INTERNATIONAL SPACE EXPLORATION AND CRITICAL TRANSPARENCY OF *BASIC* RESEARCH: IMPACT OF THE U.S. INTERNATIONAL TRAFFIC IN ARMS REGULATIONS

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I. INTRODUCTION

In January 2004, President George W. Bush announced a Vision for Space Exploration (VSE) that, in part, encouraged and mandated for the United States the pursuit of "opportunities for international participation to support U.S. space exploration goals."[1] In recent years, however, U.S. scientists have expressed a significant and growing frustration with their inability to collaborate and exchange information and research data effectively with foreign colleagues in pursuing that mandate for space exploration. The source of much of this frustration has been the confusion caused by inconsistencies in the interpretation and application of pivotal terms, such as "basic research," "fundamental research," "applied research," and "public domain" as these terms appear primarily in the U.S. Interna-

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[1] *See* Press Release, The Whitehouse, President Bush Announces New Vision for Space Exploration Program (January 14, 2008), http://www.whitehouse.gov/news/releases/2004/01/20040114-3.html.

tional Traffic in Arms Regulations (hereinafter the ITAR) and enabling documents.[2] These regulations were intended and drafted principally to protect the economic, military, and diplomatic interests of the United States. History has shown in large part that, in many instances, these regulations and their applications are self-defeating with respect to those goals.

While individuals involved with research in the space sciences recognize the necessity of treating certain hardware and technology as militarily sensitive, they also believe that the ITAR are much too inclusive; and unnecessarily so. Further, the United States has many policy priorities in space other than national security, including its diminishing leadership role in space exploration, global commercial competitiveness, re-establishing university excellence in the space-related sciences and technologies, and encouraging and maintaining critically necessary international partnerships in conducting "fundamental research" in space and space-related matters. There are ongoing costs and delays of significance in the processing of ITAR requirements, particularly as they relate to basic research proposals relying in part on foreign colleagues, foreign nations, and foreign funding for their undertaking. Critical international collaboration for basic and applied research involving U.S. personnel and facilities is diminishing rapidly.

Much of the confusion seems to stem from the inability or political unwillingness of the U.S. Congress and the U.S. Department of State to formulate realistic policies dealing with international relations consistent with national, regional, and global defense and security realities, and the role of space research and exploration in formulating those policies. This, combined with what seem to be intentional regulatory drafting ambiguities, has created an environment of debilitating confusion for scientists and engineers involved in U.S. civilian and shared

[2] Arms Export Control Act, 22 USC § 2778 (1979), Priv. L. No. 96-72m, 93 Stat. 503 (1979), 22 C.F.R. §§ 120-130 (2002). The ITAR currently are administered by the Directorate of Defense Trade Control (DDTC) at the U.S. Department of State.

civilian/military space activities mandated by the VSE, consistent with the 2006 U.S. National Space Policy. [3]

In addition to inconsistencies in interpretations and applications of pivotal ITAR words and phrases, the confusion and frustration of scientists and university and non-profit research laboratory export control officers also find their roots in the increasing indifference and lack of true understanding of legislators and policymakers regarding the *absolute critical importance of maintaining and enhancing ongoing "basic research;"* add to that, also, their increasing deference to directed or "applied" research with comparatively short-term public benefits. In large part, the critical need for basic research is lost in the broadly cast net of the ITAR, i.e., the resultant decreasing transparency of *basic* scientific research as it relates to (1) traditional and crucial open collaboration among colleagues and the necessary written and oral exchanges of data/information deriving from their basic research efforts, and (2) the preservation of the serendipitous and uniquely beneficial potentials resulting from such research.

There is a pressing need to establish more refined and consistent definitions of pivotal words and phrases, such as "*basic* research," "*fundamental* research," "*applied* research," and "public domain" as used in applicable laws in order to establish continuity and consistency, both in domestic and international understandings and uses of those words and phrases in the ITAR. The observation is based in large part, although certainly not solely, on the fact that scientists and their colleagues may be held *personally* accountable for violations of the ITAR civil and criminal provisions, and their respective sanctions or penalties.

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[3] For a general commentary by the author on the 2006 U.S. National Space Policy, as well as the full text of the unclassified version of the policy, *see* G.S. Robinson, *The U.S. National Space Policy: Pushing the Limits of Space Treaties?*, ZEITSCHRIFT FÜR LUFT- UND WELTRAUMRECHT [GERMAN J. OF AIR & SPACE L.], 45-57 (ZLW 56.Jg. 1/2007).

II. BACKGROUND

Since at least the late 1930s, the United States has restricted in one fashion or other the export of certain goods and technology. The objective, of course, is protection of its national security and foreign policy interests by maintaining control over the export of certain goods, technologies, and services that might be used in military development of other nations; particularly those that may have hostile intentions toward the United States and its allies. At present, three governmental Departments are involved in promulgating a variety of regulations aimed at securing the nation's various interests, including those relating to national security and economic competitiveness. The Department of Commerce regulates "dual use" items through its Export Administration Regulations (EAR), the Department of State through its International Traffic in Arms Regulations (ITAR),[4] and the Department of Treasury through its designation of trade embargoes by its Office of Foreign Assets Control.[5]

The ITAR assist in controlling trade in defense items and services as stated by the Arms Export Control Act, and Executive Order 11958, as amended. All categories on the U.S. Munitions List (USML) set forth the defense items and articles to be regulated by the ITAR.[6] These regulations also control all space satellites that were placed on the USML by the Strom Thurmond National Defense Authorization Act of FY 1999,[7] and Category XV of the USML includes "Spacecraft Systems and

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[4] EAR regulations are found at 15 C.F.R., Chap. VII, Part 734. The ITAR control defense trade as referenced in 22 U.S.C. § 2788 of the Arms Export Control Act [*see* 22 U.S.C. § 2778 (1979), Priv. L. No. 96-72, 93 Stat. 503 (1979), 22 C.F.R §§ 120-130 (2002)].

[5] 31 C.F.R. Part 500. The Office of Foreign Assets Control (OFAC) "administers and enforces economic and trade sanctions based on U.S. foreign policy and national security goals against targeted foreign countries and regimes, terrorists, international narcotics traffickers, those engaged in activities related to the proliferation of weapons of mass destruction." Office of Foreign Assets Control, *Mission,* http://www.ustreas.gov/offices/enforcement/ofac/ (last viewed Nov. 3, 2008). In the context of activities requiring collaborative efforts with member states of the European Union (EU),that organization has condemned, along with other entities, certain OFAC and related security laws aimed at various embargoed nations.

[6] The United States Munitions List, 22 C.F.R. § 121.1 – 121.16 (2008).

[7] Strom Thurmond National Defense Authorization Act of FY 1999, Pub. L. No. 105-261, 112 Stat. 1920 (1998).

