. Universities, federal laboratories, research institutions, along with private industry, conduct the nation's space-based research activities. These commercial and research activities help engage and train the next generation of scientists and engineers and develop innovative technologies that contribute to our economic competitiveness.

The aerospace industry, especially the satellite manufacturing industry, has long maintained that export controls have led to decreasing competitiveness and loss of market share in the global market. In addition, space science researchers have identified unintended consequences of the ITAR on fundamental space research. Government officials have also questioned whether export controls are affecting the health of the space and defense industry. Recent studies have examined the impacts of export controls on these space sectors.

In 2007, the DoD completed a study, *Defense Industrial Base Assessment: U.S. Space Industry Final Report,* which involved gathering quantitative data on the U.S. space industrial base and reviewing whether export controls were affecting the industry. The study involved a survey of companies and business units that included prime contractors that sell products to commercial and/or government institutions (Tier 1), subcontractors that provide major components and systems to prime contractors (Tier 2), and lower tier companies that sell subassemblies, structures, materials and less complex components as well as engineering and other services (Tier 3). The DoD *Industrial Base Assessment* found that ITAR is having an impact on industry sales and competitiveness; examples of these impacts are provided in the sections below.

In 2008, the CSIS issued a *Briefing of the Working Group on the Health of the U.S. Space Industrial Base and the Impact of Export Controls*, which reviewed the results of the 2007 DoD *Defense Industrial Base Assessment*, interviewed and collected data from across the government, industry, and other experts, and examined the findings of other reports on export controls. The findings of the CSIS study echo many of the issues affecting the broader areas of science and technology that were raised in the National Academies report. The CSIS report concludes, for example, that:

- U.S. policies are not controlling the rapid proliferation of non-U.S. space capabilities and in some cases the policies are encouraging them;
- U.S. preeminence in space is being challenged;
- Current export control policies are restricting U.S. international space activities and partnerships; they have led to separation between U.S. and emerging non-U.S. space actors;
- Certain elements of export controls are in variance with U.S. National Space Policy; and
- U.S. market share in foreign space markets is declining and it is harder for U.S. companies to compete in non-US markets, particularly for the lower tier companies.

The implications of these conclusions are described further in the sections below.

The National Academies held a workshop on the implications of the ITAR and space science. In 2008, the Academies released, *Space Science and the International Traffic in Arms Regulations: Summary of a Workshop*. The workshop summary pointed to the disconnect between the ITAR regulations, the fundamental research exemption, and the way in which space-based research is

conducted. The ambiguities and uncertainties in the interpretation of and application of the ITAR requirements are leading academic institutions to be overly conservative in their actions. This results in concerns over loss of competitiveness in scientific research and education at U.S. institutions of higher learning, according to the report.

Increasing Foreign Capability and Diminished U.S. Leadership in Space

The CSIS report found that "*United States preeminence in space in under challenge in many areas*." Export controls have not thwarted the increasing capabilities of foreign space programs.

- According to the CSIS report, Chinese and Indian space programs have continued to make considerable progress including the launching of indigenous high resolution imaging satellites, lunar probes, and China's successful launch of a human into outer space and the successful execution of its first human spacewalk activity.

- The report also notes that the number of nations with their own space-based positioning and navigation systems has tripled since 1999**;** the number of countries possessing earth observation and reconnaissance satellites has doubled since 1999; at least twelve nations are capable of launching their own satellites; and 38 countries can control the operations of their own communication satellites.

- According to CSIS, the capabilities of non-U.S. space countries participating in the commercial market has also grown**.** Non-U.S. companies are now capable of producing commercial communications satellites that are on par with those of the U.S.
    - As noted in the CSIS report, "*Since 1998, European and Asian manufacturers of satellites have gone from delivering satellites that were smaller, had fewer transponders, lesser payload power and shorter lives to manufacturing satellites of equal weight, number of transponders, payload power and lifespan*."
    - Europe has developed ITAR-free components and systems.
    - According to a news item of the European Space Agency, the European Commission, the European Space Agency, and the European Defense Agency "*have agreed to join forces in order to develop critical space technologies in Europe. The aim is to ensure that Europe can rely on a technical and industrial capacity for accessing space, in particular in the area of the manufacturing of satellites and launchers*."

