The Deemed Export Rule in the Era of Globalization

Submitted to
The Secretary of Commerce

By the members of
The Deemed Export Advisory Committee

December 20, 2007

THIS REPORT IS A PRODUCT OF THE DEEMED EXPORT ADVISORY COMMITTEE, A FEDERAL ADVISORY COMMITTEE ESTABLISHED TO PROVIDE INDEPENDENT ADVICE TO THE SECRETARY OF COMMERCE.

If you guard your toothbrushes and diamonds

with equal zeal,

you'll probably lose fewer toothbrushes

and more diamonds.

-- McGeorge Bundy
National Security Advisor to
Presidents Kennedy & Johnson

Deemed Export Advisory Committee

December 20, 2007

The Honorable Carlos Gutierrez
Secretary
U.S. Department of Commerce
1401 Constitution Ave., NW
Washington, DC 20230

Dear Mr. Secretary:

Attached herewith is the final report of the independent Deemed Export Advisory Committee established in October, 2006, at your direction.

It is the Committee's principal conclusion that the existing Deemed Export Regulatory Regime no longer effectively serves its intended purpose and should be replaced with an approach that better reflects the realities of today's national security needs and global economy. The obsolescence of the current regime has been brought about by profound developments in science and technology, the free-flow of massive amounts of information, the mobility of the world's populace, the burgeoning economies of other nations, and the change in the character of threats to America's security.

Contained herein is a proposed approach to the management of Deemed Exports that the Committee believes is better suited to America's needs in the Twenty-First Century. It is an approach that can enhance *both* America's security *and* its economic competitiveness. The Committee nonetheless recognizes – and emphasizes – that there is no regulatory policy in this area that is without significant inherent risks. It is our belief that the proposed approach balances these risks in a reasonable and responsible fashion.

The members of the Committee are honored to have had this opportunity to serve the Department of Commerce and the nation in this endeavor. We are particularly appreciative of the dedication and professionalism of the members of the Department of Commerce staff who have supported us so ably as we carried out our assignment.

Very truly yours,

Norman R. Augustine, Chair

Ruth A. David, Vice-Chair

Sean O'Keefe, Vice-Chair

Deemed Export Advisory Committee Members, Advisors and Support Staff

Chairman[1]

Mr. Norman R. Augustine, Committee Chairman, retired Chairman and CEO of Lockheed Martin Corporation; former Under Secretary of the Army

Members

Dr. Ruth David, Committee Co-Vice Chairman, CEO of Analytic Services, Inc.; former Deputy Director for Science and Technology at the Central Intelligence Agency

The Honorable Sean O'Keefe, Committee Co-Vice Chairman, Chancellor of Louisiana State University and A&M College; former Director of the National Aeronautics and Space Administration

1. The Honorable Robert M. Gates served as co-chair of the DEAC prior to his nomination as Secretary of Defense on November 8, 2006. Secretary Gates did not participate in the Committee's final deliberations, or in the preparation of this report.

Dr. Albert Carnesale, Chancellor Emeritus and Professor, University of California, Los Angeles

The Honorable John Engler, President, National Association of Manufacturers; former Governor of the State of Michigan

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Preface

This report documents the findings of the Deemed Export Advisory Committee (DEAC) that was chartered by the Secretary of Commerce (the "Secretary") on June 6, 2006 and renewed for an additional twelve month period on May 10, 2007. The Secretary established the DEAC under the terms of the Federal Advisory Committee Act (FACA) (Public Law 92-463, 5 United States Code, App. 2) to ensure that the nation's Deemed Export policy continues to best protect United States national security while striving to promote the ability of United States industry and academic research to continue at the leading edge of technological innovation. The DEAC undertook a comprehensive review of the national security, technology, and competitiveness dimensions of the Deemed Export

issue and engaged to provide recommendations for potential changes to the current Deemed Export regime.

The Committee was structured to ensure a balanced membership that offered a comprehensive point of view on the complex technical and policy issues associated with the Deemed Export issue. The DEAC was thus composed of members with experience in industry, academia and government service as well as other related topics.

The DEAC met in open and closed sessions on six separate occasions. The first meeting was in Washington, D.C. on October 12, 2006. Subsequent meetings in 2007 were on January 22-23, in Santa Clara, CA; May 2 in Atlanta, GA; June 19 in Cambridge, MA; July 31 in Chicago, IL; and finally on September 10, again in Washington, D.C. Each meeting was announced in advance in the Federal Register and both scheduled and unscheduled speakers provided information to the DEAC. A total of forty-five formal presentations were received by the Committee. Following the open sessions, DEAC members were typically escorted to tour a company, laboratory, or other facility directly involved with Deemed Exports in order to observe the practical implementation of the Deemed Export regulations and their impact. Subsequent to each tour, the Committee met in closed session.

All of the DEAC's activities were monitored by the Department of Commerce's Office of the General Counsel for compliance with

FACA. During the closed sessions, the Committee members discussed matters determined to be exempt from the provisions relating to public meetings found in 5 U.S.C. app. 2 §§ 10(a)(1) and 10(a)(3).

The Foreign Disclosure & Export Solutions Corporation was competitively chosen by the Department's Bureau of Industry and Security (BIS) at the request of the DEAC to compose minutes for each of the meetings and provide editorial assistance in preparing the Committee's report.

CHAPTER 1

Executive Summary

"…there are growing domestic markets outside the United States, and a much larger globalized market in resource commodities, consumer and producer goods which has eliminated the United States' advantage in mass production. There is also the growth of professional peer-to-peer networks in science and technology which are increasingly international, as well as the rise of multinational firms. When national industries become tradition-bound and fall behind, international technological convergence is advanced by the migration of capital, management and personnel across boundaries."

R.R. Nelson & G. Wright
"The Rise and Fall of American Technological Leadership…"
December 1992

Overview

It is a reality that the United States no longer holds the dominant position in science and technology that it recently enjoyed.

Leadership in science and technology today is a globally shared and highly interdependent perishable asset. Individual United States firms, along with their international competitors, are building global research enterprises. United States universities are establishing campuses abroad, creating joint educational programs with foreign institutions, and partnering with foreign faculty in the conduct of cutting-edge research. World-class research facilities are being constructed in China in the field of information technology; in Singapore in biology; in France in nuclear fusion; in Switzerland in particle physics; and in other countries in these and many other fields. First-rate universities are being established in China, India and elsewhere, and are attracting renowned researchers from nations around the world, including the United States. Saudi Arabia recently established a graduate-level research university with an opening-day endowment matching that built by the Massachusetts Institute of Technology (MIT) over 142 years.

In this new world order, a nation that attempts to build a "wall" around its scientific and technologic communities simply denies itself the opportunity to fully benefit from the vast body of knowledge being accumulated elsewhere - and thereby virtually assures itself of an inferior competitive position in the knowledge world. Such an outcome would be of concern in *both* the commercial and national security arenas - in the latter because access to leading-edge

technology, underpinned by an economy capable of financially supporting a vigorous military and homeland security effort, is the foundation of our nation's defense establishment.

With the important exception of a very few highly sensitive military areas, the United States is better served to partner in the global creation of knowledge than to attempt to protect the lesser body of knowledge that can be generated through purely domestic research efforts. America's global interests today, both in maintaining a strong economy and in defending itself, require that the nation commit its efforts to energetically sustaining a position among those at the forefront of science, technology and innovation. Stated otherwise, protecting what we know is in most instances not the primary concern; participating in creating that body of scientific and technical knowledge that is *not* known *is* the concern.

Those few highly sensitive technologies having significant military applications can and should be protected with high walls - rather than diffusing our efforts in the impracticable attempt to build high walls around large bodies of knowledge.

An entirely new approach to Deemed Exports, and perhaps to exports in general, is, in the unanimous view of the members of this Committee, warranted based upon the above considerations and the seismic changes which have engulfed the planet since the current

Deemed Export regime was first promulgated years ago. This report proposes such a fundamentally new approach.

Deemed Exports

In its simplest terms, a "Deemed Export" can be defined as (1) the release (2) of technology or source code (3) having both military and civilian applications (4) to a foreign national (5) within the United States. Thus, even though the release in question takes place within the confines of the United States, the transaction is "deemed" to be an export and therefore subject to certain United States Government export control regulations. The logic is that knowledge transferred to an individual within the United States can readily be transported abroad should the recipient wish to do so.

Deemed Export controls have a significant impact on United States industry, academia and national security. If a United States commercial firm has a foreign national working in its United States-based laboratory, it may be required to obtain an export license before it can reveal information to that employee in the normal course of business if the information may also have a military application (i.e., have a "dual-use"). Similarly, a university researcher conducting a project involving a foreign national student may be required to obtain an export license before sharing knowledge with that student relating

to equipment used in a research project if that equipment might also have a military application. If compliance with the relevant licensing regulations becomes unduly burdensome, United States firms operating under such regulations are significantly handicapped when competing with firms from nations imposing less restrictive controls. The national (including "homeland") security ramifications of Deemed Export controls are even more evident: For example, absent appropriate safeguards, biology laboratory equipment designed to produce various toxins involved in disease research may be used by terrorists to produce toxins for harmful purposes.

In recent years, increasing concern has arisen in both industry and academia that unintentional violations of United States export control laws could occur as the distinction between military and civilian technology has become blurred, and as industry and academia have become highly globalized (i.e., pursuing activities that routinely involve foreign nationals).

Background

The export of *purely commercial* items and knowledge is regulated by industrial espionage laws, patent controls and other related legislation. The export of *purely military* items and knowledge is governed by the "ITAR" (International Traffic in Arms Regulations).

The acquisition or other foreign control of companies conducting national security-related business in the United States is addressed by the Committee on Foreign Investments in the United States (CFIUS). Items or knowledge having *dual-use* (i.e., applicability in both the military and commercial spheres) are subject to the Export Administration Regulations (EAR) and fall into two sub-categories. The first of these concerns *items* that are transferred or released across a United States border (or re-transferred or released abroad) and the second addresses *technology* or source code (knowledge) that is transferred across a United States border (or re-transferred abroad). Depending on the specific item involved, the former category of activity may be controlled pursuant to the Commerce Control List (CCL) as set forth in the EAR. In contrast, technology or source code that is transferred (or released) to a foreign national *within* the confines of the United States is addressed under the Deemed Export regulatory regime. As with cross-border transfers, such transfers within the United States may also, depending on the subject matter, be subject to the EAR or found on the CCL. The release of tangible items within the United States (or software in object code form) does not constitute a Deemed Export, although the release of knowledge about such items may.

The United States is the only nation that controls Deemed Exports and also participates in multilateral export control regimes as, for

example, the 40-nation Wassenaar Agreement. Other nations depend largely on their visa processes, intelligence information, and commercial intellectual property controls rather than a formal Deemed Export licensing regime. As a consequence, unlike many other export control practices, changes to United States Deemed Export policy can be made unilaterally at the United States' discretion.

The Deemed Export control regime traces its origin to the Export Administration Act of 1979, as amended. Jurisdiction over the regulation of dual-use exports, including Deemed Exports, was assigned by Congress to the Secretary of Commerce, who in turn delegated that authority to the Department of Commerce's Bureau of Industry and Security (BIS). Over the years, various concerns have been raised over the interpretation and application of the Deemed Export regulations. Many of these concerns were alleviated by National Security Decision Directive (NSDD) 189 issued on September 21, 1985 that clarified the definition of "Fundamental Research" - a very large and important category that was thereby excluded from Deemed Export regulation. Fundamental Research was defined as comprising basic and applied research in science and engineering, the results of which "ordinarily are published and shared broadly within the scientific community." The output or product of such research is not subject to BIS's Deemed Export regulations as

set forth in the Export Administration Regulations. The result of this interpretation was to greatly reduce the potential demands on the academic community and, to a much lesser degree, the industrial community, to comply with the Deemed Export regulations because the results of virtually all academic research "ordinarily are published and shared broadly within the scientific community" -- or at least so intended.

In March 2004, the Office of the Inspector General of the Department of Commerce recommended modification of another major interpretation of the EAR having to do with so-called "use" technology (to be discussed later) that would have the potential to vastly *expand* the number of activities subject to Deemed Export licensing. In response to this and other recommendations of the Inspector General, in 2005, the Bureau of Industry and Security (BIS) sought public comments prior to making any revisions. A large number of concerns were raised throughout the industrial and academic communities.

Recognizing the contentiousness and complexity of the Deemed Export issue, BIS determined in May 2006 that a broad independent assessment should be conducted of the overall Deemed Export regulatory regime. To conduct this review, a Federal Advisory Committee was established comprising individuals with experience

in government, business, educational research and national and homeland security matters. The present document constitutes the report of that committee based on its discussions with government officials, national security personnel, educators, industrialists, association executives and members of the public. Both classified and unclassified presentations were received by the Committee. A total of six meetings were held (one each in Santa Clara, Atlanta, Cambridge and Chicago, and two in Washington, D.C.). Public input was solicited and received at each meeting. It is noted that several other ad hoc committees are currently studying various aspects of the United States' export policy, including one under the auspices of the National Research Council Committee on Scientific Communication and National Security, one under the auspices of the Center for Strategic and International Studies, and one recently completed effort by the National Research Council Committee on a New Government-University Partnership for Science and Security.

The Issue

The fundamental dilemma confronted in establishing Deemed Export regulations is that rules that are too permissive may allow scientific and engineering knowledge possessed by the United States to be accessed by foreign nationals intent on harming the United States -- whereas rules that are too restrictive may deny the United States

ready access to the world's scientific and engineering community and the expanding base of knowledge it possesses. Significantly, the latter circumstance could damage the ability of the United States to protect itself against hostile attacks, just as it could handicap the nation's position in the commercial competition to create jobs for its citizens and to build a strong economy. For example, if, as is becoming increasingly commonplace, a firm operates a complex of laboratories around the world and its ability to move employees and perishable knowledge throughout that complex is significantly hindered by United States regulations, that firm can simply confine its research activities to the locations outside the United States. The jobs that often follow the creation of new knowledge will in such a case also tend to migrate abroad. Several recent surveys of firms from around the world that were planning to establish new research laboratories have indicated that, for a variety of reasons, a majority of those facilities are to be established in either India or China.

It is of fundamental significance that at the time the existing United States Deemed Export regulations were established (and subsequently modified), the commercial and national security environments bearing on the matter were vastly different from those that exist today. For example:

- The national security threat in the past could be associated with a bloc of identifiable, geographically determinable, largely self-

isolated nations subject to deterrence through the threat of destruction. In contrast, the evolving threat includes, but is not limited to, diverse cells of geographically unattached, non-governmental elements, often composed of members who are *seeking* their own death as they carry out their mission. It is noteworthy that for at least the immediate future, this latter group will be largely dependent upon others for most forms of high technology weaponry - to the extent they choose to employ such weaponry.

- The United States in the latter half of the 20th century was preeminent in many, probably most, fields of scientific and engineering endeavor. Today, the United States is but one among a number of nations or groups of nations competing for leadership across the spectrum of scientific and engineering disciplines. Just a few examples where other nations have already established leadership positions include polymer composites (Germany), 3D optical memories (Japan), bulk metallic glass (Japan), biostatistics/multivariate statistics (France), population biology (UK), adaptive dynamics (Germany/Switzerland), theoretical biology (Netherlands), and solar energy (Japan/Germany). Any nation today seeking to remain at the forefront of science and technology must be an active participant in the global science and technology community if it is to be successful.

- In the evolving environment, unlike the recent past, denial of access to United States-possessed knowledge can often be circumvented simply by obtaining it from others.
- In the past, the creation of knowledge in a given field was generally the 'self-contained' province of an individual nation or even a specific scientific laboratory. Today, scientific and engineering knowledge is created by multi-dimensional, often informal networks of individuals residing around the globe.
- Scientific and technologic knowledge has become extremely perishable, particularly in the commercial sphere. For example, Intel's chairman points out that 90 percent of the revenues from products the firm ships on December 31 are attributable to products that did not exist on January 1 of that same year.
- Although the United States has for many years been the beneficiary of significant contributions in the fields of science and engineering by foreign nationals, today's United States research enterprise would barely function without the foreign-born individuals, including foreign nationals, who contribute to it. According to National Science Foundation data, the graduation rate of engineers who are United States citizens has actually *declined* by 20 percent over the most recent two decades, and two-thirds of the Ph.D.s in engineering granted by United States universities are now being awarded to non-citizens.

- In the past, the primary penalty associated with excessively rigorous constraints on the transfer of United States-generated knowledge was to preclude sales of a few types of items by a few United States companies to a few nations. Increasingly, however, the consequence of establishing barriers to the transfer of knowledge to foreign nationals is to make the United States a less desired partner in the global scientific and engineering communities and thus assign the United States to the fringes of the world's creative enterprise - with adverse consequences for both the nation's economy *and* national security.
- Defense-related equipment and knowledge in the past often tended to be distinctive (submarines, tanks, ordnance, etc.), whereas today commercial and military materiel and knowledge frequently overlap (cryptography, spacecraft, telecommunications, jet engines, or computers).
- In the past century, the leading edge of the state of the art in many fields was often found in the province of military research and development, whereas today the most advanced work in most fields resides within the world's academic and commercial enterprises.
- During the era in which the foundation was laid for the existing Deemed Exports regulatory regime, information could be relatively easily controlled: Borders were generally secure and

large volumes of information physically difficult to transport covertly. In contrast, today's political borders are extremely porous, being crossed by people, legally or otherwise, in very large numbers including five million annually with B-1 visas together with 500,000 students. Correspondingly, huge volumes of information can be stored in tiny devices or transmitted over long distances literally at the speed of light.