Associated Equipment," which specifically references scientific satellites among other types as defense articles, including certain types of ground control stations for satellite telemetry and other components of spacecraft systems.[8] The objective of the ITAR, EAR, and other related regulations and policies is to control the flow of defense-related information, products, and technologies, including oral and visual disclosure or transference of technical data to foreign individuals, regardless of whether it is accomplished within the United States or abroad. Except for limited circumstances and exceptions set forth in the ITAR, the transfer of defense articles and services to foreign individuals and entities all require prior review and authorization by the U.S. Department of State. Clearly, use of these regulations in furtherance of U.S. legislation and executive branch policies is for assisting U.S. foreign policy objectives, and also protecting the U.S. economy in the context of competitive international trade. Perhaps most important of all, the regulations are designed to assist in preventing the burgeoning international proliferation of weapons of mass destruction.

Nevertheless, regulations controlling various goods, technologies, and collaborative information exchanges also have negative influences on the quality of critically necessary *basic* research conducted by United States universities and non-profit research laboratories in and outside the United States. These controls, on occasion, manifest themselves in self-defeating and destructive restrictions on the traditional international understanding of what constitutes unrestricted academic freedom to conduct basic research, that is, the open and unrestricted publication and dissemination of research findings and the necessary

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[8] Defense Services referenced in the USML are defined to include "the furnishing of assistance (including training) to foreign persons, whether in the United States or abroad in the design, development, engineering, manufacture, production, assembly, testing, repair, maintenance, modification, operation, demilitarization, destruction, processing or use of defense articles." International Traffic in Arms Regulations, 22 C.F.R. § 120.9(a)(1). It would appear from such an inclusive listing that no U.S. research, basic or applied, would escape the ITAR, even with its exemption of "fundamental research", which includes "basic" as well as "applied research"…and certain transitional items and services embedded in basic research and certain aspects of the research protocol and equipment as it evolves.

open collaboration among scientist and engineer colleagues involved in that kind of research.

After serious expressions of concern and indignation by scientists in university communities involved with space research, the US Department of State amended the ITAR in 2002 in order to exclude institutions of higher learning from having to obtain licenses in order to interact with colleagues in certain other nations, as well as with specifically designated non-US citizens working in the United States who were involved in conducting "fundamental research." And here is where the current issues involved with protecting basic research come into play. The definition of fundamental research, as it appears in the ITAR, is defined as "basic *and* applied research in science and engineering where the resulting information is ordinarily published and shared broadly within the scientific community", and the research must be conducted by "accredited institutions of higher learning".[9]

Unfortunately, the relief intended by the ITAR amendment in 2002 only added to the confusion being experienced by scientists and engineers involved in basic research. Significant uncertainty exists regarding the definition, itself, of "fundamental" research that is to be exempted…again, under certain additional confusing conditions. For example, as noted in a report of the National Research Council, of the National Academies, entitled "Space Science and International Traffic in Arms Regulations: Summary of a Workshop" held in September 2007,

> There is confusion about whether results need to have been published or can simply be intended to be published, Many space science activities conducted through academic institutions involve collaboration with private companies and other parties that are not 'accredited institutions of higher learning' and thus do not appear to be covered under the fundamental-research exclusion in ITAR. That the regulations apply differently to universities, national laboratories, government, and industry has led to confusion as to what institutions must do to comply with ITAR. There is also uncertainty about what types

[9] International Traffic in Arms Regulations, 22 C.F.R. § 120.11 (8) (emphasis added).

> of project-related information can be provided to non-U.S. project participants without a license and what types can be transmitted to foreign students in an academic setting.[10]

The NRC Report continues by observing that

> The process for obtaining licenses and technical-assistance agreements (TAAs) and the administrative work necessary to ensure ITAR compliance in project implementation can introduce substantial additional costs and time requirements for space projects. It is especially notable, moreover, that some violations of ITAR are punishable criminal offenses. Because of the many uncertainties…about the applicability of ITAR, institutions tend to interpret the regulations conservatively to be on the safe side of potential legal difficulties and thus often impose upon themselves burdens that might not be necessary.[11]

Of significance here, and discussed at some length, *infra*, is the personal financial and legal burdens placed upon scientists proposing basic research (as a component of "fundamental" research under the ITAR definition), as well as upon the employing institution's contract compliance officer or export control officer; particularly if they make an uninformed and wrong decision.

A. Just What is "Basic Research" and Why is it so Important?

Although Dr. S. Dillon Ripley, former Secretary of the Smithsonian Institution in Washington, D.C., frequently referred to basic research as the "pursuit of the unfashionable by the unconventional," it is essential to recognize and accept that the pursuit of basic research in its most pure and reasonably

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[10] *See* MARGARET G. FINARELLI, SPACE SCIENCE AND THE INTERNATIONAL TRAFFIC IN ARMS REGULATIONS: SUMMARY OF A WORKSHOP, viii (The National Academies Press, Wash., D.C., 2008) [hereinafter SPACE SCIENCE AND THE INTERNATIONAL TRAFFIC].

[11] *Id*. The stated goals of the workshop were to identify concrete problems that academic, government, and industry space science researchers, faculty, managers, and institutions face as a result of ITAR regulations; determine the extent to which those problems are the result of implementation of the regulations or of misunderstanding of what is required by various parties; and identify possible steps for addressing or further examining the problems.

unencumbered form is absolutely critical to the survival of any civilization. It is what applied research and technology are built upon. No less can be said about its criticality in pursuing "space exploration" in the context of universal "human curiosity," as referenced in the 2004 Presidential Vision for Space Exploration. "Basic research" is conducted in what has been eloquently referred to by Smithsonian Institution Senior Scholar Emeritus, Dr. Wilton S. Dillon, as an "intellectual free trade zone."[12] It also has been characterized more definitively, but still with a fair amount of ambiguity, as

> experimental or theoretical work, undertaken *primarily* to acquire new knowledge and to develop related concepts and principles, without anticipating any particular use; the term 'applied' refers to similar original research that will result in new knowledge, but directed primarily toward a specific practical objective.[13]

Use of the word "primarily" to define basic research creates understandable confusion, as does the phrase "and to develop

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[12] *See* Letter of Nomination from Dr. Dillon to the Smithsonian Board of Regents on behalf of Walter Isaacson as a candidate for Secretary of the Smithsonian Institution (July 14, 2007) (on file with author).

[13] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, FRASCATI MANUAL 2002: PROPOSED STANDARD PRACTICE FOR SURVEYS ON RESEARCH AND EXPERIMENTAL DEVELOPMENT, 30 (2002) [hereinafter FRASCATI MANUAL]. *See* also the Lawrence Berkeley National Laboratory (LBNL) statement explaining the difference between basic and applied research in the following manner:

> Basic (aka fundamental or pure) research is driven by scientist's curiosity or interest in a scientific question. The main motivation is to expand man's knowledge, not to create or invent something…[B]asic research lays down the *foundation* for the applied science that follows. If basic work is done first, then applied spin-offs eventually result from this research…Applied research is designed to solve *practical problems* of the modern world, rather than to acquire knowledge for knowledge's sake. According to Dr. Ashok Gadgil of LBNL, one way to look at it is to ask the following question: *'How long will it be before some practical application results from the research*?' If a practical use is only a few years away, then the work can be defined as strictly applied research. If a practical use is still 20-50 years away, then the work is somewhat applied and somewhat basic in nature. If a practical use cannot be envisioned in the foreseeable future, then the work can be described as purely basic research.