- Foreign innovation and human capital are important to U.S. leadership in space but are increasingly harder to access. The U.S. has benefited from foreign innovation and talent. Foreign students obtain more than half of the PhDs in science, technology, and engineering and workers born

outside of the U.S. account for more than a quarter of the science and technology workforce in the U.S., according to the CSIS report. Export controls make it more difficult to take advantage of this talent pool, as noted in the CSIS report.

Conflicts with Objectives of U.S. National Space Policy

In 1996, the Clinton Administration issued a National Space Policy in which the policy's commercial space guidelines stated:

> "*The fundamental goal of U.S. commercial space policy is to support and enhance U.S. economic competitiveness in space activities while protecting U.S. national security and foreign policy interests. Expanding U.S. commercial space activities will generate economic benefits for the Nation and provide the U.S. Government with an increasing range of space goods and services*."

In 2006, the Bush Administration issued a U.S. National Space Policy, which superseded the 1996 policy, and states that:

> "*The United States Government will pursue, as appropriate, and consistent with U.S. national security interests, international cooperation with foreign nations and/or consortia on space activities that are of mutual benefit and that further the peaceful exploration and use of space*."

The 2006 Policy also supports the use of effective export policies and states that "*space-related exports that are currently available or are planned to be available in the global marketplace shall be considered favorably*."

The goals of the space policy include:

- "*Strengthen the nation's space leadership and ensure that space capabilities are available in time to further U.S. national security, homeland security, and foreign policy objectives*;"
- "*Enable a dynamic, globally competitive domestic commercial space sector in order to promote innovation, strengthen U.S. leadership, and protect national, homeland, and economic security*;"
- *"Encourage international cooperation with foreign nations and/or consortia on space activities that are of mutual benefit and that further the peaceful exploration and use of space, as well as to advance national security, homeland security, and foreign policy objectives*."

The CSIS report found that aspects of current export control policies and regulations are at variance with the national space policy. For instance, the export control system does not enable cooperation while also denying capabilities to adversaries. Placing satellites on the USML has encouraged the development of non-U.S. space capabilities, and ITAR regulations have had

negative impacts for U.S. industry. CSIS also notes that export controls have interfered with a legacy of beneficial collaboration with foreigners and have made it difficult for international partners to resolve anomalies in collaborative space activities.

Issues for Fundamental Research Using Space-Based Hardware

In response to concerns about the transfer of export controlled hardware and information to China during the 1990s, the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 [P.L. 105-261] transferred "*all satellites and related items that are on the Commerce Control List of dual-use items…to the United States Munitions List and controlled under section 38 of the Arms Export Control Act….*"

In 2002, the Department of State revised the ITAR language concerning scientific satellites for fundamental research. ITAR licenses are not required for scientific research satellites when specific conditions are met. Space researchers, however, report confusion about the application of that exemption to space research projects.

The summary report of the National Academies workshop on space science and ITAR noted that regulations are applied differently to institutions involved in a single space project—national labs, universities, industry, and government. In addition, researchers are unclear about the type of information that can be placed in the public domain, including in the classroom. Moreover, the fundamental research exclusion in the ITAR applies only to "*accredited U.S. institutions of higher learning*." There is also a lack of clarity about involving foreign students and researchers in space research projects that may use ITAR-controlled technology. Researchers are also unclear about what information regarding a satellite project they can share with non-U.S. individuals or students in an academic environment.