The seemingly inescapable conclusion from these evolving circumstances is that the erection of high "walls" around large segments of the nation's science and engineering knowledge base has become not only increasingly impracticable, but that attempts to build such walls are likely to prove counterproductive - *not only to America's commercial prowess but also, in balance, to America's ability to defend itself*. Again, the latter is the case because (1) the lack of access to much of the world's scientific and technologic knowledge reduces America's ability to maintain a modern defense establishment, and (2) a substantially weakened domestic economy diminishes the nation's ability to devote financial resources to national security.

Nonetheless, the spectrum of military and terrorist activities inimical to the interests of the United States remains broad and the existence of such threats must bear heavily upon the establishment of rules

relating to Deemed Exports. *The challenge is to strike an appropriate balance between the risk of a damaged economy on the one hand and the risk of inadvertently abetting those who would do "physical" harm to the United States on the other hand. And no matter where that balance is struck, material risk will remain that damage could occur in either or both forms.*

Findings

Examined in the context of the evolving security and commercial environments, the long established regulations that control Deemed Exports appear today to possess a number of shortcomings. The Committee's findings in this regard are as follows:

1. The current Deemed Export regulations have become increasingly irrelevant to the prevailing global situation. In the present environment, most scientific and technologic knowledge and items will not be denied to enemies even by a perfect United States control regime: They will simply be obtained from others.
2. The current Commerce Control List is too all-encompassing, covering a vast spectrum of militarily less important items ranging from police handcuffs to hunting rifles and from conventional radios to mass-market computers. (Responding to earlier demands by industry for a more succinct list, the government asked industry

for *its* proposed list. The combined proposals that were submitted exceeded 600 pages, with no company wanting to accept the notion that *its* technology was not critical.)

3. The existing regulations are excessively complex and often vague. For example, the results ("products") of fundamental research are not subject to the existing Deemed Export regulatory regime, but knowledge relating to the operation of laboratory equipment used in prosecuting that same research may be subject to such control. Similarly, research results that "ordinarily are published and shared broadly within the scientific community" are not subject to Deemed Export controls, whether or not the research results are ever actually accepted for publication or whether there is any reasonable basis to conclude that the research results *ordinarily would be published and shared broadly.* Concerns over such rather arcane definitions have been exacerbated by debates over undefined nomenclature such as "Sensitive But Unclassified," a category still not addressed in statute.

4. Many academic and industrial organizations appear to be unaware of the Deemed Export rules or to have found means to conduct their affairs without being subject to them. Typically, only about 900 Deemed Export license requests are submitted to the United States government each year, of which about 85 percent are eventually approved (some 15 percent are returned to the requestor

without action, because a license was not required, the application was incomplete, or the existence of some other complicating factor). Less than one percent are actually rejected. (In fact, during the most recent five years the annual number of rejections was 4, 9, 6, 4 and 1, respectively.) Fully 54 percent of all applications recently processed were submitted by just three United States companies in spite of the globalization of numerous high-tech industries. Correspondingly, according to the National Counterintelligence Executive's 2006 report to Congress, there has been only one case of Deemed Export violation ever brought to trial, in part due to the inherent difficulty of providing proof in such matters.

5. There appear to be many escapements to the existing regulatory regime. A foreign-born individual who becomes a United States citizen and then returns to his or her native country (perhaps with dual citizenship) is not covered by the Deemed Export regulations. Correspondingly, United States citizens are exempt from these regulations, yet most cases involving export violations (of all types) of which the Committee is aware involved United States citizens. Similarly, material presented in a classroom containing foreign nationals is not covered by the Deemed Export licensing rules if the course is broadly available and advertised in a university catalog.

6. Some regulations appear not to withstand tests of logical consistency. For example, a major debate has swirled around the use of the word "or" as opposed to the word "and" in the definition of "use" technology set forth in the EAR. If "use" is defined as it has been in the past, only information necessary for the "operation, installation, maintenance, repair, overhaul and refurbishing" of an item is subject to regulation. Thus, if *any one* of these functions is *not* involved, the information is *not* considered "use" technology that is subject to regulation. In fact, effort in support of almost all recent research activity conducted in the nation's universities has been exempted in large part based on this criterion. But the question arises as to the fundamental efficacy of such a protective scheme when *two* individuals acting in collusion could each work on, say, *three* of the functions - thereby gaining full knowledge of all six without triggering a Deemed Export licensing requirement at all.

7. The criteria for assessing the potential threat that might be posed by a foreign national who is the subject of a license application and whose loyalty is uncertain appear superficial. Under current practice a very short list of proscribed (generally terrorist-supporting) countries is maintained by the United States government; however, a far longer list is maintained of countries which must be consulted for Deemed Export purposes. Matches

against the latter list are based on the individual in question's *current* citizenship or legal permanent residency. This also contrasts with the proposal by the Department of Commerce's Inspector General whereby a match would also be made against *birth* citizenship. In any case, inadequate distinction seems to be made between an individual who, say, was born and raised in Iran but only recently became a citizen of the UK and an individual who was born in Iran but moved to the UK and became a citizen of the latter nation shortly after birth. Additionally, it would seem to be important to consider where an individual resided during his or her entire lifetime - not just where he or she was born or where his/her current citizenship has been granted. It is noteworthy that the current BIS interpretation is that the Deemed Export rule does not apply to persons lawfully admitted for permanent residence (i.e., green card holders), *wherever their prior residences may have been.*

Given the complex and relatively arcane nature of the existing deemed export regulations, it is the view of the Committee that the Department of Commerce and its Bureau of Industry and Security have done a truly remarkable job in seeking to carry out their assigned responsibilities in a balanced, professional fashion.

Recommendations

The Advisory Committee offers two recommendations for an overall revamping of the Deemed Export regulatory regime along with a series of specific implementing actions.

Recommendation 1:
Replace the current Deemed Export licensing process with a simplified new process that will *both* enhance national/homeland security *and* strengthen American's economic competitiveness.

Recommendation 2:
Extend the educational outreach program currently conducted by BIS to help assure that all parties potentially subject to licensing with the Deemed Export rules are familiar with those rules. The need for this recommendation is founded in the highly "uneven" distribution of firms and universities currently seeking Deemed Export licenses.

The implementation of these recommendations will require:

- Increasing the focus on, and building higher fences around, those elements of technical knowledge and military advantage that could have the greatest consequences in the national/homeland security sphere by systematically reviewing the Commerce Control List, with advice from independent experts, to eliminate those items and technologies that have little or no such consequences.

- Establishing a category of "Trusted Entities" involving both academia and industry that voluntarily elect to qualify for special, streamlined treatment in the processing of Deemed Export license applications by meeting certain specified criteria (see Step VI in *Implementing Construct* later in this Executive Summary). U.S. companies and universities would be eligible to qualify with the Department of Commerce all or parts of their organizations as Trusted Entities including, in the case of industry, controlled subsidiaries abroad such that individuals could move within the bounds of that Trusted Entity without the need for separate Deemed Export licenses. It is envisioned that all individuals within a Trusted Entity would be required to sign non-disclosure agreements prohibiting release of controlled information to persons outside that entity. *Only information that is unclassified and does not have a truly significant military consequence would be eligible for inclusion in such a Trusted Entity agreement.*
- Expanding the determination of the national affiliation of potential licensees to include consideration of country of birth, prior countries of residence, and current citizenship, as well as the character of a person's prior and present activities, to provide a more comprehensive assessment of probable loyalties.
- Involving a panel of outside experts in the fields of science and engineering to conduct an annual "sunset" review (i.e., "zero base"

analysis) of the list of technologies subject to the Commerce Control List. The burden of proof should reside with those seeking to add or preserve items on the proscribed list.

- Rendering moot the current distinction drawn between the product of a research endeavor and knowledge regarding the equipment supporting that research.
- Rendering moot the "ordinarily published" definition of fundamental research used in the current licensing process by considering new criteria based on more conventional definitions but allowing for government agencies to explicitly preclude publication of certain research results (e.g., classified research). It is noted, however, that in the event the simpler and more determinative definition proposed here in is not adopted, the fundamental research provisions used in the current licensing process should be maintained since it at least has developed a functional definition and is use in allowing America's research community to continue to help drive our national economic and security competitiveness.
- Rendering moot the "and/or" considerations currently applied in evaluating "use" exemptions to the Deemed Export regulations. The fundamentally new approach to Deemed Export licensing criteria proposed herein avoids the long-enduring "and/or" debate in defining "use" technology and its applicability to Deemed

Export regulations. This is accomplished by establishing rules governing the transfer of knowledge that do not require distinguishing among research results, the use of research equipment, manufacturing know-how, or other specific categories of knowledge. It is noted, however, that in the event the simpler and more determinative process proposed herein is not adopted, the "and" provision in the current definition of "use" technology should be maintained since it at least has the virtue of being reasonably widely understood and is useful in allowing America's research community to continue to help drive our national economic and security competitiveness. This is not merely a semantics debate.

- Increasing the use of interactive, web-based self-teaching programs to more broadly familiarize those impacted by the Deemed Export regulatory regime with its understanding and implementation.

Additional Observations

A collateral observation is that a more substantive involvement of the intelligence community in the Deemed Export license determination process would undoubtedly strengthen that process. This will require expanded participation by individuals who possess a science

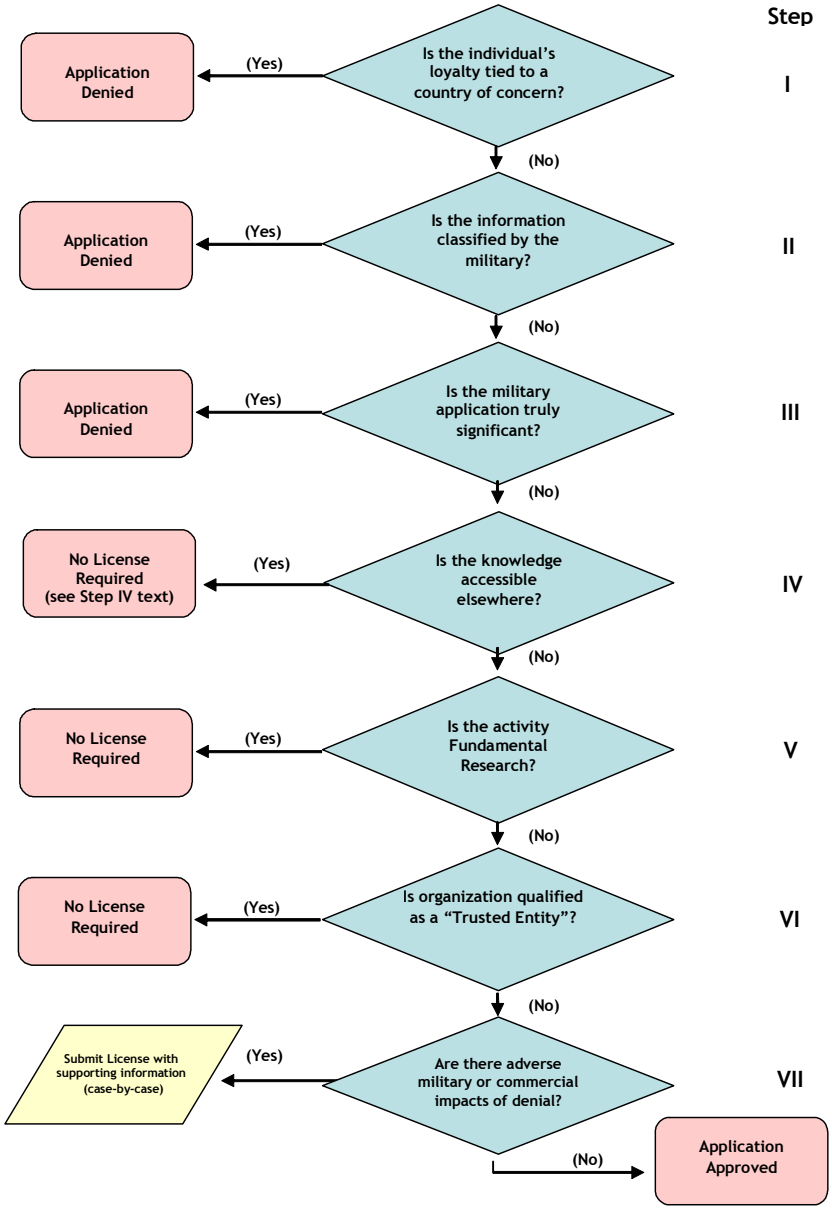
or engineering background. Significant overall benefits could also be realized by harmonizing the various lists of controlled/sensitive items maintained within the various departments and agencies of the United States Government (and, for that matter, its allies). Finally, it is noted that resolving the problems associated within the Deemed Export regime will have only limited impact absent an effort to address the shortcomings of the overall export regulatory system in today's technical and geopolitical environment.

Implementing Construct

The proposed Deemed Export Decision Construct is depicted graphically in Figure 1 on page 25 and consists of the following seven steps:

Step I. Conduct an overall assessment of the probable loyalty of the individual of interest, including consideration of the time and character of past and present foreign involvements. The applying organization would provide the names and relevant information concerning individual applicants to the government for review and approval, or disapproved. Approval is to be assumed if no response has been received within 30 days unless the government specifically declares an extension on a case-by-case basis. If such a review indicates a tie of the individual to a country on the United States

FIGURE 1. Seven Step Deemed Export Decision Process



government's proscribed (generally terrorist-supporting) list or other significant loyalty concerns the application would presumably be denied. If no concern exists, the licensing assessment proceeds to Step II.

Step II. Determine whether or not the information of concern bears a military security classification. Such a determination is to be made within 30 days except under extraordinary circumstances and a list of all overdue determinations is to be provided monthly by the classification authority to the Secretary of Commerce. Security classification is by far the most powerful factor in controlling access to sensitive information. If the information is in fact classified, the application would be denied in all but highly exceptional cases as determined by the government. If the information is not classified, the process proceeds to Step III. (Note that the fact that information has been deemed to be proprietary is not, in itself, relevant to making the above determinations.)

Step III. Determine whether the military application of the knowledge in question is both substantive and truly significant to the nation. *The approach proposed herein is to build "high walls" around "small fields" rather than, as is present practice, "nominal walls" around "large fields."* Emphasis is to be placed on critical aspects of those few technologies that could produce truly major threats (for example,

certain aspects of nuclear weapon related technology, toxic biologic agents, chemical warfare related agents, cryptography - and perhaps a few contemporary, pivotal technological breakthroughs - such as night vision, stealth, advanced composites and electronic countermeasures). In this manner, increased attention can be devoted to those technologies having truly significant consequences from a national security standpoint. If such consequences exist, the technology would be included in the outside-expert annually zero-based Commerce Control List and the application would then be rejected. If not, the process proceeds to Step IV.

Step IV. Determine in a timely fashion whether the knowledge being assessed is readily available from sources outside the United States. Where it can be clearly established that the equivalent technology or knowledge is readily available outside of the United States, no license is required. (Note: There may exist a small set of technologies/ countries whereby the United States government, as a matter of principle, would choose simply to refuse to provide any assistance whatsoever to an individual even though that assistance can readily be obtained elsewhere.) If the knowledge is not available elsewhere and the above exception does not pertain, the process proceeds to Step V.

Step V. Determine whether the activity at hand is fundamental research and therefore should continue to be excluded from Deemed Export licensing requirements. "Fundamental research" is defined in the current Export Administration Regulations as, "research where the resulting information is ordinarily published and shared broadly within the scientific community." This definition is unique to the regulatory and academic communities, but is rather circular in reasoning and leaves open such issues as what is in fact "ordinarily published" and who is qualified to make such a determination. Nonetheless, the current definition has become somewhat of a *term of art* and has aspects that are not without merit. The alternative definition of fundamental research proposed herein provides that research is excluded from Deemed Export licensing requirements if it (1) falls within a more conventional definition of fundamental research (e.g., "curiosity-driven research seeking new knowledge"); or (2) is not *precluded* from publication in the relevant contractual documents or other regulatory mechanisms. If the research activity meets either of these conditions, no Deemed Export license would be required; otherwise, the process proceeds to Step VI.

Step VI. Determine whether the organization seeking the license has qualified itself for treatment as a Trusted Entity. A program should be established whereby academic institutions and firms, including controlled overseas subsidiaries, can voluntarily qualify, given BIS

approval, for expedited treatment in the Deemed Export licensing process as previously discussed. The benefit of such participation to the organization is that, once qualified, it could transfer people, knowledge and equipment within the boundaries of the qualified entity based on a self-assessment of suitability for licensing with input from appropriate government agencies. To become so-qualified an organization would have to meet a number of criteria such as (1) demonstrate a history of responsible conduct with regard to export control matters, (2) conduct a training program for its workforce to assure awareness of relevant rules and regulations, (3) self-process licensing needs, calling upon the government for input or guidance where appropriate, (4) report periodically on all relevant actions taken, including providing to the government lists of those receiving controlled information, (5) report immediately any violations or deviations that are detected, and (6) be subject to annual audit and re-qualification. It is noted that insofar as industrial firms are concerned, their interests in protecting sensitive data based on competitiveness considerations are indeed intense and generally coincide with the overall security interests of the government. If a firm or academic institution has qualified as a Trusted Entity it can then make a self-determination of the appropriateness of the proposed transfer action by implementing the seven step process. If it is not a Trusted Entity, the licensing process proceeds to the final stage, Step VII. It should be noted that classified or militarily highly sensitive

knowledge would never progress to the point that an organization's qualification as a Trusted Entity would enter into consideration.