Lawrence Berkeley National Laboratory, *What is Basic Research?*, http://www.lbl.gov/education/ELSI/researxch-main.html (last visited Nov. 3, 2008) (emphasis added).

related concepts and principles . . . ." It might be helpful if the latter phrase referred to "related pure science concepts and principles," thereby removing the activity unquestionably from ". . . without anticipating any particular use," which relates to applied science. Again, the problem for scientists and the ITAR variety of export control officials and governmental enforcement personnel in assessing proposed basic research, that is, "curiosity" in that word's most basic and pristine definition, and determining whether it is ITAR-exempted, is the phrase "fundamental" research, which, in the context of relying on ITAR and enabling legislation, has a chimera-like complexion and function. It can be basic research *or* applied research, depending upon how close the potential is for resulting data to be used or applied to a functional objective; and as that objective *might* potentially have implications in the context of national defense services and defense items.

While the definitions, above, of fundamental research incorporate the definitions, or significant components of those definitions, both of basic and applied research, there is a discrete difference between the two and they are not synonymous. In fact, the ITAR offers no definition of basic research as a completely independent process, except by vague implication. Part of the problem frequently encountered is that in order to conduct given basic research, instrumentation might be required at the outset, or somewhere during the unfolding research process, that is not exempted under the ITAR.

Keeping in mind that the VSE also refers to its objectives in space as being required to improve conditions on Earth, in order to understand let alone agree with these distinguishing characteristics would require an almost word-by-word analysis, since these definitions are replete with vagueness and inaccuracies in contexts and in terms of timing. Perhaps the most pivotal component in the above research oriented distinctions between basic and applied research is that somehow it is more often than not influenced by one's personal experience, perspective, and direct involvement in a specific research project. That, in itself, might be viewed as a classic functional ambiguity in the arena of formulating and stating the essential nature of a set of facts, i.e., the definition of "definition." Suffice to say that promulgation of

a functional definition of *basic research while in progress* would be helpful as well.

These definitions also require further definitions which, in turn, require further definitions, almost *ad infinitum*, thereby leaving the basic research scientist in a constant quandary as to whether he or she will be starting and ending with strictly basic research characteristics; and when the research might transition into fundamental research leading directly to applied research. The distinction between basic and fundamental research, and then between fundamental and applied research is more often than not unclear both to the scientist and the reviewing export control official responsible for interpreting the fact situation and applying the ITAR criteria. It certainly leaves the basic research scientist wondering at what point in the pursuit of his or her research the methodology employed will be aborted and collaborative efforts seriously compromised, if not effectively terminated altogether. Even a law degree and years of experience will not necessarily make any knowledgeable scientist involved in basic research feel comfortable, given the civil and criminal penalties applicable for personal as well as institutional violations of ITAR.[14]

A perilously increasing inability exists on the part of governments, industry, and science policy administrators, to embrace in a functional fashion the critical distinctions between basic or pure research, and the applied sciences. In policy, basic research has been devolving in large part into defining and pursuing pure "curiosity" in a *directed* context. Basic research seems to be fading almost irretrievably amidst the perceived need of almost every government and a good portion of industry and academia to support directed research for economic benefit, military advantage, or political and diplomatic gains.[15] The imposition of intellectual property rights upon the results of basic

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[14] For the criminal sanctions and consequent penalties, *see* International Traffic in Arms Regulations, 22 C.F.R. § 120.27.

[15] For a discussion of the distinction between basic and applied research, and the diminishing support of basic research globally, *see* George McLure, *Are We Underfunding Basic Research in the Physical Sciences?*, IEEE – USA, TODAY'S ENGINEER ONLINE (June 2005), http://www.todaysengineer.org/2005/Jun/research.asp.

research when that research is funded in whole or in part by the private commercial sector is adding to this process.[16]

B. "Basic Research" and the Role of Serendipity

A great many, if not most, of the scientific discoveries leading to civilization-changing applications have been completely unanticipated. They have resulted from serendipity and not by direction or design. "Serendipity" is commonly defined as "the faculty of finding valuable or agreeable things not sought for."[17] Louis Pasteur noted that "[i]n the field of observation, chance only favors the prepared mind." Chance has been an important factor in basic research and resulting fundamental discoveries and applied sciences.[18] Teflon, cellophane, polyethylene, rayon, the microwave oven, penicillin, aspirin, quinine, retin-A and even Viagra represent a very small number of serendipitous discoveries deriving from the work of scientists looking for something entirely different, that is, pure empirical data based on the results of basic research conducted with the sole objective of obtaining that data for no other reason that just to have it and know it.[19] It is essential to recognize and accept that the

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[16] In the United States, pursuant to the Public Patent Policy, the United States usually only retains royalty-free march-in rights over an invention it has funded to any extent, whether private sector or public, *see* Pub. L. No. 96-517, and the implementing policies and regulations set forth in OMB Circular A-124.

[17] WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY, 1074 (1991).

[18] In many respects, the very nature of uncertainty of outcome of basic research requires a funding objectivity that focuses on the likelihood of success in exposing new data or knowledge of it, and the credentials of the scientist(s) and collaborator(s) involved. If the assessments are positive, the funding is made available and there should be, as a rule of thumb, a success expectation of no more than 50%.

[19] As noted by David Harris, Editor-in-Chief of Symmetry: Dimensions of Particle Physics,

> Basic research vs. political priorities: It's a timeless struggle. The conflict often comes down to competing timescales: Basic research tends to produce benefits in the long term, while politicians in a representative democracy are required to show their constituents what they are accomplishing in their current terms in office. One way scientists try to defuse this tension is to talk about scientific spin-offs–of the serendipitous application of basic research to the creation of new technology or products. The real value in scientific spin-offs, apart from the new technologies or creations themselves, is that they reflect an integration of science into wider society. Science need not be relegated to a corner of human existence where atypical people work in atypical jobs. Science is a

pursuit of basic research in its most pure and reasonably unencumbered form is critical to pursuing space exploration in the context of universal "human curiosity," as referenced in the 2004 presidential Vision for Space Exploration. "Basic research" also has been characterized more definitively, but still with a fair amount of ambiguity, as

> experimental or theoretical work, undertaken *primarily* to acquire new knowledge and to develop related concepts and principles, *without anticipating any particular use*; the term 'applied' refers to similar original research that will result in new knowledge, but directed *primarily* toward a specific practical objective.[20]