In the absence of clarity, universities and researchers interpret regulations conservatively and may add burdens that are not necessary and lead to decisions that affect university engagement in space research. For example, according to the National Academies' workshop summary, universities and researchers may make decisions not to pursue projects requiring ITAR licenses or to allow non-U.S. researchers and students to participate in space research projects. In addition, the report says that "*uncertainties are leading some professors to 'dumb down' course content rather than risk ITAR violations by discussing their research in the classroom setting*."

The workshop summary on space science and ITAR also notes that compliance "*creates a significant unfunded mandate for universities, because they operate with capped overhead costs….*" In addition, universities bear the costs of educating faculty and contracting and grants officers, maintaining documentation,

handling negotiations with the State Department, and "*the substantial costs of delays in securing approvals for activities that fall under ITAR*," according to the report.

Reduced Competitiveness of Space Industry

Both the CSIS study and the Defense Industrial Base Assessment make findings about the increasing challenges that U.S. space companies face in being competitive in foreign markets. According to the results of the DoD-initiated space industrial survey, "*Defense Industrial Base Assessment: U.S. Space Industry Final Report,*" several companies voluntarily commented that ITAR was an issue in being competitive in foreign space markets. For example, the *Assessment* notes that:

> "*Over two-thirds of the survey respondents felt strongly enough to add narrative comments with over a quarter of those encountering difficulties in export markets. Some companies have self-eliminated from foreign markets to focus on the domestic only market*."
>
> "*There have been a number of firms in all tiers that have not applied for export licenses (half of the companies surveyed) due to real or perceived problems with navigating the licensing process*."

One company commented that it chose to forgo space business because that business has not been profitable and some foreign customers will not procure items that require ITAR licenses.

- Of the companies that participated in the survey for the DoD *Assessment*, 58 percent listed export controls as the number one barrier to entry when attempting to market products abroad.
- According to the DoD *Assessmen*t, "*Companies reported $2.35B of ITAR-related potential sales lost due to the licensing process from 2003-2006, an average of $588M annually. This loss represents about 1% of total U.S. space revenues*." [Note that the $588M figure is a best estimate and does not include opportunities that were not pursued or that were lost due to ITAR. It may also involve some double-counting among competitors.]
- The cost of managing compliance with export controls is another challenge. "*Space industry-wide compliance costs averaged $49M per year in 2003-2006*," according to the DoD *Assessment*, and created a significant financial burden, especially for smaller companies.

The CSIS recommendation is to *"Remove from the Munitions List commercial communications satellite systems, dedicated subsystems, and components specifically designed for commercial use; provide safeguards by having Defense Department identify critical space components and technologies that should always require licensing and referral. Have the*

appropriate executive departments conduct a study to see if other space technologies should be removed from the list."

Pronounced Impacts on Competitiveness of Smaller and New Commercial Space Companies

The *Assessment* and the CSIS report found, in particular, that the burden of ITAR is "*more pronounced*" for smaller companies (the lower tiers) in terms of compliance costs and exports to foreign systems for example. It is the lower tier companies that are often the sources of innovation. The CSIS study found that "*Export controls are adversely affecting U.S. companies' ability to compete for foreign space business, particularly the 2nd and 3rd tier. And it is the 2nd/3rd tier of the industry that is the source of much innovation, and is normally the most engaged in the global market place in the aerospace/defense sector*." In addition, the President and CEO of the General Aviation Manufacturers Association (GAMA) stated at a March 2008 forum on export controls that "*small companies where much of the innovation takes place* [are] *leary of participating in a program that could put them in a position of inadvertently violating export control rules*."

One space company that is aiming to sell access to a commercial space habitat found that the modular inflatable technology that forms the basis of its space habitat is export controlled. The company also ran into ITAR problems with a basic technical stand. As the company president, Robert Bigelow, reported in a February 2008 article in *Space News*, "*A wonderful example of the irrationality of the current regime is the 'technical stand' from our Genesis campaigns. This simple aluminum stand is composed of a circular base with several legs sticking out. If you were to turn the stand upside down it would literally be indistinguishable from a common coffee table. However, under the current export control regime, the stand was considered 'ITAR hardware' and we were required to have two security officers guarding the stand on a 24/7 basis while at our launch base in Russia*."