Step VII. Determine whether there are remaining material adverse consequences, military, commercial or political, of a particular release and, if so, whether they outweigh the benefits of the release. The purpose of this step is to provide a final "safety-net" to allow consideration of those extraordinary cases that may simply not be addressable by rules intended for the ordinary course of business. It is expected that very few cases should reach this final step, and those that do will have been intensively vetted during the prior six steps. Such cases will necessarily be judged on their individual merits, considering the highest national priorities.

* * *

The above process is intended to provide the underlying principles for a new Deemed Export regime. It is not practicable, either in time or expertise, for the Committee itself to provide detailed implementing instructions. This must be the responsibility of the government, giving due consideration to the stated intent of the recommendations contained herein.

In proposing the above process, the Committee considered, but rejected, a number of alternatives, of which the following are the

more prominent: (1) To rely solely on the security classification system to determine whether or not a technology is releasable, and (2) To rely solely on the visa-granting system to determine whether or not a foreign national can be deemed as trustworthy for the purposes of awarding a license.

The former alternative was dismissed largely because the security classification system does not take into account commercial competitiveness considerations affecting United States firms. Additionally, it was feared that adapting the classification system to the export licensing function would encourage over-classification and dilute that system's current effectiveness. Further, there may be important commercial applications of certain sensitive technologies and their classification would automatically deny their use in the commercial sphere.

The notion of depending entirely on controls through the visa process was also discarded, in large part because of concerns that the personnel supporting the visa processing system are, in most instances, not equipped to make judgments as to the commercial and security implications of fast-changing leading-edge scientific and technologic advancements over a broad spectrum of disciplines. In addition, the task of determining the suitability of visa seekers for

Deemed Export licensing would further burden an already challenged visa processing system.

It is the Committee's opinion that by adopting a more rational construct for managing Deemed Exports based on building high walls around small fields comprised only of the most militarily consequential technologies, the nation's security, which depends increasingly on access to the latest commercial technologies generated around the world, can actually be enhanced. That is, the nation will be better served, in balance, by seeking to accelerate its own technical prowess than by seeking to deny potential enemies access to broad ranges of knowledge.

CHAPTER 2

Background about the Deemed Export Rule

In its simplest context, a "Deemed Export" can be defined as (1) the release (2) of technology or source code (3) having both military and civilian application (4) to a foreign national (5) within the United States. [1][1] Thus, even though the transfer of the knowledge in question takes place within the confines of the United States, the transaction is "deemed" to be an export and therefore subject to certain export regulations. The role assigned to the Deemed Export Advisory Committee (DEAC) was to provide recommendations to the Secretary of Commerce for possible improvements to Deemed Export regulations, policies, and processes.

1. Bracketed numbers are used in this report to indicate end-of-chapter references to the preceding information.

The federal regulations governing Deemed Exports of dual-use items are set forth in certain provisions of the Export Administration Regulations (EAR), which are administered by the United States Department of Commerce's (DOC) Bureau of Industry and Security (BIS). The EAR is the set of Federal rules that implement controls on the export of "dual-use" items, meaning items that have a predominantly commercial application but can also have military or other strategic purposes [2], thus potentially impacting United States security and foreign policy. The EAR differs from the International Traffic in Arms Regulations (ITAR), administered by the United States Department of State, in that the ITAR oversees the export of articles, services, and technical data (including all classified information) that have a primarily military application as defined by the United States Munitions List (USML).

The Deemed Export rule is a unique export control implemented unilaterally by the United States Government (USG). The Deemed Export rule is not a part of any international treaty or obligation, so it can be enhanced, modified, or eliminated at the sole discretion of the USG. It should be noted that other treaty allies with the United States do not implement a Deemed Export licensing regime, but rely largely on their visa issuance process -- or simply do not regulate "intangible exports."

Deemed Exports and United States National Security

Deemed Export controls traditionally impact national security by precluding sensitive *information* (in the form of source code or technology) from being transferred to foreign nationals who might use that information to the United States' disadvantage. However, as other nations begin to move to the forefront of many technologic fields, an important secondary and potentially conflicting impact of deemed exports is emerging. Because a relatively large percentage of America's brightest minds in advanced areas of science and technology (S&T) are foreign nationals studying or working in the United States under student or work visas [3], the Deemed Export rule may be denying highly qualified persons from fully participating in time-sensitive research or technology development projects of importance to the United States. This may place the nation at a disadvantage *vis-a-vis* its own national security as well as commercial use of the technology. The United States may miss or be late to capitalize on new breakthroughs in science and technology discovered by foreign national students, researchers, or workers. These foreign nationals are not infrequently the best, and occasionally the only, candidates available to fill the voids left by United States citizens who are increasingly foregoing studies in science and technology for pursuing of higher paying professions.

To illustrate how Deemed Exports can present a quandary for United States national (and economic) security, the following notional example is offered of a foreign national from a country of concern to the United States Government who has nonetheless been allowed to study in the United States on a student visa.

The hypothetical foreign national, having achieved a Ph.D. from a United States university, is hired by a United States company as the most qualified candidate to be the lead researcher on a cutting edge project that will produce a commercial product. A representative of the United States Department of Defense has expressed to the company its interest in the project because multiple potential military applications for the material have been identified. The company has no current plans to export the material once produced.

In this "dual-use" example, the foreign national researcher would require a Deemed Export license to participate in the project due to the individual's country of citizenship (and the possible military application of the product). Such a license can contain provisos that prevent the researcher from having further access to certain information dealing with the research in question. Because of this limitation, the individual may no longer be a reasonable candidate for the job -- even though he or she is the most qualified. In this scenario, both the company and the military lose. If the individual is granted

the job but does not have full access to the needed information because of the provisos, then the project is handicapped. However, if the individual gets the job without limitations and the project succeeds, the individual may repatriate to his home country (or to any other country) and divulge what is known to a foreign manufacturer. There are thus risks involved with each alternative.

The simplest solution in this scenario is to hire a qualified United States person (citizen or "green card" holder) with the requisite engineering or scientific skills. However, according to most independent assessments, such as the "Skills Gap Report 2005" performed by Deloitte Consulting, "... the vast majority of American manufacturers are experiencing a serious shortage of qualified employees... the research show[s] that engineers and scientists are in short supply, with 65 percent of manufacturers reporting deficiencies -- 18 percent severe and 47 percent moderate." [4] Foreign nationals with H-1B or similar visas are potential candidates to fill these positions, but, as noted, this approach poses a potential for significant S&T leakages. As the Hart-Rudman Commission on National Security stated in 2001:

"...[T]he inadequacies of our system of research and education pose a greater threat to United States national security over the next quarter century than any potential conventional war that we might imagine.

American national leadership must understand these deficiencies as threats to national security."

These threats, however, are not limited to leakages or outright transfers of technology. The United States must have the benefit of a steady stream of the latest technological developments whether created in the United States or abroad. Some of the nation's most noteworthy technological advancements have been achieved by foreign-born scientists and engineers working in the United States. Further, since a great deal of science and technology knowledge is now being generated outside the United States, it is important to keep open the window of inflow that thrives on global partnerships.

Deemed Export Licensing Data

Table 1 provides Deemed Export licensing data from the beginning of federal fiscal year (FY) 2002 through FY07. Table 2 lists the primary technological fields of BIS's Deemed Export licensing applicants [5].

Each year since 2002, over 80% of Deemed Export license applications have been approved (per Table 1) with the preponderance of license applications being received from the telecommunications, electronics, and high performance computer industries (see Table 2 on page 40). An approved license, however, is not a *carte blance* endorsement by the government for the licensee to

bestow unlimited information to its foreign national employee or student.

TABLE 1. *Deemed Export License Applications, FY02 - FY07*

	FY02	FY03	FY04	FY05	FY06	FY07
Total Licenses	706	846	995	707	865	1056
Licenses Approved	84%	92%	87%	89%	87%	85%
Applications Returned Without Action (RWA) *	16%	7%	13%	10%	13%	14%
Licenses Rejected	<1%	<1%	<1%	<1%	~0%	<1%
Processing Days (EO days) **	87	62	42	40	40	40

* An application may be returned without action if it is incomplete or if the application was not required for the item or information being proposed for export.

** Processing time is measured by the Department of Commerce in "Executive Order (EO) days." EO days do not take into consideration time during which the case may have been on "Hold without Action (HWA)".

Most approved export licenses -- whether for deemed exports or other exports -- contain limiting statements (termed "*conditions*" or "*provisos"*). For deemed exports, these *conditions* typically limit the scope of the license to technical specifications approved for the foreign national's country of citizenship. These *conditions* are often the subject of controversy between industry, academia and government. [See Appendix C, "Samples of Approved License

Conditions (Provisos)" on page 119 for an example set of Deemed Export license *conditions*.)]

TABLE 2. *Deemed Export License Applications by Technological Field*

Technological Field	% of Licenses
Telecommunications	33%
Electronics	29%
High Performance Computers	23%
Other Industries	8%
Aerospace & Materials	7%

Past Deemed Export Studies and Reviews

In March 2004, the Department of Commerce (DOC) Inspector General (IG) published a report entitled, "Bureau of Industry and Security: Deemed Export Controls May Not Stop the Transfer of Sensitive Technology to Foreign Nationals in the United States." [6] This document listed deficiencies in the Deemed Export process in several areas:

- The IG viewed the requirements for a Deemed Export license -- mainly the access to "development", "production", and "use" technical information -- as too broadly defined regarding "use". Per the EAR, the term "use" is composed of six criteria in combination (i.e., all six must occur for an item to be categorized as "use" technology, and consequently potentially requiring a

deemed export license) whereas the IG's view was that any of the six criteria occurring individually should render an item's "use" technology subject to potential deemed export licensing requirements [7].

- The IG criticized the current BIS Deemed Export licensing policy for focusing only on the subject's nation of current citizenship instead of all of the nationalities that the foreign national subject has ever maintained. The IG recommended that BIS "amend its policy to require U.S. entities to apply for a deemed export license for employees or visitors who are foreign nationals and have access to dual-use controlled technology if they were born in a country where the technology transfer in question is EAR-controlled regardless of their most recent citizenship or permanent resident status." [7]

In response to the IG report, BIS published a Federal Register Notice in March 2005 to provide advance public notice and solicit public comments on proposed EAR rule changes that satisfied the alleged deficiencies noted in the IG report. Included in the Notice were proposed revisions to change "and" to "or" in the "use" definition, and to potentially consider additional citizenship information in the review of Deemed Export license applications. Many of the arguments/assertions contained in the 311 public comments received in response to this Notice were that the "or" interpretation would

capture too many routine operations carried out by foreign national students and employees, and that the proposed rules would constitute a large (and, it was asserted, generally unnecessary) compliance burden on affected organizations [8].

Following an internal review and consideration of the public comments, on May 31, 2006, BIS withdrew all of the rule changes proposed in the March 2005 Federal Register Notice [9]. BIS determined that the existing licensing requirement based upon a foreign national's current country of citizenship or legal permanent residence is appropriate and recognized declarative assertions of affiliation as having greater significance than the geographical circumstances of birth. BIS also concluded that the existing definition of "use" (i.e., the full combination of all six criteria under the "and" interpretation) appropriately implements the underlying export control rationale in the EAR. Finally, BIS announced in the May 2006 Notice that it would establish a Deemed Export Advisory Committee under the Federal Advisory Committee Act (FACA) in recognition of the nature and extent of the public comments received on these issues. This committee was given broad latitude to recommend changes to the Deemed Export rules and their implementation.

Public Testimony and Comments

The DEAC met in open session on six separate occasions between October 2006 and September 2007 and received 37 formal and informal presentations including several from citizens representing themselves or interested organizations. The 26 invited presenters included qualified individuals from governmental organizations, high-tech corporations and educational institutions, including Presidents and Provosts from leading United States research universities and senior executives from United States commercial firms. Sessions were held at both the classified and unclassified levels. Informal remarks were also received from persons involved with the topic of Deemed Exports representing associations, law firms and other interested parties. These presentations generally pointed to specific recommendations that the speakers proffered to the DEAC for due consideration.

Many of the recommendations put forward in the public comments overlapped one another, particularly in two key areas. The first was the recommendation to streamline and update the Commerce Control List that many felt was out-of-date and in some instances, attempted to protect obsolete or globally available technologies. A second recurring recommendation was to retain the current interpretation of "use" in the EAR that is, the combination of the six listed criteria comprising the term are operative and not the Department of

Commerce Inspector General's recommendation to redefine "use" as any one of the six criteria individually.

Other public assertions included:

- That the Deemed Export rule lacks sufficient data on its effectiveness to warrant its continuation.
- That National Security Decision Directive 189, "National Policy on the Transfer of Scientific, Technical, and Engineering Information" (1985), appropriately excludes from Deemed Export licensing basic requirement and applied research in science and engineering, the results of which "ordinarily are published and shared broadly within the scientific community." [10].
- That Deemed Export license application efforts are disproportionate to the application rejection rate and cost to business in lost productivity.
- That United States high-tech firms are at least as interested (if not more so) in protection of intellectual property and trade secrets as is the federal government in protecting dual-use national security information and know-how. Leading United States high-tech firms typically employ multiple layers of technology security becasue of competitiveness considerations, some of which rival United States Defense Department security provisions, and as such

should be given special consideration (or a presumption of approval) for Deemed Export license applications.

- That Deemed Exports should be handled "at the border" through the United States State Department's visa application review such that students issued visas for study or work in the United States should be presumed approved for Deemed Export purposes.
- That intra-company communications, including international interactions, should be exempt from Deemed Export licensing controls.
- That Deemed Export regulations should simply be obsoleted by the conventional national security classification system.

It should be noted that a number of other advisory committees are currently reviewing various aspects of the issue of dual-use technology and national security. The National Academy of Sciences Advisory Board on Biosecurity is nearing completion of its report into *Security of Dual-Use Research*. Although that report does not specifically address the issue of Deemed Exports, it provides an important set of guidelines for the biosciences community [11]. The Center for Strategic and International Studies has also been asked to review the issue of United States export controls and national security by the Department of Defense. This study, begun in May 2007, is estimated to take about eight months to conduct and will focus mostly

on United States Munitions List (primarily military) exports, military export regulations, and 21st century globalization factors as they relate to United States national security [12].

Other Export Regulatory Regimes

In addition to the EAR, there are several other statutes, regulations, and government agency directives that govern the export of technical information and know-how to foreign national individuals and organizations in the United States.

1. The Committee on Foreign Investment in the United States (CFIUS) is an interagency federal committee led by the Secretary of the Treasury that implements Section 721 of the Defense Production Act of 1950, and which was recently amended by the Foreign Investment and National Security Act of 2007. Although the CFIUS committee and the federal regulation under which it functions (31 CFR Part 800) is not specifically an export-control regulation, CFIUS does review the acquisition, merger or takeover by foreign entities of companies doing business in the United States. A foreign takeover may impact the ability of a company to conduct research or produce items for national defense purposes without foreign intervention, or the company's ability to segregate certain information from the acquiring foreign entity. In the case

of classified work performed by the acquired United States company, the company must create an absolute firewall mechanism (e.g., a proxy agreement, voting trust, or special security arrangement) in order to continue to hold its facility clearance and classified contracts [13].

2. The International Traffic in Arms Regulations (ITAR) regime is the set of federal regulations (22 CFR Parts 120-130) that implements the Arms Export Control Act (AECA). This arrangement parallels the relationship of the EAR to the Export Administration Act (EAA). [14]

3. Department of Defense (DoD) Directive 5230.25 implements 10 US Code Section 140c, as added by Public Law 98-94, "Department of Defense Authorization Act, 1984", Section 1217, to allow DoD to withhold from public disclosure certain *unclassified* technical data that has a military or space application. This directive gives DoD Program Managers and other DoD officials the ability to determine which consumers are to be allowed access to technical information generated by or for the program. These potential consumers typically include U.S. government agencies, contractors, research institutions, and foreign nationals [15].

References

[1] Code of Federal Regulations (CFR), Title 15, Parts 730 to 744 (2007), commonly known as the "Export Administration Regulations (EAR). The specific definitions of "Deemed Export", "development", "production", "use" can be found in Section 772, Definitions.

[2] EAR, Section 730.3, "Dual use exports."

[3] The 1990s showed strong increases in the number of foreign-born individuals holding United States science and engineering (S&E) jobs; by 2000, this share had increased from 14% to 22%. The largest increases were for doctorate holders, from 24% to 38%, and for certain job specialties. More than half of the engineers holding doctorates and 45% of doctorate holders in the physical sciences, computer sciences, and life sciences were foreign born. One-third of these foreign-born scientists and engineers came from India, China, and the Philippines; among doctorate holders, those from China and India alone constituted one-third of the total. Source: *Science & Engineering Indicators 2006*, National Science Board, February 23, 2006, Overview/S&E Trends In The United States, http://www.nsf.gov/statistics/seind06/.