Use of the word "primarily" to define basic research creates understandable confusion, as does the phrase "and to develop related concepts and principles . . . ." It might be helpful if the latter phrase referred to "related pure science concepts and principles," thereby removing the activity unquestionably from "without anticipating any particular use," which relates to applied science. Again, the problem for scientists and the ITAR variety of export control officials and governmental enforcement personnel in assessing proposed basic research, that is, "curiosity" in that word's most basic definition, and determining whether it is ITAR-exempted, is the phrase "*fundamental* research," which, in the context of relying on ITAR and enabling legislation, has a chimera-like complexion and function. It can be basic research *or* applied research, depending upon how close

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> natural part of a healthy society. A general consensus flowing from certain scientists at the Smithsonian Institution and various universities who and which were interviewed by the author over a lengthy period of time, indicated strongly that the general public and, unfortunately, a good portion of private industry and governmental agencies offering research grants and contracts, considered the kinds of subjects involving basic research to be for the most part useless and often unjustifiably expensive musings. In short, basic research lacked the functional consequences of directed research, evolved fundamental research, and strictly applied research from the outset of conception. Basic research proposals were considered less apt to compete successfully for funding with those proposals embracing applied or directed research.

David Harris, *From the Editor: The Role of Spin-offs*, 4 SYMMETRY: DIMENSIONS OF PARTICLE PHYSICS (June/July 2007).

[20] FRASCATI MANUAL, *supra* note 13, at 30 (emphasis added).

the potential is for resulting data to be used or applied to a functional objective; and as that objective *might* potentially have implications in the context of national defense services and defense items.

While the definitions, above, of fundamental research incorporate the definitions, or significant components of those definitions, both of basic and applied research, there is a discrete difference between the two and they are not synonymous. In fact, the ITAR offers no definition of basic research as a completely independent process, except by vague implication.

Keeping in mind that the VSE also refers to its objectives in space as being required to improve conditions on Earth, in order to understand let alone agree with these distinguishing characteristics would require an almost word-by-word analysis. Perhaps the most pivotal component in the above research oriented distinctions defining *basic* and *applied* research is that somehow it is more often than not influenced by one's personal experience, perspective, direct involvement in a specific research project. Promulgation of a functional definition of *basic research while in progress* would be helpful, as well, since that undertaking often is distinguishable (if at all possible) only by personal experience of the investigating scientist and his/her associates.

III. IN SEARCH OF WORKING DEFINITIONS: BASIC RESEARCH EXEMPTIONS UNDER THE ITAR

The ensuing discussions are premised in significant part on operative definitions of words and phrases in the context of applicable ITAR and related laws, interpreted and applied by a multitude of disparate individuals involved in space-related basic research, and representing a variety of cultural backgrounds and levels of training. The result has been an increasing awareness of, and concern with, potential criminal and civil penalties and consequences applicable to those individuals and their employing organizations responsible for assuring compliance with the ITAR.

A. Arms Export Control Act and ITAR Definitions

As noted, above, the *Arms Export Control Act, as amended* (AECA), specifically authorizes the President of the United States to control the export and import of "defense articles and defense services", such as arms, ammunition and implements of war, to protect U.S. national security and foreign policy.[21] The Office of Defense Trade Controls (ODTC) in the Department of State administers the Act in part through implementing regulations, that is, the ITAR. These regulations contain a list of equipment considered to be arms, ammunition or implements of war, and referred to as the United States "Munitions List" (USML).[22] Military satellites and launch vehicles have been on the Munitions List for many years. In addition, "technical data" related to satellites and launch vehicles also are on the Munitions List.[23]

According to §120.10 of the ITAR definitions,[24] technical data is any information

> [W]hich is required for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance or modification of defense articles. This includes information in the form of blueprints, drawings, photographs, plans, instructions and documentation . . . . This definition does not include information concerning general scientific, mathematical or engineering principles commonly taught in schools, colleges and universities or information in the public domain as defined in §120.11.

Under §120.11 of the ITAR definitions:[25]

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[21] Arms Export Control Act, *supra* note 2.

[22] United States Munitions List, *supra* note 6. The USML is divided into 22 categories, and although some categories are very specific, the majority vary in coverage and, for the most part, lack the specificity that normally assists in easy and timely compliance.

[23] *See generally*, F. Kenneth Schwetje and Dennis J. Burnett, *U.S. Export Controls and Litigation of Contracts: Another Example of Unintended Consequences*, *in* 45 PROCEEDINGS OF THE COLLOQUIUM ON THE LAW OF OUTER SPACE 356, 357 (2002).

[24] 22 U.S.C., § 120.10.

[25] *Id.* at § 120.11(8).

> [p]ublic domain means information which is published and which is generally accessible or available to the public: . . . (8) Through fundamental research in science and engineering at accredited institutions of higher learning in the U.S. where the resulting information is ordinarily published and shared broadly in the scientific community. Fundamental research is defined to mean basic and applied research in science and engineering where the resulting information is ordinarily published and shared broadly within the scientific community, as distinguished from research the results of which are restricted for proprietary reasons or specific U.S. Government access and dissemination controls. University research will not be considered fundamental research if: (i) The university or its researchers accept other restrictions on publication of scientific and technical information resulting from the project or activity,[26] or (ii) The research is funded by the U.S. Government and specific access and dissemination controls protecting information resulting from the research are applicable.

The precision and uniformity of the accepted meaning of "fundamental research" can be the key to ITAR compliance and implementation in the area of scientific research.

B. General Distinction of the ITAR and EAR

Generally, the objectives of the ITAR and EAR include the restriction on export and re-export of technology, services, and goods or equipment that might contribute to military postures of U.S. adversaries, as well as unacceptable economic superiority. They also are designed to assist in confronting and protecting against acts of terrorism and the development of weapons of mass destruction. Other than the implementation of the EAR by the Department of Commerce and the ITAR by the Department of State, there are major differences between the ITAR

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[26] These restrictions, in addition to those imposed on collaborating universities and other such organizations, may often relate to the identification of intellectual property rights inuring to the principal investigator and the entity(ies) sponsoring the research, and may have nothing whatsoever to do with protected data/information relating to national security interests. Very few grants are being made by the private sector or governmental sources for basic research without the retention of some form of intellectual property rights by the granting entity.

and the EAR. For example, the ITAR[27] primarily address control of military "items" or articles considered part of, or important to, the national defense, and also technical data connected with defense articles or *items* and defense *services*.

Specifically included in the ITAR jurisdiction and control are the export and re-export of technology and data related to space activities, primarily because of the potential for application of those matters and technology to missile technology. The EAR[28] address what are considered to be "dual use" items, as well as various items that could have military applications, such as pathogenic biological materials, aircraft designed primarily for civilian use, computers and program data, as well as any related technology.

Export control compliance requires scientists engaged in research projects to differentiate between several different types of research, the definitions of which are vague and confusing at best and of little practical meaning at worst. What is clear is that information in the "public domain" is potentially exempt from export licensing requirements. In order for research to be considered within the public domain for export purposes it must be considered *fundamental research*; and what is less than clear in practice are the distinguishing features of such research under the applicable export regulations.