Lost Revenue in Satellite Manufacturing Market

The CSIS report notes that "*Study after study shows the same results, an erosion of U.S. share of the global commercial satellite market since the late 1990s*." In addition, the DoD *Assessment*, shows that, based on Satellite Industry Association reports in 2004 and 2006,

- "*The U.S. share of global satellite manufacturing has decreased since the ITAR changes were implemented in 1999*."
- "*U.S. market share dropped from 63% in 1996-1998 to 52% in 1999-2001 and 42% in 2002-2006*."
- "*Revenues dropped in real terms as well from an average of $6.6B in the first period, to $5.5B in the transition period, and $4.2B in the most recent period of the data*."
- "*U.S. share of GEO [geostationary] commercial communications satellites manufactured has decreased 10 percent since 1998*."

Challenges for Government-Sponsored International Space Activities

Much of the nation's civil space activities are international given the global nature of the marketplace, the benefits of commercial strategic partnerships, and the legacy of cooperation in NASA's space-based scientific research and human exploration mission programs. Export controls hinder these activities and may introduce safety concerns. The NASA director for export control noted at a March 2008 Aerospace States Association forum on Export Controls that:

> "*Unfortunately, certain provisos requiring separate and specific Government review and approval for any collaborative anomaly resolution activity may impede the ability of NASA's contractors to expeditiously take action to assure operations safety and mission success, including during real-time operations, where an anomaly could be encountered*." He said "*Rendezvous and docking of the European Automated Transfer Vehicle (ATV) and Japanese H-II Transfer Vehicle (HTV) with the International Space Station are time-critical operations that require timely exchange of information for effective operations. In the event of an on-orbit problem, for the safety of the Space Station and its crew, ATV and HTV engineers must be able to quickly and easily share technical data—in real-time—with U.S. engineers…*"

Along those same lines, a 2007 report of the International Space Station Independent Safety Task Force (IISTF) explained that "*Currently the ITAR restrictions and the IP's objections to signing technical assistance agreements are a threat to the safe and successful integration and operations of the Station."* The study recommended that the State Department grant relief to NASA contractors working directly with the International Space Station (ISS) international partners and their contractors to enable engineering and safety reviews, program management interactions, and to handle anomaly resolution among other specific activities and that the *"Executive and Legislative Branches of the government should conduct a comprehensive and thorough review of government policies and procedures related to ITAR and related export controls as soon as practical*."

The CSIS recommendation on anomaly resolution is that: "*The Secretary of Defense and NASA Administrator, in addition to the Secretary of State, should have the authority to grant real-time, case-by-case, specific time period exemptions for anomaly resolutions deemed to be in the national interest based on criteria from the National Space Policy."*

The NASA export control director also commented that the State Department has "*advised NASA to seek legislative authority as a prerequisite to the Department's promulgation of an exemption to facilitate the implementation of NASA's programs, including the U.S. Space Exploration Policy*." The Bush

Administration did not send any proposed legislation to Congress regarding this export control matter.

A significant portion of NASA's science missions involve international cooperation in which export controls apply. At a hearing of the House Committee on Science and Technology, Subcommittee on Space and Aeronautics, held in March 2008 to examine NASA's science programs, Dr. Jack Burns, a professor from the University of Colorado noted: "…*we need to be looking at more international cooperation because sharing the costs and the risks associated with these large projects in astrophysics… The ITAR restrictions are making it more difficult than they need to be*." Another witness at the hearing, Dr. Steven Squyres of Cornell University, the Principal Investigator for the Mars Exploration Rovers (Spirit and Opportunity), testified that "*many talented students come and want to work on the mission. These are students and post-docs from Denmark and Canada, and we have had to turn away people because of the restrictions on ITAR. And these are people who can materially advance a U.S. space mission and make it a better mission*."