[4] *2005 Skills Gap Report -- A Survey of the American Manufacturing Workforce*, Deloitte Consulting LLP, p. 1, http://www.nam.org/2005skillsgap.

[5] Data provided to the Deemed Export Advisory Committee by the Department of Commerce, Bureau of Industry and Security, on Deemed Export license applications from federal fiscal year 2002 through 2007.

[6] *Office of the Inspector General: Deemed Export Controls May Not Stop the Transfer of Sensitive Technology to Foreign Nationals in*

the U.S., United States Department of Commerce, Office of the Inspector General, Final Inspection Report No. IPE-16176, March 2004, http://www.oig.doc.gov/oig/reports/2004/BIS-IPE-16176-03-2004.pdf

[7] Section 772 of the EAR defines "use" as "operation, installation (including on-site installation), maintenance (checking), repair, overhaul and refurbishing." The IG recommended that any of the six criteria occurring individually should render an item "use" technology and thus subject to potential deemed export licensing requirements. Some non-governmental personnel have simplified the IG's recommendation to changing the word "and" in the "use" definition to the word "or".

[8] *Federal Register*: March 28, 2005 (Volume 70, Number 58), Proposed Rules, Page 15607-15609, http://www.gpoaccess.gov/fr/index.html.

[9] *Federal Register*: May 31, 2006 (Volume 71, Number 104), Proposed Rules, Page 30840-30844, http://www.gpoaccess.gov/fr/index.html.

[10] National Security Decision Directive 189, "National Policy on the Transfer of Scientific, Technical and Engineering Information," September 21, 1985.

[11] *Security of Dual-Use Research,* National Sciences Advisory Board on Biosecurity, http://www.biosecurityboard.gov/pdf/NSABB%20Draft%20Guidance%20Documents%2027Sep06%20(12%2011%202006).pdf.

[12] Center for Strategic and International Studies Press Release, "CSIS To Conduct Independent Study on US Export Control

Regulations and National Security," May 8, 2007, http://www.csis.org/component/option,com_csis_press/task,view/id,2724/.

[13] National Industrial Security Program Operating Procedures (NISPOM), Chapter 2, Section 3, February 28, 2006.

[14] In the ITAR, the topic of "Deemed Exports" is mentioned in §120.17, the section dealing with the definition of "export", as "Disclosing (including oral or visual disclosure) or transferring technical data to a foreign person, whether in the United States or abroad [as a footnote: This section is roughly equivalent to the definition of "Deemed Export" in the EAR… See also §125.2(c) requiring licenses for disclosures of technical data to foreign persons].

Then in §125.2(c), "Exports of Unclassified Technical Data," the ITAR states, "(c) Disclosures. Unless otherwise expressly exempted in this subchapter, a license is required for the oral, visual or documentary disclosure of technical data by United States persons to foreign persons. A license is required regardless of the manner in which the technical data is transmitted (e.g., in person, by telephone, correspondence, electronic means, etc.). A license is required for such disclosures by United States persons in connection with visits to foreign diplomatic missions and consular offices."

[15] Department of Defense Directive 5230.25, *Withholding of Unclassified Technical Data From Public Disclosure*, August 18, 1995, http://www.dtic.mil/whs/directives/corres/pdf/523025p.pdf.

CHAPTER 3

Issues About Globalization, National Security Concerns, and Deemed Exports

There is no longer a single country (or even a small group of countries) leading the world in a preponderance of the fields of science and technology (S&T). S&T leadership today has been both globalized and marginalized, and is now shared around the world on an interdependent basis. This can be seen in the commercial sphere as United States firms, along with their competitors, establish global research enterprises (not just places, but networks) to best use specialized S&T niches of each enterprise node. United States universities are also following this model by establishing campuses abroad, creating joint partnerships or ventures with foreign research institutions, or teaming with foreign faculty in jointly pursuing highly specialized cutting-edge research. The Internet assists in the ubiquitous transfer of knowledge from one place to another, but is not

the only driving factor behind this shift in the conduct of S&T research. Ease of personal international transportation; the reliability of overnight deliveries of perishable or fragile shipments; the simplified use of voice and data communications over hand-held devices; the improving standards of living in developing countries; and many other new and emerging technologies have contributed to the continuing dispersal of the S&T enterprise to far-reaching nodes.

If a nation is to be successful in this global business and academic environment, it will need to develop a coherent set of advantages to attract the type of economic activity it wishes to foster [1]. Because Deemed Exports mainly deal with foreign national access to high-end technologies and know-how while physically located in the United States, the globalization control facet vital for Deemed Exports is *knowledge*, and in particular the character of that knowledge, to whom that knowledge is disseminated, and how it is used.

Understanding a Knowledge Economy

Mr. John Houghton at Australia's Centre for Strategic Economic Studies, has, among others, conducted extensive research on the topic of knowledge economies. In "The Global Knowledge Economy," Houghton explains this phenomenon in the following terms:

> *A knowledge-based economy is so fundamentally different from the resource-based system of the last century that conventional economic understanding must be re-examined... The knowledge economy increasingly relies on the diffusion and use of knowledge, as well as its creation. Hence the success of enterprises, and of national economies as a whole, will become more reliant upon their effectiveness in gathering, absorbing and utilising knowledge, as well as in its creation.*
>
> *A knowledge economy is, in effect, a hierarchy of networks, driven by the acceleration of the rate of change and the rate of learning, where the opportunity and capability to get access to and join knowledge-intensive and learning-intensive relations determines the socio-economic position of individuals and firms.* [2]

This concept is critical to any discussion of Deemed Export regulations since the root of these regulations is the control and limited distribution of technologic know-how to foreign nationals studying or working in the United States. The control and limitation of knowledge has both positive and negative potential consequences for the nation's economy and its national security.

Innovation in Knowledge-Based Systems

Innovation has been a key driver of the United States economy. As President Bush stated in his opening remarks in the "American Competitiveness Initiative" booklet [3],

> *"One of the greatest engines of our growing economy is our Nation's capability to innovate. Through America's investments in science and technology, we have revolutionized our economy and*

> *changed the world for the better. Groundbreaking ideas generated by innovative minds in the private and public sectors have paid enormous dividends -- improving the lives and livelihoods of generations of Americans."*

The type of innovation described by President Bush is iterative and involves individuals, intellect, and imagination. Innovation increasingly involves numerous interactions between actors and institutions. In a knowledge economy, people and firms search for linkages to promote inter-personal and inter-firm learning, and for outside partners and networks to provide complementary assets. These relationships help spread the costs and risks associated with innovation, provide additional talent, gain access to new research results, acquire key technologic components, and share assets in manufacturing, marketing and distribution. As they develop new products and processes, the innovators determine which activities they will undertake individually, which in collaboration with other persons and firms, which in collaboration with universities and research institutions, and which with the support of governments. The interactions within these global systems influence the innovative performance of people, firms, and ultimately the economy. The ability of the system to distribute knowledge and ensure its delivery in a timely manner is critical in determining the success of its participants [4].

The issue of knowledge distribution goes directly to the core of the the Deemed Exports regulation and the ability of entities to rapidly determine who gets to participate in a specific endeavor and at what level. For instance, in 1998, the Executive Branch determined that High Performance Computer Systems (HPCS) are a critical national asset for designing or improving advanced nuclear explosives and advanced conventional weapons capabilities. It identified HPCS' as also having applications in such national defense areas as cryptology, battle management and target engagement, joint theater missile defense, information superiority and electronic warfare [5]. However, HPCS' are also produced by other countries, used by foreign nationals working and studying in the United States and abroad, and have a host of standard commercial applications such as commercial aircraft design, ship performance analysis, commercial satellite design, and other non-military applications that continue to advance the overall state-of-the-art. In this context, the question arises: "Do Deemed Export restrictions on the use of HPCS by highly qualified foreign national students and workers in the United States protect national security, or do they simply inhibit innovation and harm the United States' position in the world economy?"

Because there is no definitive way to determine a futuristic outcome in advance (i.e., the protection mechanism worked and prevented a technology leak to a potential adversary; or the protection mechanism

stifled innovation by preventing a bright foreign national from making a major contribution to the United States' creative endeavor), the matter becomes one of risk management. The GAO Report on HPCS expresses the idea of export risk in the following manner:

> *"The United States export control system is about managing risk; exports to some countries involve less risk than to other countries and export of some items involve less risk than others. Under United States law, the President has the authority to control and require licenses for the export of items that may pose a national security or foreign policy concern. The President also has the authority to remove or revise those controls as United States concerns and interests change." [6]*

According to the United States Department of Commerce, the key to effective export control is setting control levels at a point slightly more restrictive than the level of known foreign availability of materials of concern. The Export Administration Act of 1979, as amended (EAA) describes foreign availability as involving goods or technology that are accessible without restriction to controlled destinations from sources outside of the United States in sufficient quantity and comparable quality to those produced in the United States so as to render the controls ineffective in achieving their purpose [7]. This system of controls works reasonably well in the general context of exporting tangible items outside the United States. However, Deemed Exports are more complex since nothing tangible (potentially) leaves the country, only knowledge. In today's post-Cold War globalizing, Internet-connected world, knowledge is a

commodity that is exceptionally difficult to control if for no other reason than that it can be stored in the human brain, and humans are becoming increasingly mobile.

Where Are The New Innovations and Technologies?

In March 2006, a Joint U.S.-U.K. committee was formed to review defense critical technologies important to both countries. This committee, composed of members of the United States Defense Science Board and the United Kingdom Defence Scientific Advisory Council, stated in its report that among its concerns was a general loss of innovation in the defense sector. The Joint Committee stated,

> *"One final concern that arose during the panel's deliberations is the belief that the list of critical technologies is surprisingly familiar with few, if any, being new additions that would not have been on the list compiled five or ten years ago. Of those that are new, many are technologies that can be substituted for existing components -- as opposed to those that create revolutionary new capabilities. A failure to discover and develop revolutionary new technologies is of particular concern, given the belief that new systems concepts often arise in response to the development of new component technologies."* [8]

This general lack of innovation sentiment was echoed by President Bush on December 20, 2006 when he signed Executive Order 13419, entitled "National Aeronautics Research and Development," where he stated in Section 1,

> *"Continued progress in aeronautics, the science of flight, is essential to America's economic success and the protection of America's security interests at home and around the globe. Accordingly, it shall be the policy of the United States to facilitate progress in aeronautics research and development (R&D) through appropriate funding and activities of the Federal Government, in cooperation with State, territorial, tribal, local, and foreign governments, international organizations, academic and research institutions, private organizations, and other entitles, as appropriate."* [9]

These statements not only point to the importance of science and technology to the national economy and the nation's security, but also reflect the growing internationalization of such endeavors. Significant innovation is occurring in other parts of the world where multinational collaboration is thriving (and is less constrained by export restrictions). Many of these foreign activities draw upon individuals educated in the United States. For instance, at Microsoft's Beijing research laboratory, one-third of its programmers have Ph.D.s from United States universities [10].

Emigration and Technology Transfer

It is no accident that many foreign countries are in-fact *developing*. For many years, the United States has been helping to educate the next generation of innovators for these countries -- both in the name of our own national interests and in our responsibility as a world leader. The Honorable Franklin L. Lavin, former Under Secretary of

Commerce for International Trade, remarked at the President's Export Council meeting on June 7, 2007, that the United States is running a television show in India to encourage Indian students to think about attending United States colleges and universities.

> *"We're profiling Indian students here [in the United States on the television show]. ... India represents the single largest source of foreign students in the U.S. We believe [that education] is an important export as well as an important cultural/public diplomacy connectivity." [11]*

Indian, Chinese, Russian, and other foreign national students are excelling at United States universities at the highest educational levels and upon graduation establishing residency and/or citizenship where they can best extract value for their education -- sometimes in the United States and sometimes not. This portability of nationality presents a significant challenge to agencies with export control responsibilities since country of nationality may not be as significant as country of birth or country of rearing and education, or some other country of connection. Individual foreign nationals may, for example, be educated in the United States and then emigrate to an EU country where they may work for a multinational defense firm under an EU country's citizenship. In such a scenario, a proposed United States Department of State policy would allow such "EU-nationals" access to ITAR export-controlled information. In recent testimony before Congress on July 26, 2007, the Honorable Stephen D. Mull,

Acting Assistant Secretary of State for Political-Military (PM) Affairs, told Congress,

> *"In the Department's continuing review of export control policy, the [Politico-Military] Bureau is initiating changes to manage export control risk... We are set to initiate a policy change that will permit employees of foreign companies who are nationals from NATO or EU countries, Japan, Australia and New Zealand, to be considered authorized under an approved license or [Technical Assistance Agreement, or TAA]. This will alleviate the need for companies to seek non-disclosure agreements for such nationals and recognize the low risk of transferring technologies to nationals of these countries under an approved license or TAA."* [12]

This policy seems to conflict with other current United States export regulations since it assumes a homogeneous population in the EU and NATO. Since many of these countries routinely confer citizenship upon emigrés, especially those with advanced science and technology degrees, the State Department's Politico-Military Bureau's proposed policy would allow these persons unquestioned access to direct defense technologies. There would seem to be a certain irony in imposing technology restrictions (via a Deemed Export license) on a brilliant foreign national Ph.D.-candidate researcher contributing to the next generation of technology while studying in the United States, but then allowing him or her unrestricted access to the same or better technology after graduation as a naturalized citizen of a NATO country working for a European firm.

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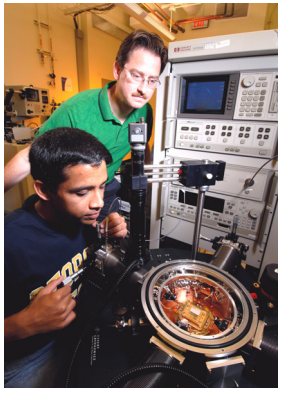
CHAPTER 4

Issues Regarding The Need For and Risk of Using Foreign National Talent

The Importance of Foreign National Students to the United States' Science and Technology Enterprise



During the spring semester of 2006, foreign national students and researchers at the Georgia Institute of Technology (Georgia Tech) in Atlanta, GA, along with IBM chip designers, established a new chip speed record when they ran a silicon/germanium microprocessor with helium supercooling at 500 Gigahertz (GHz) -- with simulations showing that the chip may be able to run at speeds as high as 1 Terahertz (1,000 GHz) [1]. In addition to Dr. John D. Cressler, the

lead researcher and a professor at Georgia Tech's School of Electrical and Computer Engineering, the research team included Ph.D. students Ramkumar Krithivasan and Yuan Lu; Jae-Sun Rich of Korea University in Seoul, South Korea (formerly of IBM); and Marwan Khater, David Alhgren and Greg Freeman of IBM Microelectronics in East Fishkill, NY. Each of these persons is said to have contributed significantly to the innovation and success of this research.

This one example, and many more such examples in universities and research institutions throughout the United States, illustrates the importance of foreign nationals, particularly graduate students and post-doctoral researchers, to the United States Science & Technology (S&T) enterprise. A 2006 study conducted by researchers at the Pratt School of Engineering at Duke University concluded that persons from outside the United States founded 52% of Silicon Valley companies and 39% of California start-ups in the 1995-2005 period, with Indians being the predominant ethnic group leading these startups in the second five years of the study [2]. Some of these companies were started with venture funding and now employ tens of thousands of United States workers (see Table 1) [3]. According to an article appearing in *Asia Times Online* regarding the Duke study, "These findings ... are likely to be used by corporations to lobby the United States Government to lift restrictions on skilled immigrants from countries like India and China. The United States will have to

accept that with Americans lagging behind in tech skills, its economy doesn't just need immigrant brain power, it is dependent on it" [4].

TABLE 1. *Examples of Immigrant-Founded Venture-Backed Public Companies*

Company	Immigrant Founder or Co-Founder	Country of Birth	Number of Employees (FY 2005)	Industry
Intel Corp.	Andy Grove	Hungary	99,900	Semiconductor & Related Device manufacturing
Solectron Corp.	Winston Chen	Taiwan	53,000	Bare Printed Circuit Board Manufacturing
Sanmina-SCI Corp	Jure Sola	Bosnia	48,621	Bare Printed Circuit Board Manufacturing
Sun Microsystems	Andreas Bechtolsheim	Germany	31,000	Electronic Computer Manufacturing
eBay Inc.	Pierre Omidyar	France	12,600	Electronics Auctions
Yahoo, Inc.	Jerry Yang	Taiwan	9,800	Web Search Portals
Google, Inc.	Sergey Brin	Russia	5,680	Web Search Portals

According to the most recent *Science and Engineering Indicators of the 2006* report issued by the National Science Board (NSB), the United States' dependence on foreign-born scientists and engineers is increasing. The NSB's data show that the percent of foreign-born national science and engineering workers rose from 14% to 22% from 1990-2000. The largest increase (as a subcategory of this trend)

was for doctorate holders, which rose from 24% to 38% in important S&T specialties. More than half of the 2006 graduating engineers in the United States holding doctorates and 45% of Ph.D.s in the physical sciences, computer sciences, and life sciences were foreign born. One-third of this group came from India, China, or the Philippines. Among science and engineering doctorate holders working in the United States, one-third of this total group came from India and China [5].