Again, as noted previously, the ITAR define fundamental research as "*basic and applied research* in science and engineering where the resulting information is ordinarily published and shared broadly within the scientific community, as distinguished from research the results of which are restricted for proprietary reasons or specific U.S. Government access and dissemination controls."[29] The Export Administration Regulations (EAR) share a fairly similar definition of fundamental research with the ITAR, defining such research as

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[27] 22 C.F.R. §§ 120-130.

[28] 15 C.F.R. §§ 730-774 (2003).

[29] 22 C.F.R. § 120.11(8). "University research will not be considered fundamental research if: (i) The University or its researchers accept other restrictions on publication of scientific and technical information resulting from the project or activity, or (ii) The research is funded by the U.S. Government and specific access and dissemination controls protecting information resulting from the research are applicable." *Id*.

> [B]asic and applied research in science and engineering, where the resulting information is ordinarily published and shared broadly within the scientific community. Such research can be distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary reasons or specific national security reasons.[30]

Both the ITAR and EAR definitions of "fundamental research" leave much to be desired by way of clarity and general applicability. By incorporating "basic research" and "applied research" into its definition, the term "fundamental research" would seem to surrender any independent meaning. Unfortunately, neither the ITAR nor the EAR provide much helpful guidance on how to distinguish between these different kinds of research. This inherent vagueness has left scientists with a less than clear understanding of the status of research projects with respect to whether a fundamental research exemption from the ITAR applies. Without providing much by way of explanation, the EAR do state that most research conducted at universities will satisfy the definition of fundamental research.[31] However relieving this rare instance of guidance might appear at first blush, researchers and scientists are still left without any bright lines to discern where the public domain exemption criteria end, and export control coverage begins.

C. Commodity Jurisdiction Review: Varying Definitions and Interpretations

While the regulations provide an avenue by which clarification may be sought,[32] the Commodity Jurisdiction Review (CJR) process introduces yet another layer of non-uniform definitional interpretation to the process. Once a request for review is submitted to the Directorate of Defense Trade Controls, the Department of State then out-sources the request for consultation from the Department of Commerce and the Department of De-

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[30] 15 C.F.R. § 734.8(a).
[31] *Id.* at § 734.8(b)(1).
[32] 22 C.F.R. § 120.4.

fense. In practice, these three departments have different interpretations of what constitutes the components of "fundamental research."[33] For example, Commerce defines "basic research" as research that "[p]ursue[s] a planned search for new knowledge, *whether or not* the search has reference to a specific application."[34] On the other hand, the Department of Defense defines "basic research" for purposes of fiscal management as

> *Systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind. It includes a scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs. It is farsighted high payoff research that provides the basis for technical progress.* Basic research may lead to: (a) subsequent applied research and advanced technology developments in Defense-related technologies, and (b) new and improved military functional capabilities in areas such as com-

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[33] COMMITTEE ON DEPARTMENT OF DEFENSE BASIC RESEARCH, NATIONAL RESEARCH COUNCIL, ASSESSMENT OF DEFENSE BASIC RESEARCH (2005), *available at* http://books.nap.edu/catalog.php?record_id=11177.

> The Department of Defense (DOD) supports basic research to advance fundamental knowledge in fields important to national defense. Over the past six years, however, several groups have raised concern about whether the nature of DOD-funded basic research is changing. The concerns include these: Funds are being spent for research that does not fall under DOD's definition of basic research; reporting requirements have become cumbersome and onerous; and *basic research is handled differently by the three services*. To explore these concerns, the Congress directed DOD to request a study from the National Research Council (NRC) so as to determine if the programs in the DOD basic research portfolio are consistent with the DOD definition of basic research and with the characteristics associated with fundamental research. This report presents that assessment. It notes that the current basic research portfolio is largely consistent with the definition, but argues that the definition should change to include use-directed basic research. The report also has other findings and recommendations to improve the efficacy of the DOD-funded basic research.

Id.

[34] Bureau of Industry and Security, U.S. Department of Commerce, *Technology Assessment of the U.S. Assistive Technology Industry,* at app. G (Dec. 31, 2001) [emphasis added] [hereinafter *Technology Assessment*], *available at* http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/defmarketresearchrpts/assisttechrept/g_appendix.htm (last visited Nov. 10, 2008).

> munications, detection, tracking, surveillance, propulsion, mobility, guidance and control, navigation, energy conversion, materials and structures, and personnel support.[35]

Clearly, this definition of basic or fundamental research is about as close to directed or applied research as one can come without saying that no difference exists between the two concepts and their implementing methodologies.

D. Basic Research Plus Fundamental Research = Fundamental Research Plus Applied Research

As observed by R. Hardy, the fundamental research exclusion

> applies literally to . . . information (but not to export controlled items) resulting from "basic and applied research in science and engineering" . . . conducted at an "accredited institution of higher education" (EAR) or 'higher learning' (ITAR) . . . "located in the United States" . . . that is ordinarily published and shared broadly within the scientific community . . . and that is not "restricted for proprietary reasons or specific national security reasons (EAR) . . . or subject to "specific U.S. Government access and dissemination controls" (ITAR).[36]

Until relatively recently, the vast majority of universities and their research faculty adopted the position that the fundamental research exclusion was just that . . . an "exclusion" from any consideration under the ITAR, and not an "exemption" requiring an explanation of why the research was exempt.

In the ITAR Sec 120.11(8) definition, a clear understanding is that *basic* research cannot be defined without including the criteria of what constitutes *fundamental* research. Fundamental research, on the other hand, must include basic research

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[35] 2B DoD FINANCIAL MANAGEMENT REGULATION, at ch. 5, "Uniform Budget and Fiscal Accounting Classification (June 2004), *available at* https://www.defenselink.mil/comptroller/fmr/02b/02barch/02b_05old.pdf. (emphasis added).

[36] Robert Hardy, Export Controls and Universities: Licensing Research?, Address Before the National Association of College and University Attorneys – Workshop on Higher Education Research, Compliance and Technology Transfer, 6 (Nov. 10 – 12, 2004), *available at* http://206.151.87.67/docs/nacua.doc.

characteristics, at which point the research may no longer be considered basic. In short, for scientists and other private and governmental officials who are responsible for implementing the ITAR relating to basic and fundamental research, the definition is much too loose and ambiguous to allow for reasonable and consistent interpretations applicable to given facts at any one point in the proposed research. It lends itself to a multitude of equally as confusing decisions regarding exemptions set forth in the ITAR that are applicable to basic research and, under certain circumstances, fundamental research, depending on specific transitioning fact situations at any one point while conducting the research.