In addition, the National Academies workshop summary on space science and ITAR raised concern over the ability to continue international collaborations, especially as projects become increasingly more complicated. The workshop summary notes that :

> "*The costs and delays imposed by ITAR processing requirements coupled with other nations' reluctance to be made subject to restrictions derived from U.S. law and regulations, are making the United States less and less desirable as a partner to its foreign collaborations. The implications for continued international collaboration are grave*." The workshop summary also said that "*International participants in the workshop went so far as to speculate that without high-level U.S. government relief on ITAR, the development of highly integrated infrastructure programs, such as those envisioned for human space exploration, will be impossible*."

ATTACHMENT A

National Academies, *Beyond "Fortress America": National Security Controls on Science and Technology in a Globalized World*, 2009

Excerpt from the Executive Summary

"Recommendations

The committee structured its recommendations into three areas: reforming the export control process, ensuring scientific and technological competitiveness, and improving the non-immigrant visa system that regulates the entry into the United States of foreign science and engineering students, scholars, and professionals.

In the committee's view, it is important to act immediately, within the boundaries of the President's authority to ameliorate the policy logjam that is the unintended consequence of Congress's inaction over dual-use export controls. The new President needs to make the changes that will stem a serious decline affecting broad areas of the nation's security and economy.

***Recommendation 1**. The President should restructure the export control process within the federal government so that the balancing of interests can be achieved more efficiently and harm can be prevented to the nation's security and technology base; in addition to promoting U.S. economic competitiveness.*

Restructuring the export control process does not involve abandoning all export controls. Rather, the committee recommends that two policy changes and two structural changes be made to retain needed export controls while shedding the largest obstacles to an efficient system. With these changes implemented in an expedient manner, the United States will stem the loss of technological and economic competitiveness and begin to benefit from carefully targeted and calibrated controls that reflect and meet current challenges that the country faces in protecting both our national security and our economic well-being.

Action Items

A. Recognize the interdependence of national security and economic competitiveness factors in making export control decisions with respect to individual requests for licenses through a principle-based system.

When the licensing agency applies principles to decisions about export controls, the focus will stay on why items should or should not continue to be controlled, rather than on adding to otherwise static lists of controlled items. This kind of governance system can assess each decision in terms of whether an item should be controlled against the governing principles that have been established within the system. Doing so can ensure that the remaining controlled items are relevant to rapidly changing global conditions. It can also help ensure that decisions are made in a timely manner. The following are the principles that the committee recommends:

1. Maintain the value of protecting traditional U.S. national security in export control policy.

2. Recognize that today this value must be balanced against the equally important value of maintaining and enhancing the scientific and technological competitiveness of the United States.

3. Allow openness and engagement to prevail unless a compelling case can be made for restrictions.

4. Articulate a rational basis for each restriction. Restrictions on unclassified technology should be implemented only when:

a. The U.S. alone, or the U.S. and cooperating allies, possess technology that leads not only to identifiable military advantage, but to an advantage that is likely to persist for a significant period of time (i.e., the time needed to field a system based on that technology);

b. The U.S., or the U .S. acting together with allies, control the technology such that they can prevent it from moving into the hands of possible adversaries;

c. The restrictions do not impose costs and inefficiencies that are disproportionate to the restrictions' security benefits; and

d. Restrictions are re-examined and re-adjusted periodically to ensure they remain appropriate.

5. Protect the capability to "run faster".

6. Treat weapons separately – but define them narrowly and precisely.

7. Recognize the "global public good" nature of health-related technologies.

B. Apply "sunset" requirements to all items on export control lists that are controlled unilaterally by the U.S., and require findings to be made every 12 months that removing controls on an item would present a substantial risk to national security. No version of the current control system should survive without an effective method for pruning items from the control lists when they no longer serve a significant definable national security interest.

C. Establish as a new administrative entity a coordinating center for export controls, with responsibilities for coordinating all interfaces with persons or entities seeking export licenses and expediting agency processes with respect to the granting or denial of export licenses.