From 1990 to 2003, foreign national students holding temporary visas earned between 6,800 and 8,700 doctorates per year from United States universities. In calendar year 2003, this group earned one-third (8,700 of 26,900) of the total number of doctorates (in all fields) awarded in the United States. Within that subset, more than half of the foreign national degrees (~ 4,400) were awarded in engineering fields of study. Of the remainder, 44% of mathematical and computer science doctorates were conveyed upon foreign nationals, and 35% of the physical science doctorates went to foreign nationals. (Only about 900 (~10%) of the 8,700 total doctorates awarded to foreign nationals in 2003 were in *non*-S&T fields of study.) In pre-graduation surveys, many of these students stated that they planned to stay in the United States after they completed their education [6], although this is a trend that is gradually reversing.

Keeping America Competitive

The need to innovate and keep the American economy vibrant, thus contributing to the federal tax base that fuels the strength of the government and funds the nation's military, has been widely recognized. The President's *American Competitiveness Initiative* launched in early 2006 has been described by the Office of Science and Technology Policy in the following terms:

> *"Keeping our competitive edge in the world economy requires focused policies that lay the groundwork for continued leadership in innovation, exploration, and ingenuity. America's economic strength and global leadership depend in large measure on our Nation's ability to generate and harness the latest in scientific and technological developments and to apply these developments to real world applications. These applications are fueled by: scientific research, which produces new ideas and new tools that can become the foundation for tomorrow's products, services, and ways of doing business; a strong education system that equips our workforce with the skills necessary to transform those ideas into goods and services that improve our lives and provide our Nation with the researchers of the future; and an environment that encourages entrepreneurship, risk taking, and innovative thinking."* [7]

In concert with this rationale, the Congress passed and the President signed the "America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Sciences" (COMPETES) Act, a bill to strengthen the United States educational system in science and technology in order for the nation to remain competitive in today's global knowledge economy.

As such initiatives are formulated and begin to produce results, and as other parts of the world continue to strengthen their academic and research institutions to compete with the United States, practicing American-born scientists and engineers continue to be in short supply and thus, the country remains heavily reliant upon foreign talent. A statement in the National Academy of Sciences' 2005 report, *Policy Implication of International Graduate Students and Postdoctoral Scholars in the United States*, puts this reliance in the following perspective:

> *"As the [science & engineering] expertise rises around the world, it is in the nation's interest to understand better the contributions of international scientists and engineers to the U.S. economy and national security, create policies that can sustain this contribution, and find ways to attract more U.S. citizens to careers in [science & engineering]."*
>
> *The American Competitiveness Initiative, the COMPETES ACT, and other such programs will surely help alleviate the U.S. shortfall in the future years, but in the interim Deemed Exports remain a national concern.*

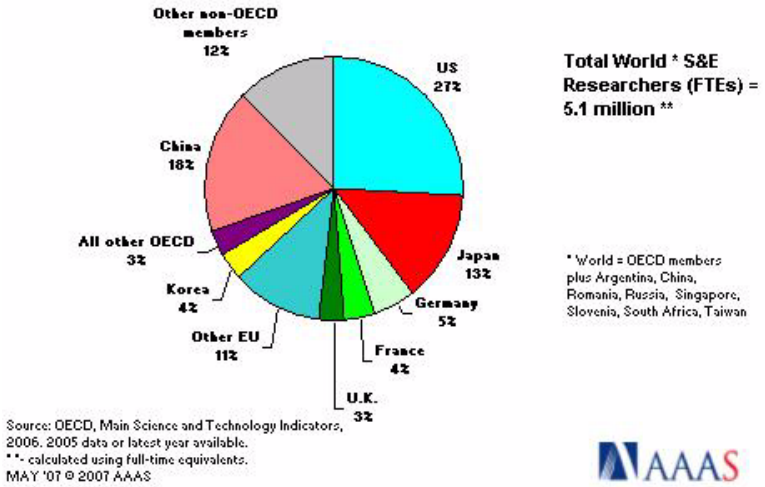
Foreign National Help Comes at a Risk

As the dynamics of the science and technology playing field change in the United States, so too are they changing around the world. In a recent report, the American Association for the Advancement of Science (AAAS) stated that China is now second in the world in its

share of science and engineering researchers (see Figure 1, "Shares of World Science & Engineering Researchers, 2005) [8].

Because many researchers educated in the United States are now working outside of the United States, a dilemma is presented for security professionals. This arises because of the threat of industrial and defense espionage while such researchers are in the United States and the potential for knowledge portability if they repatriate.

FIGURE 1. Shares of World Science & Engineering Researchers, 2005



According to the *Foreign Economic Collection and Industrial Espionage, 2005* report (published in August 2006 by the Office of the National Counterintelligence Executive),

> *"... most foreign students and academics working in United States research institutions are not involved with United States technology theft. In fact, many significantly contribute to the advancement of research at their respective universities and institutes. However, the sheer size of the population and the access that some have to key R&D projects make it inevitable that this group will serve as an important funnel abroad for technologies." [9]*

According to the above mentioned report, in federal fiscal year 2005 (Oct 04 - Sep 05), a record number of countries, 108, were involved in collection efforts against sensitive and protected United States technologies. However, only a small number of countries, including China and Russia, accounted for much of the targeting (just as they have since the Counterintelligence Community first began systematic tracking of foreign collection efforts in 1997) [10].

The *Espionage 2005* report continues that,

> *"Private-sector players -- foreign businessmen, scientists, engineers, students, and academics -- were active collectors in FY2005, although those who engaged in theft represented only a small fraction of total foreign experts in the United States. Moreover, evidence suggests that the vast majority of those who did attempt to steal technology or trade secrets did not initially come to the United States with that intent nor were they directed to do so by agents of foreign governments. Instead, after finding that they had access to information that was in great demand abroad, most engaged in illegal collection to satisfy their desire for profits, for academic or scientific acclaim, or out of a sense of patriotism for their home countries."* [11]

In this context, the "spy" could be just about anyone, including a United States citizen, given the increasing degree of international physical and communication portability available in both developed and developing countries.

Collection Objectives

Collection efforts erode the United States military advantage by enabling foreign militaries or non-aligned adversaries to acquire sophisticated capabilities that might otherwise have taken years and considerable resources for them to develop [12]. The apparent objective of such nations is to identify United States "Critical Program Information" (CPI) that comprises the most militarily sensitive technologies and components of United States weapons, systems, or equipment. By identifying the CPI, the adversary may be able to copy defeat, or shorten the expected useful combat life of a system, or to cause a significant redesign of the system at considerable expense to the United States [13].

The other common objective of foreign collection is industrial. Foreign firms use surreptitious means to short-circuit the R&D process and use stolen information to undercut any United States economic or industrial advantage. They use this information to make it possible for their local firms to gain a competitive economic edge over their rival United States companies [14].

Collection Modus Operandi

According to the Defense Security Service's (DSS) *Technology Collection Trends 2006* report [15], the most frequent methods of operations for collection agents were:

- Simple requests for information (34%)
- The purchase of controlled technology (32%)
- Solicitation of marketing services (10%)
- Exploitation of relationships (5%)
- Internet activities (5%)
- Exploitation of a foreign visit in the United States (5%)
- Targeting at conventions, expositions, or seminars (4%)
- Social and cultural commonalities (1%)
- Use of foreign employees (1%)
- Others (3%)

An example of such seemingly innocuous activity in the arena of dual-use technologies cited in the *Trends 2006* report involved laser and optics technology:

> *"A foreign firm sent an unsolicited email request for a price quote for export controlled dual-use laser technology from a cleared defense contractor. The (foreign) firm claimed that the ND:YAG laser with aiming beam was for a biomedical physics project. This item can be used in both commercial and military applications. Military uses include range finders and target designators. The*

> *laser is on the U.S. Department of Commerce [Commerce Control] List..."* [16]

This kind of contact is difficult to evaluate by security and counterintelligence professionals since it is difficult to distinguish between a legitimate business' marketing or sales activity, a research institution's appropriate international interactions, and the illegitimate activities of foreign companies or governments attempting to illegally acquire United States technology. The *Trends 2006* report speaks to this matter, stating:

> *"Foreign entities will likely use ostensibly legitimate businesses to target and exploit U.S. firms that develop sensitive technologies. Many countries already deem it to be in their national interest to acquire any and all U.S. military and dual-use technology, no matter how insignificant, in order to assemble a body of technological work for domestic industries to exploit. The threat environment is multidimensional: Countering that threat requires innovative thinking..."* [17]

Internal Company Technology Protections

Virtually all high-tech companies take steps to protect their intellectual properties (IPs) and trade secrets from industrial espionage. The Deemed Export Advisory Committee (DEAC) was addressed by high-tech companies such as Intel, Advanced Micro Devices (AMD), and Qualcomm, each of which stated that their company's have layered internal IP and trade secret protection

programs and that it was not in their company's interest to divulge their development/production/use information such that it might be utilized by competitors. All professed that their trade secrets, in particular, were the heart and soul of their companies and any leakage to an outside entity would be seriously detrimental to their continued profitability and even potential existence. Several of these presenters are among the largest holders of Deemed Export licenses and the technology protection programs described during their presentations appeared to be well conceived and executed.

Prosecuting Deemed Export Violations

The United States Department of Justice (DoJ) announced on June 20, 2007, the appointment of the nation's first "National Export Control Coordinator." As stated in the DoJ's press release announcing the appointment,

> *"This new position will be responsible for improving DoJ's investigation and prosecution of illegal exports of United States arms and sensitive technologies... In recent years, the Justice Department has prosecuted independent arms brokers and foreign agents for attempting to illegally acquire component parts for nuclear weapons systems, guidance systems for rockets and missiles, and base ingredients for chemical and biological weapons." [18]*

While this is a relatively straightforward action in the prosecution of tangible illegal exports, the prosecution of Deemed Export violations

presents a much more difficult challenge. To build a prosecutable case, investigators normally need an inside source to develop prosecutorial information regarding knowledge, intent, and access [19]. This is normally a very high hurdle to overcome.

The National Counterintelligence Executive's August 2006 *Annual Report to Congress on Foreign Economic Collection and Industrial Espionage 2005*, specifically addressed this issue in its report:

> *"Although the [Counter-Intelligence] Community believes that a significant amount of protected U.S. technology leaves the country each year after being released to foreign nationals in the United States, so far, there has been only one case tried for violation of the Deemed Export law. In 2004, a U.S. company, whose primary shareholder was a Chinese firm controlled by the People's Republic of China Government, failed to obtain export licenses for three Chinese nationals who worked at the company and were trained in manufacturing technology controlled by the [Export Administration Regulations]. The result was the transfer to China of knowledge concerning the manufacture of export-controlled products with direct military application.*
>
> *In our view, the reason so few cases have been prosecuted under the Deemed Export law is the difficulty in observing Deemed Exports. With no observable movement of goods, the transfer is virtually impossible to detect, let alone prosecute. The absence of prosecutions, in turn, may be a factor in lowering the awareness of the U.S. scientific community to the extent of the problem."*

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CHAPTER 5

Findings and Recommendations

Findings

Viewed in the context of the evolving security and commercial environments of the post-Cold War 21st Century, the long established regulations that control Deemed Exports appear today to possess a number of shortcomings that range from the way the regulations are written and interpreted by the Government to the change in the very business and research environment to which the regulations are applied. The most prevalent of these shortcomings is that the current Deemed Export regulations have become increasingly irrelevant in the prevailing globalized commercial, academic and national security environments.

At least as far back as 1999 when the United States Defense Science Board examined the impact of globalization on national security, it was evident that most scientific and technologic knowledge and resulting items cannot be denied to adversaries even by a perfect United States control regime; they can simply be obtained from others. This reality is not reflected in the manner in which Deemed Export regulations are applied today as the world's body of knowledge is accelerating.

In addition to their reflection of a bygone era, in their present form the Deemed Export regulations tend to be complex, vague, and confusing. In the simple case of a fundamental research study, the "output" (or report resulting from research) is not subject to the existing Deemed Export regulatory regime, but knowledge relating to the use of laboratory equipment used in prosecuting that same research (the "input") may be subject to such control. Similarly, the results or output of "fundamental research" (meaning basic research in science and engineering where the resulting information is ordinarily published and shared broadly within the scientific community) are not subject to Deemed Export controls, whether or not the research results are ever actually accepted for publication or whether there is any reasonable basis for the stated intent in the first place. So-called "use" technology is controlled in a manner that is easily overcome by researchers working in tandem to circumvent the

current regulatory prescription. Concerns over such circumstances have been amplified by debates over the use, by government officials or program managers, of document control markings such as "Sensitive But Unclassified" or similar control markings not addressed in statutory law.

To complicate the matter further, many academic and industrial organizations appear to be unaware of the Deemed Export rules or to have found means to conduct their affairs without being subject to them. Table 1 on page 39 shows that on average over the last five years, only about 900 Deemed Export license requests are submitted to the United States Government each year, of which about 85 percent are approved (some 15 percent are returned to the requestor without action because either a license was not required, the application was incomplete, or some other complicating factor). Less than one percent are actually rejected and 54 percent of all applications processed in 2006 were submitted by just three United States companies -- in spite of the globalization of numerous high-tech industries. Correspondingly, according to the National Counterintelligence Executive's 2006 report to Congress noted in Chapter 4, there has been only one case involving a Deemed Export violation ever brought to trial. The latter is presumed to be attributable largely to the difficulty of obtaining convictions rather than the absence of violations.

One potential reason for the paucity of Deemed Export license applications appears to be the existence of many escapements to the existing protocol as discussed in the previous chapter. A foreign-born individual who becomes a United States citizen and then returns to his or her native country (perhaps with dual citizenship) is not covered by the Deemed Export regulations. United States citizens are exempt from these regulations, yet most cases involving violations (export violations in general) of which the Committee has been made aware of involved United States citizens. Similarly, export-controlled material presented in a classroom containing foreign nationals is not covered if the course is broadly available and advertised in a university catalog.

The criteria for assessing the potential threat that might be posed by a foreign national who is the subject of a Deemed Export license application and whose loyalty is uncertain also seem to be superficial. Under current practice, a very short list of proscribed (generally terrorist-supporting) countries is maintained by the United States government; however, a far longer list is maintained of countries which must be consulted for Deemed Export purposes. Matches against the latter list are based on the individual in question's *current* citizenship or legal permanent residency. It would seem that inadequate distinction is made between an individual who, say, was born and raised in Iran but only recently became a citizen of the UK

and an individual who was born in Iran but moved to the UK and became a citizen of the latter nation shortly after birth. Additionally, it would seem to be important to consider where that individual resided during his or her entire lifetime - not just where he or she was born or where his or her current citizenship has been granted. It is noteworthy that the current BIS interpretation is that the Deemed Export rule does not apply to persons lawfully admitted for permanent residence (i.e., green card holders), *wherever their prior residences may have been.*

Portions of the Deemed Export regulations also appear not to withstand tests of logical consistency, such as the debate over the use of the word "or" as opposed to the word "and" in the definition of "use technology." If "use" is defined as it is at present, only activities that involve the combined information necessary for the "operation, installation, maintenance, repair, overhaul and refurbishing" of a product is subject to regulation. Thus, if *any one* of these functions is *not* involved, the overall activity is *not* subject to regulation. In fact, almost all recent research activity conducted in the nation's universities has been exempted from export controls based at least in part on this interpretation of the EAR definition of "use". But the question arises as to the fundamental efficacy of such a protective scheme when *two* individuals in collusion could each

work on, say, *three* of the functions - thereby gaining full knowledge of all six without triggering any licensing requirement whatsoever.

Finally, the current Commerce Control List (CCL) is too all-encompassing, covering a vast spectrum of minimally important dual-use (commercial and military) technologies ranging from police handcuffs to hunting rifles, and from radios to mass-market electronics. Determining, at a user-level, what is covered by the CCL and the Deemed Export regulations and what is not, is difficult and at times confusing. Even when an item is listed in the CCL there may be many caveats to the listing (attempting to further refine and narrow the scope of the export regulation); one or more export license exception categories listed by codes; and one or more country tables to cross-reference in order to simply determine if an export license is required in the first place. It is difficult to convey this degree of knowledge to the large user-level community where the majority of foreign national interactions occur.

Given the complex and relatively arcane nature of the existing Deemed Export regulations, it is the view of the Deemed Export Advisory Committee that the Department of Commerce and its Bureau of Industry and Security have done a truly remarkable job in seeking to carry out their assigned responsibilities in a balanced, professional fashion.

Recommendations

The Advisory Committee offers two recommendations for an overall revamping of the Deemed Export regulatory regime along with a series of specific implementing actions:

Recommendation 1:
Replace the current Deemed Export licensing process with a simplified new process that will *both* enhance national/homeland security *and* strengthen American's economic competitiveness.

Recommendation 2:
Extend the educational outreach program currently conducted by BIS to help assure that all parties potentially subject to licensing with the Deemed Export rules are familiar with those rules. The need for this recommendation is founded in the highly "uneven" distribution of firms and universities currently seeking Deemed Export licenses.