The same confusion applies to the definition of fundamental research set forth in the National Policy on the Transfer of Scientific, Technical, and Engineering Information, National Security Decision Directive 189:

> 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, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons.[37]

Again, use of the word "and" to connect basic research and applied research as though it were always one context, is very confusing in terms of when and under what circumstances exempted basic research exists, applied research exists, or perhaps both exist in an inextricable transitional relationship referred to as fundamental research. Add to that confusion a reference to the term "proprietary research", which for each situation assessed for potential ITAR exemptions must be examined in terms of applicable facts and applicable law (e.g., intellectual property laws), the likelihood diminishes significantly of rea-

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[37] National Policy on the Transfer of Scientific, Technical, and Engineering Information, National Security Decision Directive 189 (Sept. 21, 1998) [hereinafter NSDD-189] *available at* http://www.fas.org/irp/offdocs/nsdd/nsdd-189.htm [emphasis added].

sonable, consistent, and proper application of the ITAR, either to basic or fundamental research.

IV. ATTENTION TO THE PRINCIPAL ENABLING LAWS

A. National Security Defense Directive: Recognizing the Difficulties of Academia

On September 21, 1985, the National Security Defense Directive -189 was issued (NSDD-189).[38] It was largely in response to intense reaction by universities to the extraordinary difficulties being experienced while attempting to conduct research and still comply with the numerous export control laws reflecting confusion of terms and phrases, as well as interpretations and applications. NSSDD-189 defined fundamental research to include "basic and applied" research, and indicated that there would be no restrictions on how federally-funded research is conducted or reported if a university has not had any security restrictions imposed on them. Of particular interest is that research sponsored by industry grants or contracts that impose non-disclosure or other intellectual property safeguards and rights, the fundamental research exemptions will not apply.

In 2001, Condoleezza Rice reaffirmed President Ronald Reagan's NSDD-189 and the need for open and collaborative research enabling the free exchange of ideas was necessary for "scientific innovation, prosperity, and the U.S. national security." Perhaps, inadvertently, this statement gave credence to the concern of universities that the majority, if not all, of the research they conducted under federal and private grants and contracts was to be considered significantly more than just *basic* research and, therefore, largely not covered by the free exchange of ideas benefit envisaged in the ITAR exemptions and the Rice letter, itself.[39]

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[38] *Id.*

[39] *See* Letter from Condoleezza Rice, former Assistant to President George W. Bush for National Security Affairs, to Dr. Harold Brown, Co-Chairman, Center for Strategic & International Studies (Nov. 1, 2001), *available at* http://www.aau.edu/research/Rice11.1.01.html.

Until comparatively recently, most colleges and universities have not paid close attention over the years to U.S. export and re-export control laws that derive from perceived national security and defense requirements. Generally, these laws have been thought by university staff and faculty to be aimed primarily at major industries in the United States. The laws are extensive and complex. Traditionally, they have been perceived by many university administrators and research faculty members to contain broad exemptions for research conducted at their respective institutions. Nevertheless, the various applicable export control laws do not exclude from their embrace all higher education research and, with governmental attention turning post 9/11 to *all* potential sources of exportable controlled data and information, it is critical for colleges and universities to ensure their grant proposals, research policies, and implementing procedures are consistent with the applicable laws.

Export control regulations *currently* absorb an inordinate amount of the academic research community's time and efforts. Disproportionate funding also is required to address and fulfill these regulatory requirements Despite the fact that concerted efforts are being made to educate members of that community regarding these regulatory controls, government oversight efforts focused on the academic community regarding these controls are becoming tighter and more demanding. There is every indication that the U.S. government will increase these types of export control regulations and increase, as well, its compliance audits with institutions, faculty, and administrative/management staff within the academic community.[40]

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[40] *See*, H.R. 4246 of the U.S. Congress, a new bill initially introduced by Reps. Donald Manzullo (R-Ill.) and Brad Sherman (D-Calif) on November 11, 2007, to reduce defense trade license processing times, create a spare part waiver for the closest U.S. allies, and make defense trade licensing more transparent and predictable. Unfortunately, the remedial action of the belabored bill is limited almost exclusively to applied research and product development. As noted by Congressman Manzullo during a March 11, 2008 session on Capitol Hill of the Aerospace States Association, "[t]hese non-controversial good government changes will make munitions manufacturers in every category, including space, more competitive in the international marketplace." Clearly, the objective of the bill does not include promoting and safeguarding basic research in space solely to create knowledge for the sake of knowledge, alone. For a general discussion of H.R. 4246, its intentions, and shortcomings, *see* Lawyers Push Bill that would Improve Arms Export Regulations, Space News, at 17 (Mar. 17, 2008).

V. THE OBJECTIVE

A. Preserve the Benefits of Basic Research through Traditional Open Collaboration between Scientists Involved in Such Research

The focus at this point is on recognition of the ongoing imperative nature and significance of basic research in the context of space exploration. It is essential to identify and preserve for basic research the critically necessary and traditional characteristics of open communication and collaboration, written and oral, between and among scientist colleagues, and to preserve the potentially serendipitous consequences of the results of basic research; particularly those relating to space exploration. To accomplish this, it is essential to identify the primary basic research implementation issues under the ITAR by assessing the research proposal and fact situation in terms of whether an export or re-export license is needed. Help in isolating the principal issue(s) involved in whether research is basic or applied, or somewhere in between in the apparent transitional phase of fundamental research, can be found in knowing exactly when and under what circumstances scientists and their export control officers need apply for an export or re-export license, that is, when a Technical Assistance Agreement (TAA)[41] request needs to be submitted. Licenses are required to provide defense services or enter into technical assistance or manufacturing license agreements.[42] Under 22 C.F.R. § 120.10(a)(5) technical data does *not* include the information in the public domain, which are therefore excluded from the ITAR licensing requirements.[43]

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[41] If the ITAR exemptions are determined not to be available for specific research proposals, it may be necessary to seek export licenses or Technical Assistance Agreements (TAA) from the Department of State in order to interact with international colleagues in cooperative space science missions.

[42] *See*, J. R. Liebman & K. J. Lombardo, A Guide to Export controls for the Non-Specialist, 28 Loy. L.A. Int'l & Comp. L.R. 497, 504 (2006). In this context, *see* also 22 C.F.R. §§ 123.15, 123.16 (2006).

[43] "[I]nformation concerning *general scientific*, mathematical *or* engineering principles commonly taught in schools, colleges and universities" is exempt, as is information in the public domain as defined in § 120.11. Information in the *public domain* includes "fundamental research" and is defined in 22 C.F.R. § 120.11(a)(8).

The EAR offers a definition of fundamental research fairly similar to that of the ITAR. As a matter of statutory construction, these respective provisions in the ITAR and the EAR are sufficiently similar that a definition of basic research in EAR could be read to be tacitly incorporated into the intended meaning of basic research under ITAR.[44] If this view or position is reasonably acceptable, then the intent behind the rules regarding fundamental research carried out by universities is to identify as "fundamental research" basic and applied research in science and engineering, where the resulting information is ordinarily published and shared broadly within the scientific community.