This small coordinating entity would be responsible for:

- *Receiving all applications for export licenses;*
- *Determining whether the Department of Commerce or the Department of State should handle the license application and dispatch the application to the appropriate agency for a decision;*
- *Maintaining timetables for decision making on license applications so that applications do not languish;*
- *Receiving decisions on applications from the designated agencies and distributing these decisions to applicants;*
- *Receiving appeals of licensing decisions and petitions for review of sunset decisions, and delivering these to the appellate panel (see description below);*
- *Maintaining timetables for decisions on appeal;*
- *Receiving decisions on appeals and distributing these decisions to applicants;*
- *Providing administrative support to the appellate panel (see description below); and*
- *Monitoring and oversight of the sunset process.*

D. Establish an independent export license appeals panel to hear and decide disputes about whether export licenses are required, whether particular decisions to grant or deny licenses were made properly, and whether sunset requirements have been carried out properly. An independent, neutral decision-making authority is required to break the logjams in the system caused by philosophical differences and varying interpretations of statutory, regulatory, and executive order language. Two kinds of issues can be resolved quickly and effectively using an appellate decision-making panel:

- *First, if the agency makes a decision (either requiring or not requiring a license), and a party or a government agency believes the matter was wrongly decided, there is an avenue to resolve these differences.*
- *Second, if the agency fails to remove an item or category of items from the control list under the sunset requirement, or does not act at all within the one-year time period for review of each item on the list, an affected party could appeal either to reverse the agency's determination, or to require the agency to act in a timely way to make the necessary determination.*

The committee recommends that an independent export license appeals panel be constituted, appointed by the President or the National Security Advisor Panel members would serve a five-year term. [NB: *It is at times difficult to get presidential action on appointments in a timely way, particularly at the beginning of an administration when there are many competing concerns. For that reason, the President's Executive Order would allow 90 days from the date of issuance of the Order for the appointments to be made through the presidential processes, and after that, the appointments would be made by the Chief Judge of the Federal Court of Appeals for the District of Columbia Circuit within 30 days. Replacement judges would be selected in the same way. No Senate confirmation would be required because this is not a "court"; it is an administrative panel assembled by the President to assist agencies in carrying out their responsibilities. This panel makes decisions among competing interests of agencies the same way the National Security Council's staff makes decisions about the competing interests of the Departments of State and Defense.*] *The panel would be co-located with the coordinating center and would be housed, for administrative purposes, under the same organizational umbrella. Appeals panels such as this one are not "directed" by an administrative authority. This kind of panel acts independently and neutrally to resolve disputes. It has no operational responsibility other than to hear disputes and issue opinions.*

The best organizational home for the proposed coordinating center and the export license appeals panel would be within the National Security Council structure, with the coordinating center's director reporting directly to the National Security Adviser. This placement in the White House structure will ensure the coordinating center's independence and will establish its relationship to the President. The coordinating center and the export license appeals panel would not necessarily be co-located with the NSC. This would not be required for an effective exercise of its powers under the Executive Order.

The committee weighed several options before making the recommendation for a new coordinating center and an export license appeals panel and locating them within the NSC. The option to create an interagency group was rejected because experience supports the conclusion that this would devolve into just another debating society and

would not constitute a practical means to improve the present export control system. The option to use a group made up of private sector members was rejected because that alternative would not be acceptable to the government agencies involved. The option to place this responsibility with the Department of Defense was rejected, because the department, through its management of the Militarily Critical Technologies List, is an important player in the export control regime. Similarly, any placement within any other cabinet-level department involved in licensing would also compromise the independence of the proposed center. The option to place these administrative functions in the Office of Management and Budget was also considered. Although neither the National Security Council nor the Office of Management and Budget is an operational agency, the committee thinks that the NSC provides the better fit, because of its focus on national security and economic policy. In addition, the chain of command would have the coordinating center's director reporting directly to the National Security Advisor. This would not only signify the importance of these issues, in terms of both national security and economic policy, it would also serves as a brake on the director in terms of choosing his or her battles carefully.