The implementation of these recommendations will require:

- Increasing the focus on, and building higher fences around, those elements of technical knowledge and military advantage that could have the greatest consequences in the national/homeland security sphere by systematically reviewing the Commerce Control List, with advice from independent experts, to eliminate those items and technologies that have little or no such consequences.

- Establishing a category of "Trusted Entities" involving both academia and industry that voluntarily elect to qualify for special, streamlined treatment in the processing of Deemed Export license applications by meeting certain specified criteria (see Step VI in *Implementing Construct* later in this Executive Summary). U.S. companies and universities would be eligible to qualify with the Department of Commerce all or parts of their organizations as Trusted Entities including, in the case of industry, controlled subsidiaries abroad such that individuals could move within the bounds of that Trusted Entity without the need for separate Deemed Export licenses. It is envisioned that all individuals within a Trusted Entity would be required to sign non-disclosure agreements prohibiting release of controlled information to persons outside that entity. *Only information that is unclassified and does not have a truly significant military consequence would be eligible for inclusion in such a Trusted Entity agreement.*
- Expanding the determination of the national affiliation of potential licensees to include consideration of country of birth, prior countries of residence, and current citizenship, as well as the character of a person's prior and present activities, to provide a more comprehensive assessment of probable loyalties.
- Involving a panel of outside experts in the fields of science and engineering to conduct an annual "sunset" review (i.e., "zero base"

analysis) of the list of technologies subject to the Commerce Control List. The burden of proof should reside with those seeking to add or preserve items on the proscribed list.

- Rendering moot the current distinction drawn between the product of a research endeavor and knowledge regarding the equipment supporting that research.
- Rendering moot the "ordinarily published" definition of fundamental research used in the current licensing process by considering new criteria based on more conventional definitions but allowing for government agencies to explicitly preclude publication of certain research results (e.g., classified research). It is noted, however, that in the event the simpler and more determinative definition proposed here in is not adopted, the fundamental research provisions used in the current licensing process should be maintained since it at least has developed a functional definition and is use in allowing America's research community to continue to help drive our national economic and security competitiveness.
- Rendering moot the "and/or" considerations currently applied in evaluating "use" exemptions to the Deemed Export regulations. The fundamentally new approach to Deemed Export licensing criteria proposed herein avoids the long-enduring "and/or" debate in defining "use" technology and its applicability to Deemed

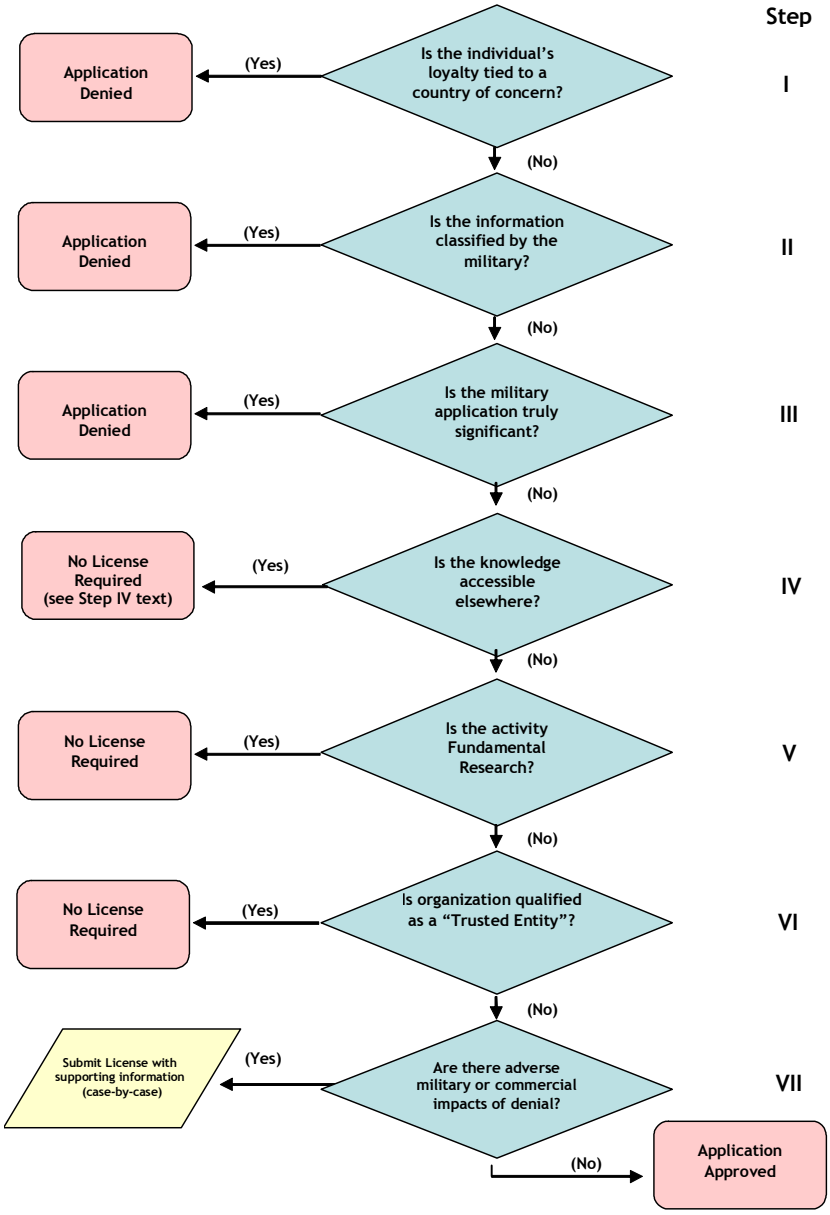
Export regulations. This is accomplished by establishing rules governing the transfer of knowledge that do not require distinguishing among research results, the use of research equipment, manufacturing know-how, or other specific categories of knowledge. It is noted, however, that in the event the simpler and more determinative process proposed herein is not adopted, the "and" provision in the current definition of "use" technology should be maintained since it at least has the virtue of being reasonably widely understood and is useful in allowing America's research community to continue to help drive our national economic and security competitiveness. This is not merely a semantics debate.

- Increasing the use of interactive, web-based self-teaching programs to more broadly familiarize those impacted by the Deemed Export regulatory regime with its understanding and implementation.

Implementing Construct

The proposed Deemed Export Decision Construct is depicted graphically on the following page and consists of seven steps:

FIGURE 1. Seven Step Deemed Export Decision Process



Step I. Conduct an overall assessment of the probable loyalty of the individual of interest, including consideration of the time and character of past and present foreign involvements. The applying organization would provide the names and relevant information concerning individual applicants to the government for review and approval, or disapproved. Approval is to be assumed if no response has been received within 30 days unless the government specifically declares an extension on a case-by-case basis. If such a review indicates a tie of the individual to a country on the United States government's proscribed (generally terrorist-supporting) list or other significant loyalty concerns the application would presumably be denied. If no concern exists, the licensing assessment proceeds to Step II.

Step II. Determine whether or not the information of concern bears a military security classification. Such a determination is to be made within 30 days except under extraordinary circumstances and a list of all overdue determinations is to be provided monthly by the classification authority to the Secretary of Commerce. Security classification is by far the most powerful factor in controlling access to sensitive information. If the information is in fact classified, the application would be denied in all but highly exceptional cases as determined by the government. If the information is not classified, the process proceeds to Step III. (Note that the fact that information

has been deemed to be proprietary is not, in itself, relevant to making the above determinations.)

Step III. Determine whether the military application of the knowledge in question is both substantive and truly significant to the nation. *The approach proposed herein is to build "high walls" around "small fields" rather than, as is present practice, "nominal walls" around "large fields."* Emphasis is to be placed on critical aspects of those few technologies that could produce truly major threats (for example, certain aspects of nuclear weapon related technology, toxic biologic agents, chemical warfare related agents, cryptography - and perhaps a few contemporary, pivotal technological breakthroughs - such as night vision, stealth, advanced composites and electronic countermeasures). In this manner, increased attention can be devoted to those technologies having truly significant consequences from a national security standpoint. If such consequences exist, the technology would be included in the outside-expert annually zero-based Commerce Control List and the application would then be rejected. If not, the process proceeds to Step IV.

Step IV. Determine in a timely fashion whether the knowledge being assessed is readily available from sources outside the United States. Where it can be clearly established that the equivalent technology or knowledge is readily available outside of the United States, no license

is required. (Note: There may exist a small set of technologies/ countries whereby the United States government, as a matter of principle, would choose simply to refuse to provide any assistance whatsoever to an individual even though that assistance can readily be obtained elsewhere.) If the knowledge is not available elsewhere and the above exception does not pertain, the process proceeds to Step V.

Step V. Determine whether the activity at hand is fundamental research and therefore should continue to be excluded from Deemed Export licensing requirements. "Fundamental research" is defined in the current Export Administration Regulations as, "research where the resulting information is ordinarily published and shared broadly within the scientific community." This definition is unique to the regulatory and academic communities, but is rather circular in reasoning and leaves open such issues as what is in fact "ordinarily published" and who is qualified to make such a determination. Nonetheless, the current definition has become somewhat of a *term of art* and has aspects that are not without merit. The alternative definition of fundamental research proposed herein provides that research is excluded from Deemed Export licensing requirements if it (1) falls within a more conventional definition of fundamental research (e.g., "curiosity-driven research seeking new knowledge"); or (2) is not *precluded* from publication in the relevant contractual

documents or other regulatory mechanisms. If the research activity meets either of these conditions, no Deemed Export license would be required; otherwise, the process proceeds to Step VI.

Step VI. Determine whether the organization seeking the license has qualified itself for treatment as a Trusted Entity. A program should be established whereby academic institutions and firms, including controlled overseas subsidiaries, can voluntarily qualify, given BIS approval, for expedited treatment in the Deemed Export licensing process as previously discussed. The benefit of such participation to the organization is that, once qualified, it could transfer people, knowledge and equipment within the boundaries of the qualified entity based on a self-assessment of suitability for licensing with input from appropriate government agencies. To become so-qualified an organization would have to meet a number of criteria such as (1) demonstrate a history of responsible conduct with regard to export control matters, (2) conduct a training program for its workforce to assure awareness of relevant rules and regulations, (3) self-process licensing needs, calling upon the government for input or guidance where appropriate, (4) report periodically on all relevant actions taken, including providing to the government lists of those receiving controlled information, (5) report immediately any violations or deviations that are detected, and (6) be subject to annual audit and re-qualification. It is noted that insofar as industrial firms are

concerned, their interests in protecting sensitive data based on competitiveness considerations are indeed intense and generally coincide with the overall security interests of the government. If a firm or academic institution has qualified as a Trusted Entity it can then make a self-determination of the appropriateness of the proposed transfer action by implementing the seven step process. If it is not a Trusted Entity, the licensing process proceeds to the final stage, Step VII. It should be noted that classified or militarily highly sensitive knowledge would never progress to the point that an organization's qualification as a Trusted Entity would enter into consideration.

Step VII. Determine whether there are remaining material adverse consequences, military, commercial or political, of a particular release and, if so, whether they outweigh the benefits of the release. The purpose of this step is to provide a final "safety-net" to allow consideration of those extraordinary cases that may simply not be addressable by rules intended for the ordinary course of business. It is expected that very few cases should reach this final step, and those that do will have been intensively vetted during the prior six steps. Such cases will necessarily be judged on their individual merits, considering the highest national priorities.

Conclusion

It is the Committee's opinion that by adopting a more rational construct for managing Deemed Exports based on building high walls around small fields comprised only of the most militarily consequential technologies, the nation's security, which depends increasingly on access to the latest commercial technologies generated around the world, can actually be enhanced. That is, the nation will be better served, in balance, by seeking to accelerate its own technical prowess than by seeking to deny potential enemies access to broad avenues of knowledge. The alternative is to find United States-based research and technology efforts "frozen out" from the increasingly trans-national entities conducting such research.

APPENDIX A

Committee Member Biographies

Mr. Norman R. Augustine, DEAC chairman, attended Princeton University where he graduated with a BSE, magna cum laude, and an MSE in Aeronautical Engineering. He was elected to Tau Beta Pi, Phi Beta Kappa and Sigma Xi. In industry he has worked at the Douglas Aircraft Company, LTV Corporation, Martin Marietta Corporation and Lockheed Martin Corporation - at the latter two of which he served as chairman and CEO. In government he served as Assistant Director of Defense Research and Engineering, Assistant Secretary of the Army and Under Secretary of the Army. In academia, he has been a Lecturer with the Rank of Professor on the faculty of Princeton University and is a Trustee Emeritus of Johns Hopkins University and a former member of the Boards of Trustees of Princeton and MIT. Mr. Augustine was Chairman and Principal Officer of the American Red Cross, Chairman of the National Academy of Engineering, Chairman of the Defense Science Board and President of the American Institute of Aeronautics and Astronautics and the Boy Scouts of America. He is a current member of the Boards of Directors of ConocoPhillips and Black & Decker and a former member of the boards of Procter & Gamble and

Lockheed Martin. He has been elected to membership in the American Philosophical Society and the Council on Foreign Affairs and is a Fellow of the National Academy of Arts and Sciences. He was presented the National Medal of Technology by the President of the United States and holds 22 honorary degrees.

Dr. Ruth David, Committee Co-Vice Chairman, is President and Chief Executive Officer of Analytic Services Inc, a not-for-profit corporation that provides research and analytic support for the national security, homeland security, and public safety communities. She previously served as the Deputy Director for Science and Technology at the Central Intelligence Agency and, while in that capacity, represented the agency on numerous advisory bodies, including the National Science and Technology Council and its Committee on National Security. Prior to joining the CIA, Dr. David served in several leadership positions at Sandia National Laboratories, where she began her professional career in 1975. Dr. David is a member and councilor of the National Academy of Engineering and currently chairs a standing committee of the National Research Council for Technology Insight--Gauge, Evaluate, and Review (TIGER). She also is a member of the Homeland Security Advisory Council and serves on several other governmental and nonprofit advisory groups. She earned her advanced degrees in electrical engineering from Stanford University.

The Honorable Sean O'Keefe, Committee Co-Vice Chairman, has served since 2005 as the Chancellor of Louisiana State University and A&M College. Previously, he served as Secretary of the Navy, Deputy Director of the Office of Management and Budget (OMB) and as the Administrator of the National Aeronautics and Space Administration (NASA). In his current duties, Mr. O'Keefe is responsible for a comprehensive research institution that annually receives ~$100 million for government-sponsored research. His current position places him at the crossroads of several critical issues the Committee will consider. Among these will be how to ensure that

the large contribution foreign nationals provide to U.S. research, engineering, and development efforts is consistent with U.S. national security needs. Mr. O'Keefe earned an M.P.A. degree from Syracuse University, and also holds a degree from Loyola University in New Orleans.

Dr. Albert Carnesale is Chancellor Emeritus and Professor at the University of California, Los Angeles (UCLA). He served as Chancellor from 1997-2006, and currently holds professional appointments in the School of Public Affairs and in the Henry Samuel School of Engineering and Applied Sciences. Prior to his service at UCLA, Carnesale was for 23 years at Harvard University, where he was the Lucius N. Littauer Professor of Public Policy and Administration (1974-97), Dean of the John F. Kennedy School of Government (1991-95), and Provost of the University (1994-97).

The Honorable John Engler has held the role of President of the National Association of Manufacturers (NAM), the largest industry trade group in the United States, since 2004. NAM represents small and large manufacturers across industry sectors. As President of NAM, Mr. Engler understands the needs of Americans employed in manufacturing and is a leading advocate for educating the public and policymakers on issues that impact the needs of this sector. In past years, Mr. Engler has worked to promote foreign markets for U.S. manufacturing companies and to win the adoption of Central American Free Trade Agreement in 2005. Throughout his distinguished career, he has focused on U.S. industry competitiveness by encouraging innovation through research and development, intellectual property rights, education and training and visas for skilled foreign workers. He was appointed by Secretary of State Condoleezza Rice to serve on the Advisory Committee on Transformational Diplomacy. In addition, in 2005, Mr. Engler was named Vice Chairman of the President's Advisory Committee for Trade Policy and Negotiations. Mr. Engler is a former three-term governor of Michigan where he helped create more than 800,000 new

jobs during his tenure. Prior to becoming Governor, Mr. Engler served in the Michigan legislature for twenty years and was the youngest person ever elected to the Michigan State House of Representatives. Mr. Engler is a graduate of Michigan State University with a degree in Agricultural Economics and earned a law degree from the Thomas M. Cooley Law School.

Dr. Anthony A. Frank received his BA in Biology from Wartburg College and his Doctor of Veterinary Medicine from the University of Illinois. He completed a Ph.D. in toxicologic pathology and residencies in pathology and toxicology at Purdue University. He served on the faculty at Oregon State University where his research focused on chemical carcinogens and teratogens before joining Colorado State University in 1993 where he served as Chair, Department of Pathology and Associate Dean for Research, College of Veterinary Medicine and Biomedical Sciences and later as the Vice President for Research and Information Technology. He currently serves as Colorado State's Provost & Senior Vice President. Dr. Frank is board certified in veterinary toxicology and pathology and his recent research has focused on aerosol models of tuberculosis. He is experienced in the fields of biotechnology, biosecurity including select agent containment and aerosols, and intellectual property.