However, fundamental research under 15 CFR §§ 734.8 and 734.11 provides for specific rules to be used to determine whether research in given institutional contexts qualifies as "fundamental." The rules are less than simple and precise, and differ with respect to data and related information derived from university research, corporate research, research based at Federal agencies, or research by scientists and engineers based elsewhere. Nevertheless, the data and information deriving from their work will be treated as the product of fundamental research carried out in a corporate context.[45]

B. The U.S. Bureau of Industry and Security (BIS) Technology Assessment Application Questionnaire

In "Technology Assessment: Assistive Technology, General Instructions" in furtherance of a TAA application,[46] *basic* research is defined as pursuing "a planned search for new knowledge, whether or not the search has reference to a specific application." Clearly, "new" knowledge is imprecise, and the phrase "*whether or not the search has reference* to a specific application" seems to render the definition in context contradictory at best.

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[44] For the EAR definition, *see* 15 C.F.R. § 734.8.

[45] *See* 15 C.F.R. § 734.8, para. (b) – (d) and § 734.11, which set forth the relatively complex and broad rules for determining whether research carried out at these institutions/entities qualifies as "fundamental research."

[46] *See Technology Assessment*, *supra* note 34.

Applied research is then defined in the BIS General Instructions as "[a]pplying existing knowledge to problems involved in the creation of a new product or process, including work required to evaluate possible uses, or apply existing knowledge to problems involved in the improvement of a present product or process."[47] Applied research necessitates a relatively easy to understand set of circumstances and criteria. An element of preciseness and continuity in establishing criteria is missing for the transition between basic and applied research that is represented by "fundamental research." The determination of precisely when and under what circumstances these ambiguous criteria are crossed is difficult at best, and very troubling given the potential penalties for submitting less than accurate information.

Reflecting on the EAR "Country Chart,"[48] Liebman and Lombardo argue that "[t]he matrix . . . reveals that the level of control applied is determined by four factors: (i) the level of technological sophistication of the commodity, (ii) the commodity's potential for becoming the foundation of more advanced technology, (iii) the commodity's end-use, and (iv) the end-user to whom the exporter desires to send the commodity."[49] If the authors are correct, it would indicate that at least the first three determinative factors hint at when basic research begins to transition into fundamental and applied research that is apt to require an export/re-export license. Again, the complexity and variations of pivotal definitions, and the lack of continuity in definition/fact situation interpretation and application, all lend themselves to the question of whether the ITAR and the EAR are unconstitutionally vague and over-broad.[50]

The definitional uncertainty as to whether certain scientific research and resulting data and information are covered by the ITAR exemptions is compounded by scientists themselves using the terms "basic research" and "fundamental research" inter-

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[47] *Id.* The BIS is the focal point within the Department of Commerce for developing, promoting, and implementing policies that are intended to ensure a strong, technologically superior U.S. defense industrial base.

[48] 15 C.F.R., Part. 738, Supp. 1.

[49] *See* Liebman, *supra* note 42, at 504.

[50] *See, infra,* Sec. VIII, Issues of Constitutional Law.

changeably. In short, *basic* research as a concept in practice is potentially critical to all applications in the immediate present or distant future, and that is why it is recognized as such an elusive concept, whether for national defense purposes or strictly civilian commercial uses. That, also, is why the Department of Defense, the National Science Foundation, the Department of Energy, and other Executive departments and agencies funding research pursuits, have always been strong supporters, until lately, of basic research from which fundamental and applied scientific research *may* develop. Consequently, it is not difficult to imagine why very little basic research would be exempted from the ITAR, when governmental and private sector funding are looking for general public benefits, and lucrative benefits if commercially sponsored, to flow within a reasonable period, or even ultimately, from such basic research. These potential "applications expectations" can influence disproportionately the manner in which purported basic research proposals are drafted, and ultimately influence those proposals actually selected for financial support.

VI. COMPROMISING BASIC RESEARCH THROUGH COMMERCIAL INCENTIVES

Sheldon Lee Glashow, Nobel Laureate of physics and Boston University faculty member serving as an unabashed defender of the purity of basic research, a very *expensive* kind of research, noted that

> [t]here was a time when companies such as General Electric, AT&T, and IBM played essential roles in the pursuit of truly basic research…Unfortunately, the glory days of commercially sponsored research have virtually come to an end. Employees or former employees of the once great Bell laboratories have garnered an amazing eleven Nobel Prizes, but today's much reduced laboratory is unlikely ever to produce another. The Microsoft Company, to give another example, rather than investing in basic research *per se*, has purchased an enormous portfolio of academic patents, which its scientists and engineers are told to exploit. Once again, basic research has been

> relegated to the universities, whose funding for basic research is ever declining.[51]

A. Patents Replacing Publication Incentives for Basic Researchers

Expanding on the difficulty of maintaining a level playing field in competition for grants between the basic research scientist and the fundamental and applied researchers is the full likelihood that if a scientist or engineer publishes a peer reviewed idea in an academic journal, the idea will receive comparatively slight interest from the funding institutions or agencies. But if it is an idea that has been patented, or *may be* patentable, it will equally as likely be acquired and developed as a commercial product. This admonition, according to Peter Mikhail,

> [U]nderlies the logic of today's governmental technology program. Publication, by itself, is becoming an insufficient reward for scientific achievement. Instead, the patent race has taken its place, and the great halls of America's research universities are now the inventor's track.[52]

Referring to the emphasis placed in the VSE and the 2006 U.S. National Space Policy on private commercial space endeavors, it can be seen as equally unfortunate that most basic research conducted by scientists in university settings is corrupted by the tantalizing potential of receiving any funding at all for their basic research, and that funding deriving from commercial interests, directly and indirectly, is considered better than no funding at all. Patent officers on the staffs of certain universities and other non-profit basic research entities are inducing scientists to corrupt in varying degrees the substantive objectives and the protocols of their basic research in order to

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[51] Sheldon Lee Glashow, The Scientific and Technological Importance of Basic Scientific Research, 2 (Jan. 2005), *available at* http://peace-foundation.net.7host.com/pdf/sheldon%20l%20glashow.pdf.

[52] Peter Mikhail, Note, *Hopkins v. Cellpro: An Illustration that Patenting and Exclusive Licensing of Fundamental Science is not Always in the Public Interest*, 13 HARV. J.L. & TECH. 375 (Winter 2000).

secure funding from anywhere to be able to conduct their research at all, or at least some aspect of it. Ever time a grant is made, additional overhead expenses (more often than not "bloated") are made available to the employing or grantee university.

This reality of commercial influence also tends quite effectively to shut down normal collegial discourse among scientists conducting basic research. The reason may lie in part in the increasing possibility that the information/data discussed might be co-opted by colleagues, who will then unethically and otherwise inappropriately secure intellectual property rights for the information or data they, themselves, may not have produced, or only have been a slight participant in producing. They may have been voracious followers and readers of the publications by the true principal investigator; and, consequently, become the potentially less than ethical beneficiary of the open exchange of data and related information inherent in traditional methodologies of basic research.