***Recommendation 2**. The President should direct that executive authorities under the Arms Export Control Act and the Export Administration Act be administered to assure the scientific and technological competitiveness of the United States, which is a prerequisite for both national security and economic prosperity.*

Action Items
A. Maintain the Fundamental Research Exemption that protects unclassified research, as provided by National Security Decision Directive 189, and ensure that it is properly implemented.

B. Create an economic competitiveness exemption that eliminates export controls on dual-use technologies where they, or their functional equivalents, are available without restriction in open markets outside the United States.

***Recommendation 3**. The President should maintain and enhance access to the reservoir of human talent from foreign sources to strengthen the U.S. science and technology base. Traditionally, the United States had to worry about science and technology flowing out of the country. In today's conditions, the U.S. must make sure that advanced science and technology will continue to flow into the country. For this reason, the U.S. visa regulations as applied to credentialed foreign scientists should ensure that the U.S. has access to the best talent. Science and engineering degree holders who prefer, after graduation, to work in the U.S. should have ready access to permission for long-term stays. Granting this access for highly trained technical and scientific personnel is an important way of augmenting a critical segment of the workforce. The U.S. cannot protect U.S. jobs by denying entry to foreign professionals; jobs will simply go abroad. It is important for both the national security and economic prosperity to maintain the flow of human talent into the United States.*

Action Items
A. Streamline the visa process for credentialed short-term visitors in science and technology fields.

The committee recommends the President's Executive Order require that a non-immigrant visa applicant who is a graduate student, researcher, or professional in any

field of science or technology and whose application is supported by a qualified university, scientific body, or corporation should receive a determination on his or her visa application within 30 days. This will allow access for credentialed academic researchers to work with U.S.-based colleagues and in U.S.-based programs, and will facilitate work done in U.S. science laboratories.

B. Extend the duration of stay for science and engineering graduates with advanced degrees.

The committee recommends the President's Executive Order provide a one-year automatic visa extension to international students to remain in the United States to seek employment or acceptance into further advanced study on receipt of advanced degrees in science, technology, engineering, mathematics, or other fields of national need at qualified U.S. institutions. If these students are offered jobs by U.S.-based employers and pass security screening measures, they should be provided automatic work permits and expedited residence status. If students are unable to obtain employment within one year, their visas would expire.

C. Include expert vouching by qualified U.S. scientists in the non-immigrant visa process for well known scholars and researchers.

The committee recommends that the President's Executive Order allow qualified U.S. scientists, as part of the visa application process, to vouch for the technical credibility and legitimacy of visa applicants who are in the same or in a similar field. A more interactive application review procedure would permit those with expertise in relevant scientific and technology fields (and personal knowledge of the expertise of the individual whose application is being reviewed) to aid consular officials in accurately and efficiently determining the existence of a real security threat.

D. Institute skills-based preferential processing with respect to visa applications.

The committee recommends that the President's Executive Order institute a new skills-based, preferential processing with respect to visa applications. The visa applications of scientists and engineers should be given priority. Graduate-level education and science and engineering skills should substantially raise an applicant's chances and confer priority in obtaining residence permits and U.S. citizenship.

In Conclusion

As a nation, we cannot, and should not abandon well-conceived efforts to keep dangerous technology and scientific know-how out of the hands of those who would use this knowledge to create weapons of mass destruction and other, equally dangerous military systems. However, these represent a very narrow and limited set of goods, technology, and knowledge. Our former unilateral strategy of containment and isolation of our adversaries is, under current conditions, a self-destructive strategy for obsolescence and declining economic competitiveness. A strategy of international engagement is a path to prosperity that can be coupled with a smarter approach to security using an adaptive system of government regulation and incentives. The committee recommends the issuance of an Executive Order that implements the recommendations it has outlined as one of the first orders of business in January 2009."

ATTACHMENT B

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