General John A. Gordon (U.S. Air Force, Retired) served in the White House as the President's Homeland Security Advisor from June 2003 until June 2004 and as the Deputy National Security Advisor for Counter Terrorism and the National Director for Counter Terrorism from June 2002 to June 2003. Prior to joining the White House team, General Gordon was the first administrator of the National Nuclear Security Administration and Undersecretary of Energy, responsible for the entirety of the nation's nuclear weapons program, serving from June 2000 until June 2002. As an Air Force four-star general, he was the Deputy Director of Central Intelligence from October 1997 until June 2000. General Gordon's thirty-two year Air Force career included significant concentration on research

and development, strategic planning, missile and space operations, inter-governmental operations, and international negotiations. General Gordon holds an M.S. degree in physics and an M.A. degree in business administration.

General Gordon is a now private consultant and serves on the boards of several corporations and non-profit organizations.

Dr. Eva J. Pell, a John and Nancy Steimer Professor of Agricultural Sciences, was appointed Vice President for Research and Dean of the Graduate School at The Pennsylvania State University during the Board of Trustees meeting in January 2000. She served in this position on an interim basis from July 1, 1999 until that time. On May 12, 2006, the Board of Trustees approved the recommendation for her title to change to Senior Vice President for Research and Dean of the Graduate School. In Dr. Pell's portfolio is oversight of the Defense Related Research Units (DDRU) including the Applied Research Laboratory. The DDRU account for one-fifth of The Pennsylvania State University's research expenditures annually and bring Penn State to the position of second nationally in DOD-sponsored research according to data provided by the NSF. Dr. Pell earned a B.S. in biology from City College of the City University of New York in 1968, and a Ph.D. in Plant Biology from Rutgers University in 1972. She was appointed as an Assistant Professor of Plant Pathology at Penn State in 1973. She was promoted to Associate Professor in 1978 and Professor of Plant Pathology in 1983. In 1991 she was named Distinguished Professor of Plant Pathology, and in 1995 was named the Steimer Professor of Agricultural Sciences. Dr. Pell's research focused on the impact of air pollutants on vegetation and her research spanned from the molecular to the ecophysiological. She was the recipient of grants totaling more than $7 million. She is the author or co-author of over 100 publications and more than 65 abstracts. In 2003, she was elected as a Fellow of the American Association for the Advancement of Science (AAAS). Dr. Pell serves on numerous national committees

and organizations. Dr. Pell was the 2003-2004 President of AAU's Association of Graduate Schools and was chair of NASULGC's Council of Research Policy and Graduate Education from 2004-2005.

Dr. James N. Siedow received his BA from the University of Texas at Austin in 1969 and completed his Ph.D. in plant biochemistry from Indiana University in 1972. He did postdoctoral research at the University of Michigan and Rice University before joining the Duke faculty as an Assistant Professor of Botany in 1976. He became a Full Professor of Botany in 1987 and a Professor of Biology in 2000. He was a recipient of the Trinity College Distinguished Teaching Award in 1984. Past service at Duke includes election to the Executive Committee of the Academic Council (1992-93) and as Chair of the Academic Council (1994-96). He also served as the Dean of Faculty Development in Arts and Sciences from 1997-99. He became Vice Provost for Research in January, 2001. Professionally, Dr. Siedow has held numerous positions in the American Society of Plant Biologists (ASPB), including President, Chair of the Board of Trustees, Secretary, and Chair of the Public Affairs Committee. He is currently chair of the ASPB Education Foundation. He also currently serves as the Chair of the Board of Directors of the Oak Ridge Associated Universities. He spent a year as a Program Director of the Cellular Biochemistry Program at the National Science Foundation in 1998-99. He is an elected Fellow of the American Association for the Advancement of Science (2002) and the American Society of Plant Biologists (2007). He has served as an Associate Editor of Plant Physiology and is currently an Associate Editor of the Journal of Biological Chemistry and Plant Molecular Biology and a member of the Editorial Boards of Current Opinion in Plant Biology and Genome Biology. His research has involved the study of oxidative processes in higher plants with an emphasis on processes related to plant respiration. A primary project in his laboratory has involved characterizing the structural and regulatory features of the unusual cyanide-resistant oxidase found in all plant mitochondria. In addition, a long-term collaboration with a

group at North Carolina State University led to elucidating the molecular mode of action of the toxin associated with the fungus responsible for Southern Corn Leaf Blight.

Mr. Michael Splinter is President and Chief Executive Officer, as well as member of the Board of Directors of Applied Materials, the global leader in nanomanufacturing technology solutions for the electronics industry. Prior to joining Applied Materials, Splinter was an executive at Intel Corporation for nearly 20 years. As a member of the Technology CEO Council, Splinter is helping drive new U.S. federal public policy. He serves on the board of Semiconductor Equipment and Materials International (SEMI), a global association representing the collective interests of the equipment and materials industry. He also is Chair of the board of directors for the Silicon Valley Leadership Group, an organization of CEOs focused on quality of life issues affecting their employees. Internationally, Splinter is a member of the Governors' Council of the World Economic Forum.

Dr. William A. Wulf is currently a University Professor at the University of Virginia. He was formerly the President of the National Academy of Engineering, an Assistant Director of the National Science Foundation, Founder and CEO of Tartan Laboratories Inc., and a Professor of Computer Science at Carnegie Mellon University. Dr. Wulf is a member of the National Academy of Engineering, a Fellow of the American Academy of Arts and Sciences, a Fellow of the American Philosophical Society, a Corresponding Member of the Academia Espanola De Ingeniera, a Member of the Academy Bibliotheca Alexandrina (Library of Alexandria), a foreign member of the Engineering Academy of Japan, and a Foreign Member of the Russian Academy of Sciences and the National Academy of Engineering of Venezuela. He is also a Fellow of five professional societies: the ACM, the IEEE, the AAAS, IEC, and AWIS. He is the author of over 100 papers and technical reports, has written three

books, holds two US Patents, and has supervised over 25 Ph.D.'s in Computer Science.

APPENDIX B

Deemed Export Advisory Committee Charter

The Secretary of Commerce ("Secretary"), pursuant to duties imposed by law upon the Department, including the Export Administration Act of 1979, as amended (50 U.S.C. app. §§ 2401-2420 (2000)), the International Emergency Economic Powers Act (50 U.S.C. §§ 1701 - 1706 (2000)), and the Federal Advisory Committee Act, (5 U.S.C. app. § 2 (2005)), and with the concurrence of the General Services Administration, hereby renews the Deemed Exports Advisory Committee (DEAC).

OBJECTIVES AND DUTIES

1. The DEAC will develop recommendations for possible improvements to policies on the transfer of technology or source code subject to the Export Administration Regulations to persons within the United States. These recommendations are intended to be used by the Secretary, the Under Secretary for Industry and Security ("Under Secretary"), and the Department of Commerce's Bureau of Industry and Security ("BIS") in revising, as appropriate, its controls on such exports.

2. The DEAC will update the Secretary regularly on its progress during the development of its recommendations and will agree upon the contents of its recommendations before advising the Secretary to adopt any or all of them.

3. The DEAC will function solely as an advisory body and will comply with the requirements of the Federal Advisory Committee Act.

MEMBERSHIP

1. The DEAC shall not exceed 12 members to be appointed by the Secretary to assure a balanced representation of views among business executives, university administrators, and other experts in the field. Members will be Special Government Employees.

2. Members shall have a current Secret clearance in order to analyze intelligence products relevant to their work.

3. Each member shall be appointed for 12 months and will serve at the discretion of the Secretary. Appointments shall be renewable for additional terms.

4. The Secretary shall appoint the Chairperson or Co-Chairpersons. The Secretary may also appoint one or more Vice-Chairpersons.

5. Members will be subject to all ethical standards and rules applicable to Special Government Employees.

6. Members will be selected on a clear, standardized basis, in accordance with applicable Department of Commerce guidance.

ADMINISTRATIVE PROVISIONS

1. The DEAC shall report on its activities and recommendations to the Secretary or to other individuals within the Department of Commerce that the Secretary may designate.

2. The Secretary shall appoint the Under Secretary as the Executive Director of the DEAC. The Under Secretary shall not be a member of the DEAC.

3. The Director of BIS's Office of National Security and Technology Transfer Controls shall be the DEAC Designated Federal Official (DFO), and Committee staffing will be coordinated through his/her office.

4. The DEAC shall meet as deemed necessary by the Secretary, but in no case less than quarterly.

5. BIS shall provide funding and administrative support for the Committee.

6. Members of the DEAC shall not be compensated for their service, but shall on request be allowed travel expenses, including per diem in lieu of subsistence, as authorized by law for persons serving intermittently in government service (5 U.S.C. §§ 5701 - 5707), consistent with the availability of funds.

7. The DEAC may establish subcommittees of its members as necessary, subject to the relevant provisions of the Department of Commerce Committee Management Handbook. The Secretary or his designee shall designate the Chairperson and members of any subcommittee.

8. The annual cost of operating DEAC is estimated to be $150,000, which includes 0.5 person years of staff support.

9. The DFO or his/her delegee shall be responsible for filings and other applicable statutory requirements of the Federal Advisory Committee Act.

DURATION

This charter shall terminate 12 months from the date of filing with the appropriate U.S. Senate and House of Representatives Oversight Committees, unless earlier terminated or renewed by proper authority.

Dated: June 6, 2006
Renewed on: May 10, 2007

Signed by: Chief Financial Officer and Assistant Secretary for Administration, U.S. Department of Commerce

APPENDIX C

Legal, Policy Basis, and History of Deemed Export Controls

In order to understand the genesis of the "Deemed Export Rule," an understanding of the legislative background surrounding the control of dual-use (civilian and military) technology is vital. For the purposes of the Deemed Exports Advisory Committee's (DEAC) tasking, the fundamental legislative basis for controlling dual-use exports by the Department of Commerce was not addressed, although the issue was raised in many of the public comments and presentations received by the Committee.

Export Administration Act

The Export Administration Act of 1979, as amended (EAA) provides the Executive Branch the authority to oversee the export and reexport of certain items from the United States. The EAA has been in lapse since August 21, 2001, when Congress failed to agree on an extension. In the absence of an Export Administration Act [EAA], the U.S. dual-use export control system continues to be dependent on the President's invocation of the emergency powers provided to the

executive branch by Congress under the International Emergency Economic Powers Act.

The Export Administration Regulations (EAR), written and administered by the Department of Commerce, Bureau of Industry and Security (BIS), is the set of federal regulations that implement the EAA. It is codified in the federal regulation at 15 CFR Parts 300-744. Specific regulatory sections ("§") of the EAR are noted throughout this report.

Deemed Export Rule

The Deemed Export Rule is reflected in several provisions of the EAR. The most basic provision is found at §734.2(b)(2) which provides that an export is subject to the EAR if that export takes the form of:

> "(ii) Any release of technology or source code subject to the EAR to a foreign national. Such release is deemed to be an export to the home country or countries of the foreign national. This deemed export rule does not apply to persons lawfully admitted for permanent residence in the United States and does not apply to persons who are protected individuals [persons granted political asylum] under the Immigration and Naturalization Act (8 U.S.C. 1324b(a)(3))…"

Several key terms found in the definition of the Deemed Export Rule must themselves be defined in order to fully understand the scope and impact of the Rule. These terms, documented exactly as they appear in the EAR, include:

Release: (§734.2(b)(3)) Technology or software is "released" for export through:

(i) Visual inspection by foreign nationals of U.S.-origin equipment and facilities;

(ii) Oral exchanges of information in the United States or abroad; or

(iii) The application to situations abroad of personal knowledge or technical experience acquired in the United States.

Technology: (§772) Specific information necessary for the "development", "production", or "use" of a product. The information takes the form of "technical data" or "technical assistance". Controlled "technology" is defined in the General Technology Note [see definition below] and in the Commerce Control List (Supplement No. 1 to part 774 of the EAR).

Development: (§772) "Development" is related to all stages prior to serial production, such as: design, design research, design analyses, design concepts, assembly and testing of prototypes, pilot production schemes, design data, process of transforming design data into a product, configuration design, integration design, layouts.

Production: (§772) Means all production stages, such as: product engineering, manufacture, integration, assembly (mounting), inspection, testing, quality assurance.

Use: (§772) Operation, installation (including on-site installation), maintenance (checking), repair, overhaul and refurbishing.

Technical Assistance: (§772) May take forms such as instruction, skills training, working knowledge, consulting services.

Technical Data: (§772) "Technical data".--May take forms such as blueprints, plans, diagrams, models, formulae, tables, engineering designs and specifications, manuals and instructions written or recorded on other media or devices such as disk, tape, read-only memories.

Source Code: (§772) (or source language) A convenient expression of one or more processes that may be turned by a programming system into equipment executable form ("object code" (or object language)).

General Technology Note: (Supplement No. 2 to §774) The export of "technology" that is "required" for the "development", "production",

or "use" of items in the Commerce Control List (CCL) is controlled according to the provisions of each CCL Category. "Technology" "required" for the "development", "production", or "use" of a controlled product remains controlled even when applicable to a product controlled at a lower level.

Deemed Export License Process Introduction

[The information below was requested by and provided to the Deemed Export Advisory Committee by the Bureau of Industry and Security for use in this report.]

According to the U.S. Department of Commerce, Bureau of Industry and Security (BIS), the vast majority of deemed export license applications involve releases of controlled semiconductor, computer and telecommunications technology (Categories 3, 4 and 5 on the Commerce Control List).

In FY07, 1,056 deemed export license applications were processed by BIS. The number of foreign nationals involved may be somewhat higher, because one application may include multiple foreign nationals. Most license applications are submitted because a U.S. company wishes to hire a foreign national as a permanent full-time employee in the United States; other cases involve foreign national contractors, researchers and interns pursuing academic programs at universities who are subsequently hired by their company or university. In addition, some cases may involve deemed re-export licenses for third-country nationals working with U.S. technologies outside of the United States. Approximately 30% of licenses processed on an annual basis are for renewals and upgrades to existing authorizations.

Only a very small fraction (less than 1%) of deemed export license applications are denied, but many deemed export license cases have

extended processing times due to concerns presented by the applications. Deemed export license applications are processed in an average of 40 Executive Order (EO) days[1].

Six Licensing Process Steps

Under the current Deemed Export procedures, an exporter/applicant is expected to address, prior to submitting an application, is to ensure that the technology or software is appropriately classified. Exporters are expected to make every effort to classify their own technology using the guidance provided in the EAR. However, BIS does provide assistance in the form of official advisory opinions and commodity classifications if requested or required. Should an exporter require support in this area, a request may be submitted to BIS either in advance of the license application or along with it.

Step 1: Submitting the Application

The exporter may submit a deemed export license application either by mail or online. The Redesigned Simplified Network Application Process (SNAP-R) online filing system allows exporters to not only attach supporting documentation but also provides them with a method for tracking application status every step of the way as well as the ability to contact the licensing officer specifically assigned to process the application.

Step 2: Registration

When the paper application is completed and arrives at the Department of Commerce, it is reviewed for accuracy and then logged into the Export Control Automated Support System (ECASS) by personnel in the Technical Support Division. This process is known as "registration".

1. Processing time is measured by the Department of Commerce in "Executive Order (EO) days." EO days indicate that the average does not take into consideration days during which the case may have been on "Hold without Action (HWA)".

Once the application has been registered, ECASS automatically routes it to the appropriate Division responsible for that particular item. All deemed export license applications are forwarded to the Deemed Export and Electronics Division (DEED) within the Office of National Security and Technology Transfer Controls (NSTTC) and subsequently assigned to one of five deemed export licensing officers on staff.

With the online SNAP-R system, the information provided by the exporter is automatically transferred into ECASS. Nearly all license applications received by BIS are submitted online.

Step 3: Verifying the Classification and Requirement for a License

Upon receiving the application, the licensing officer is tasked with ensuring that the request contains sufficient information to make an appropriate classification or licensing decision. The licensing officer does this by reviewing the technical description and specifications of the technologies and comparing this information to the entry requirements on the Commerce Control List (CCL).

Sometimes the licensing officer may find that the application does not contain sufficient information to make a classification decision. As indicated in step 2, the initial screening process ensures that the application form is filled out completely. However, those engaged in the "registration process" do not have the subject matter expertise to determine whether the technical specifications and transaction information are sufficient for making a classification and licensing decision. In these cases, the license application may be "Returned without Action (RWA)", with a request for more information or be placed on "Hold Without Action (HWA)" while awaiting additional data.

Once the licensing officer has verified the Export Control Classification Number of the item proposed for export, the licensing officer must then determine if an export license is required. If a determination is made that a license is required, the licensing officer will continue with the review and processing of the application. If

not, the application may be "RWA'd" because the exporter requested a license for non-controlled technology. Other reasons for RWA'ing an application are described in Step 4, below.

Step 4: Conducting a Technical Review of the Proposed Transaction and Applicant

In the case of a deemed export license application, BIS requires that personal information on the foreign national at issue be submitted and reviewed.

Exporters must provide the following information before an application can be referred to the other reviewing agencies: 1) the foreign national's resume listing all educational institutions attended beyond high school, with street addresses and degrees and/or certificates received, all positions held, with employers' names and street addresses, and brief description of work done at each position. Resumes should have gaps no greater than 30 consecutive days and also include brief abstracts of all scientific and technical papers published, presentations at scientific and technical conferences; 2) copy of visa or other documentation such as the Employment Authorization Card; paperwork should include any information on immigration status foreign national has in other countries, such as dual citizenship; 3) copy of full passport; 4) letter of explanation detailing the scope of the technologies to be released, where the release will take place and the job description of the individual. The applicant should also address the availability abroad of comparable foreign technologies or software; 5) applicant's internal technology control plan (TCP). As a guideline, the TCP may address the organization's corporate commitment to export compliance, its physical security and information security plan, personnel screening procedures, training and awareness program and self evaluation program.

Applicants are also expected to address whether or not the end-user has any strong ties to the United States (e.g., family here), ties to his/her home country (bank account, immediate family, etc.), as well as

any special benefits or expertise the foreign national brings to the applicant (i.e., what specific skills the foreign national offers the company).

The application may be RWA'd for a variety of reasons such as a lack of sufficient information to classify the technologies or verify the bonafides of the end-user. Often, it is determined that a license is not required based on a review of the particular technologies and the foreign national's country of citizenship/permanent residency. There may also be license exceptions available.

Alternatively, the licensing officer may place the application on HWA and contact the company for additional information (such as updated visa documentation for the end-user or clarifications on the technologies to be released). When an application is placed on HWA, the clock stops for purposes of calculating the license review period until the exporter provides the additional information. Upon receipt of such information, the case is taken out of the hold queue. If the requested information is not submitted within a 10-day period, the application may then be RWA'd. According to statutory requirements, BIS has 9 days during which to review the additional information and refer the application to the other reviewing agencies.

As cases are referred to the other agencies, the licensing officer also submits the applications for intelligence checks to the FBI and may utilize the CIA's Trade Reports (TRs). In addition, the Department of Commerce's export database is checked for licensing history, including any previous approvals or denials.

Step 5: Interagency Review Process

As noted in Step 3, BIS annually RWAs approximately 14% of all deemed export license applications and therefore, some applications never reach the interagency review process.

All deemed export cases are reviewed by the Departments of Defense and State. Certain applications such as those with nuclear proliferation, missile technology and chemical/biological controls as

well as those dealing with certain items, including technologies, in Category 3 are reviewed by the Department of Energy.

Agencies have 30 days to submit their recommendations. Within 10 days of receipt of a referral, the reviewing agency must advise BIS of any information not contained in the supporting documentation. The time that elapses between the date the information is requested by the reviewing agency and the time it is received does not count in the processing time frames (§750.4 of the EAR). If agencies concur in the recommendation made by the Department of Commerce, the application will be approved or denied accordingly. If there is disagreement among agencies, the application enters the dispute resolution process. In addition to the interagency review process, all deemed export licenses require an intelligence and law enforcement check. This is conducted concurrently during the interagency review process. The FBI conducts a search of its name check database and the CIA provides information via its TRs.

Dispute Resolution

The Operating Committee (OC), chaired by the Department of Commerce, is the first level of interagency dispute resolution forum and is composed of career government employees from all reviewing agencies. The OC meets once a week to discuss disputed license applications. The OC is comprised of representatives from each of the reviewing agencies. Most disputes are resolved at this level.

If agreement is not reached in the OC, the case is escalated to the Advisory Committee for Export Policy (ACEP) at the assistant-secretary level. This committee meets monthly and is also chaired by the Department of Commerce and requires a majority vote for a decision to be rendered. If disagreement cannot be resolved by the ACEP, a request for escalation to the cabinet-level Export Administration Review Board (EARB) by any dissenting agency must be made within 5 days of the decision of the OC Chair.

Cases not resolved by the EARB may be escalated to the President of the United States for resolution. Cases rarely reach the level of the President unless the U.S. Government is about to make a major foreign policy change with a particular country.

In order to ensure a timely response to license applications, Executive Order 12981 has established deadlines for each step of the licensing process. For example, if a case is escalated to the EARB, the total processing time allowed for a license is 90 days. The following diagram depicts this process.

The Department of Commerce refers applications to other agencies within 9 days of receipt. Other agencies then have 30 days to submit their positions to Commerce. If agencies disagree on how to resolve the case, the matter must be submitted to the interagency Operating Committee (OC) for resolution within 14 days. If unresolved by the OC, the case must then be submitted to the Advisory Committee on Export Policy (ACEP) within 5 days. If unresolved by the ACEP, the case must be submitted to the Export Administration Review Board (EARB) within 5 days. If unresolved at the EARB level, the case may be referred to the President for final resolution within 5 days. The President's decision constitutes the final resolution of the disagreement.

Step 6: Decision to Applicant

A license is issued to the applicant if the final resolution is an approval or approval with conditions. The license is sent by mail and is also available for print through the SNAP-R system. In addition, information is also available to the exporter through BIS' voice activated telephone attendant. If the Department is planning to deny the application, an "Intent to Deny" letter is issued to the exporter notifying it of the impending action. The letter provides the exporter with 20 days to appeal the decision. If no response is received during the 20-day grace period, the official license denial is generated on the

45th day after the date of notification. Exporters must keep records, including supporting documentation and copies of the export license for 5 years (Part 762.6 of the EAR).

Recent Process Changes

In recent years, BIS has made a number of changes in the processing of deemed export licenses. For example:

- The standard license is valid for twenty-four months. However, in an effort to facilitate the licensing process, BIS has received inter-agency agreement to match the expiration date of a deemed export license to that of the end-user's visa. Therefore, a license may be valid for as long as thirty-six months. If the end-user's visa is to expire in under twenty-four months, the license will be issued for the standard period.
- To assist the exporter in the continuity of operations, BIS will automatically issue a six-month extension. The exporter must submit a license application renewal within 45-days of the expiration in addition to requesting an extension of the current license.
- To expedite cases for exporters, BIS has received interagency agreement to process technology upgrade licenses within a 20 day period.

Samples of Approved License Conditions (Provisos)

The following are examples of the type of conditions (also known as "provisos" in U.S. Munitions List export licenses issued by the U.S. Department of State) an exporter may see on a deemed export license issued by BIS after it has been approved through the interagency process:

1. As outlined and/or constrained by the conditions placed on this license, the applicant is authorized to release to the foreign national technology and software controlled under the following ECCNs:

a) Design technology controlled under 3E001 for items controlled under 3A001.A.3.C only) and 3E002;

b) 4D001 software for the design and use of items controlled under 4A003.C;

c) 4D002 software to support 4E001.A technology for items controlled under 4A003.C ONLY;

d) 4D003.A software;

e) Design and use technology controlled under 4E001.A (for items controlled under 4A003.C ONLY);

f) 5D001.B software to support technology controlled under 5E001.B.3, 5E001.B.4, or 5E001.C.1;

g) 5D001.C.3 software;

h) 5D001.D.1 software;

i) Design technology controlled under 5E001.B.3 or 5E001.B.4 for commercial products and;

j) Design technology controlled under 5E001.C.1 for commercial products.

The transfer of controlled technology and software shall be limited to the minimum needed by the foreign national in his/her role as described in the license application. Any further request for access to controlled technical data or software subject to the Export Administration Regulations (EAR) not authorized under this license would require prior approval of the Department of Commerce's Bureau of Industry and Security.

2. Technology for integrated circuits with physical gate lengths smaller than 13 nanometers shall not be transferred.

3. Involvement in the design of information technology products with an adjusted peak performance (APP) level above 0.4 weighted teraflops (wt), or components to support aggregation above 0.4 wt, is not authorized. "Use" of computers with an APP above the current tier III "use" levels (0.75 wt) must be controlled and monitored to ensure that only job-related work is performed.

4. No access to technology for the design, development or production of x-ray, e-beam, EUV or laser lithography equipment.

5. The transfer of manufacturing process software and technology for integrated circuits is limited to the minimum required to enable software and design engineers to coordinate with process engineers on circuit layout, design/design rules and lithography design, to achieve process/production compatibility.

6. Access is limited to MOS technology, including BI-POLAR, BI-MOS, BI-CMOS, and CMOS. Access to compound semiconductor technology (e.g., gallium arsenide (GAAS)) is not authorized. Access to silicon-on-insulator (SOI) and silicon-on-sapphire (SOS) technologies is not authorized.

7. The applicant will ensure that the foreign national does not have access to controlled technology required for the design or development of analog-to-digital converters controlled by 3A001.A.5.A.4 or 3A001.A.5.A.5.

8. Access to radiation hardened integrated circuits and technology associated with their development or production, as defined by ECCN 3A001.A.1 and 3E001 is not authorized.

9. No access to technology for the design or development of items controlled by 3A001.B.2 or 3A001.B.4.

10. Access to optical computer technology or neural network technology is not authorized.

11. The validity period of this license is limited to two (2) years from the date of issuance providing the end-user maintains a valid visa and

does not violate the work restrictions, if any, associated with the visa class.

12. The applicant shall maintain a record of when the foreign national obtains his/her permanent resident states (i.e., green card), or changes his/her visa status (i.e., between B-1, L-1 F-1, H-1B, etc.), or leaves the company prior to obtaining permanent resident status. The applicant shall maintain this information on file and provide it upon request to BIS.

13. Prior to transfer of technology, the applicant shall inform the foreign national in writing of all license conditions and his/her responsibility not to disclose, transfer or re-export any controlled technology, without prior U.S. government approval. The foreign national will certify in writing that he/she has been advised of and understands the terms and conditions of this license and that he/she will not disclose, transfer or re-export any technology without authorization from BIS, if such authorization is required under the EAR.

14. The applicant will establish an internal technology control plan (TCP) to ensure compliance with the conditions of this license, particularly those regarding limitations on access to technology by foreign nationals. The applicant's key export control management officials will ensure that the foreign national complies with conditions 1 - 14. A copy of such procedures will be provided to DOC/BIS.

Information Not Subject to the EAR

§734.7-10 of the EAR defines certain categories of information that are not subject to the EAR and therefore cannot require a license from BIS. Although there are many caveats to each of these categories, they generally include:

- Published information and software that is generally accessible to the public in any form. (§734.7)
- Information arising during or resulting from fundamental research, including basic and applied research in science and engineering where the resulting information is ordinarily published and shared broadly within the scientific community. (§734.8)
- Educational information, including information released by instruction in catalog courses and associated teaching laboratories of academic institutions. (§734.9)
- Patent applications, including information contained in a patent application prepared wholly from foreign origin technical data where the application is sent to a foreign inventor to be executed and returned to the United States for subsequent filing with the U.S. Patent and Trademark Office. (§734.10)

APPENDIX D

National Security Decision Directive (NSDD) 189 - Fundamental Research

NATIONAL SECURITY DECISION DIRECTIVE (NSDD) 189

September 21, 1985

NATIONAL POLICY ON THE TRANSFER OF SCIENTIFIC, TECHNICAL AND ENGINEERING INFORMATION

I. PURPOSE

This directive establishes national policy for controlling the flow of science, technology, and engineering information produced in federally-funded fundamental research at colleges, universities, and laboratories. Fundamental research is defined as follows:

"'Fundamental research' means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, pro-

duction, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons."

II. BACKGROUND

The acquisition of advanced technology from the United States by Eastern Bloc nations for the purpose of enhancing their military capabilities poses a significant threat to our national security. Intelligence studies indicate a small but significant target of the Eastern Bloc intelligence gathering effort is science and engineering research performed at universities and federal laboratories. At the same time, our leadership position in science and technology is an essential element in our economic and physical security. 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.

In 1982, the Department of Defense and National Science Foundation sponsored a National Academy of Sciences study of the need for controls on scientific information. This study was chaired by Dr. Dale Corson, President Emeritus of Cornell University. It concluded that, while there has been a significant transfer of U.S. technology to the Soviet Union, the transfer has occurred through many routes with universities and open scientific communication of fundamental research being a minor contributor. Yet as the emerging government-university-industry partnership in research activities continues to grow, a more significant problem may well develop.

III. POLICY

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. Each federal government agency is responsible for: a) determining whether classification is appropriate prior to the award of a research grant, contract, or cooperative agreement and, if so, con-

trolling the research results through standard classification procedures; b) periodically reviewing all research grants, contracts, or cooperative agreements for potential classification. No restrictions may be placed upon the conduct or reporting of federally-funded fundamental research that has not received national security classification, except as provided in applicable U.S. Statutes.

APPENDIX E

List of Scheduled Meetings, Speakers, Presenters and Public Commentators

A complete listing of all of the Deemed Export Advisory Committee's meeting minutes may be found on the Department of Commerce's website at http://tac.bis.doc.gov.

October 16, 2006 in Washington, D.C.

Department of Commerce, Herbert C. Hoover Auditorium

Scheduled Speakers and Presenters:

- The Honorable Carlos Gutierrez, Secretary of Commerce
- Mr. Mario Mancuso, Under Secretary of Commerce for Industry and Security
- Mr. Mark Foulon, Under Secretary of Commerce for Industry and Security
- Mr. David Sampson, Deputy Secretary of Commerce
- Mr. David McCormick, Deputy National Security Advisor, National Security Council
- Dr. Sharon Hayes, Associate Director, White House Office of Science and Technology Policy

Public Comments:

- Mr. Terry Murphy, M.K. Technologies
- Mr. William Root, Independent Consultant
- Mr. Jonathan Epstein, Holland Knight LLP

January 22 and 23, 2007, in Santa Clara, CA

American Electronics Association's (AeA) Conference Room

Scheduled Speakers and Presenters:

- Dr. Authur Bienenstock, Stanford University
- Mr. Donald A. Weadon, Jr., Weadon and Associates
- Mr. Steve Kott, Manager, Global Trade, Advanced Micro Devices (AMD)
- Mr. William B. Linscott, The Boeing Corporation
- Ms. Kathleen Gebeau, Qualcomm Corporation
- Mr. Larry Christensen, Vice President, J.P. Morgan Chase Vastera, Inc.

May 2, 2007 in Atlanta, GA

Georgia Institute of Technology, Georgia Tech Research Institute (GTRI) Conference Center

Scheduled Speakers and Presenters:

- Dr. G. Wayne Clough, President, Georgia Institute of Technology
- Dr. Winfred M. Phillips, Vice President for Research, University of Florida
- Dr. Charles Liotta, Vice Provost for Research and Dean of Graduate Students, Georgia Institute of Technology
- Mr. David Brady, Director of Export and Secure Research Compliance, Virginia Polytechnic Institute and State University

Public Comments:

- Mr. Charles Brown, Special Assistant to the Provost, Georgia Institute of Technology
- Ms. Jamie Louis Keith, Vice President and General Council, University of Florida
- Mr. Dean Sutter, Associate Director of Infrastructure Packaging Research Center, Georgia Institute of Technology
- Ms. Catherine Robinson, Associate Director, High Technology Trade Policy, National Association of Manufacturers
- Ms. Giovanna M. Cinelli, Partner, Patton Boggs, LLP
- Dr. John Childress, Director, Division of Sponsored Research, Vanderbilt University

June 19, 2007 in Cambridge, MA

Massachusetts Institute of Technology (MIT), Building 10-250

Scheduled Speakers and Presenters:

- Dr. Claude Canizares, Vice President of Research and Associate Provost, Massachusetts Institute of Technology
- Ms. Sheila Widnall, Distinguished Professor at the Massachusetts Institute of Technology (and former Secretary of the Air Force)
- Mr. Steve Kott, Manager, Global Trade, Advanced Micro Devices (AMD)
- Mr. Jon Goding, Principal Engineering Fellow, Raytheon Corporation (Florida Operations)
- Mr. John Barker, Arnold and Porter LLP
- Dr. Carrie Wolinetz, Federation of American Societies for Experimental Biology
- Mr. Jonathan Wise, ISTAC Chair and Export Classification Manager, Agilent Technologies

Public Comments:

- Mr. Lawrence K. Disenhof, Group Director, Export Compliance, Cadence Design Systems, Inc.
- Mr. Geoffrey E. Grant, Vice President for Research Administration, Partners Healthcare
- Ms. Catherine Robinson, Associate Director, High Technology Trade Policy, National Association of Manufacturers

July 30 and 31, 2007 in Chicago, IL

University of Chicago, Donnelly Biological Sciences Learning Center Conference Room

Scheduled Speakers and Presenters:

- Dr. Keith Moffat, Deputy Provost for Research and Professor of Biochemistry and Molecular Biology, University of Chicago
- Mr. Gerald L. Epstein, Center for Strategic and International Studies
- Mr. Robert Rarog, Export Policy Manager, Sun Microsystems

September 10, 2007 in Washington, D.C.

Department of Commerce, Main Auditorium

Scheduled Speakers and Presenters:

- The Honorable Carlos Gutierrez, Secretary of Commerce
- Mr. Mario Mancuso, Under Secretary of Commerce for Industry and Security
- Mr. Melvin Schwechter, Co-Chair, Export Compliance and Facilitation Committee of the American Association of Exports and Importers (AAEI); Partner, LeBoeuf Lamb, Greene & MacRae LLP
- Ms. Julie Le Crosse, Chair, Export Controls Committee, American Electronics Association (AeA)

- Mr. William Root, Independent Consultant
- General Brent Scowcroft, former National Security Advisor to President George H.W. Bush

Public Comments:

- Ms. Catherine Robinson, Associate Director, High Technology Trade Policy, National Association of Manufacturers