Not infrequently, commercial interests will insist upon all scientists involved in a basic research project it is sponsoring, financially or otherwise, signing non-disclosure agreements, further shutting down collegial collaboration and communication about the project, and also requiring the immediate filing of patent applications by a sponsored scientist in order to forestall or shut out the use of the data by the individual or team that may actually produced it!

As questioned, asserted, and properly emphasized by Glashow,

> If curiosity-driven research [i.e., basic research] is economically important, why should it be supported by public rather than private funds? The reason is that there are kinds of science which yield benefits that are general, rather than specific to individual products or processes. The eventual economic returns from this kind of research cannot be captured by any single company or entrepreneur. That is why most pure research is funded by governments with no immediate commercial interest in the results. Government support of undirected

> basic research must continue if there are to be further technological advances and economic spin-offs.[53]

In other words, it is imperative that the United States Government and its agents do not interpret the ITAR and its exemptions for basic research in such a way that it defeats the critical *need* for that type of research. As concluded by Glashow in a philosophically ringing observation,

> [I]t must be admitted that pursuits of such disciplines as particles physics, astrophysics and cosmology are not motivated by their potential economic relevance, no matter how great that may be. *We study these disciplines because we believe it to be our duty to understand, as best we can, the world we were born to.* Science provides a rational understanding of our place in the universe and can replace the destructive superstitions of the past.[54]

VII. ISSUES OF CONSTITUTIONAL LAW: PRIOR RESTRAINT, OVERBREADTH, AND VAGUENESS

The U.S. case law relating to "basic research" involving U.S. and non-U.S. citizens and the applicability of the ITAR have inclined toward cautious protection of Constitutional First Amendment rights and freedoms. These have been invoked in support and furtherance of safeguarding traditional collaborative avenues of communications among colleagues involved in basic research and even certain aspects of fundamental research. As a general principle, basic and fundamental research collaboration is constitutionally protected under the freedom of speech provision, but with carefully drawn parameters. Exempted data and related information deriving from basic research and certain portions of fundamental research are generally considered to be in the "public domain," unless otherwise restricted from open dissemination, for example, by an intellectual property right.

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[53] *Id.* at 4.

[54] Glashow, *supra* note 51, at 5 (emphasis added).

If public domain scientific research is constitutionally protected free speech,[55] then there may be numerous issues in the ITAR related to overbreadth, vagueness, and prior restraint. "Overbreadth" issues may arise in areas where the ITAR appear to reach "fundamental" scientific research that is already in the public domain and is more than likely entitled to First Amendment protection.[56] "The ITAR, at 22 CFR 124.1(a), specifically states that the giving to a foreign national of even public domain information otherwise exempted from licensing is a defense service requiring a license."[57]

This application is consistent with overbreadth actions that occur when a statute sweeps into constitutionally protected speech that the government may not regulate. The practical consequences of the potentially overbroad ITAR match the overbreadth doctrinal purposes of preventing a chilling effect on free speech and preventing arbitrary or selective enforcement by governmental agents. Within the context of the VSE, there are concerns about a potential chilling effect on intelligent and learned scientists who, uneducated in complex legal analyses, are unable to discern when the ITAR sweeps into areas of fundamental research, and certainly *basic* research, that they thought were protected.

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[55] *See* International Traffic in Arms Regulations (ITAR) § 120.11 – Public Domain, for what information and data are determined to be in the "public domain" and, therefore, exempt from licensing restrictions.

[56] Rachel Lehmer Claus, Space-Based Fundamental Research and the ITAR: A Study in Vagueness, Overbreadth, and Prior Restraint, 2 Santa Clara J. Int'l Law 1, 10 (2004). *See* also Memorandum from the U.S. Department of Justice, Office of the Deputy Assistant Attorney General, on Revised Proposed International Traffic in Arms Regulations (ITAR) (July 5, 1984). The conclusion section of this memorandum states that "[a]s we previously recommended, this remaining overbreadth should be eliminated by more narrowly drafted regulations."

[57] Claus, *supra* note 56. Assuming, as we have been, that publicly available scientific information that constitutes fundamental research is protected speech, and given that a violation of the ITAR can result in both criminal and civil penalties, then the licensing requirement is likely to deter speech containing information about fundamental research in the aero-astro field generally or any research taking place in outer space. Such an outcome fairly compels the conclusion that, with regard to public domain information pertaining to space-based or satellite-related research, the ITAR is overbroad and constitutes in application a denial of due process.
Id.

This chilling effect is further exacerbated by ITAR regulators who are willing to implement the regulations expansively based on the somewhat understandable fear of losing their jobs, security clearances, and perhaps violating the ITAR in the process of attempting to implement these less than precise regulations. In any event, to the extent that the ITAR require a license for the export of speech or public domain publications, the licensing scheme imposed by the ITAR might lack the constitutionally required procedural safeguards, thus implicating an issue of unconstitutional prior restraint.[58]

A Constitutional issue of "vagueness" may arise regarding the ITAR. At the heart of all vagueness issues are the same chilling effect and arbitrary or selective enforcement concerns attendant to the overbreadth doctrine. Of particular interest to the VSE might be that "the ITAR's treatment of public domain information is inconsistent, and in particular founders with regard to what may be considered a 'defense service.'"[59]

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[58] Claus, *supra* note 56, at 13. "For a licensing requirement on the export of speech to be constitutional, it must be subject to three procedural safeguards: 1) a specific and reasonable time is set for the making of a licensing decision, 2) provision is made for prompt judicial review, and 3) the censor bears the burden of going to court and justifying a licensing denial." *See FW/PBS, Inc. v. City of Dallas, 493 U.S. 215, 227-28 (1990)* [citing *Freedman* v. *Maryland*, 380 U.S. 51, 58-60 (1965)]. Further, as noted by Claus,
[t]he Arms Export Control Act excludes from the Administrative Procedures Act the functions to be implemented in the ITAR. There is no limit to the time in which the Office of Defense Trade Controls (ODTC) must make a licensing decision. The ITAR does not provide for judicial review of licensing decisions, and the initial designation of items as defense articles is not reviewable. Because there is no such recourse, there is no burden on ODTC to justify any denial. Thus, The ITAR scheme fails on every count. As it pertains to expression concerning space-based or satellite-related fundamental research, it constitutes an impermissible prior restraint on protected speech.
Claus, *supra* note 56.

[59] Claus, *supra* note 56, at 8. Here, Claus also notes that in ITAR Part 124 "Agreements, Off-Shore Procurement, and Other Defense Services," is the following statement: "The requirements of this section apply whether or not technical data is to be disclosed or used in the performance of the services described in 120.9(a) of this subchapter (e.g., all the information relied upon by the U.S. person in performing the defense service is in the public domain or is otherwise exempt from the licensing requirements of this subchapter pursuant to 125.4 [exemptions of general applicability] of this subchapter). Thus, it appears that one may also be deemed to provide a defense service by innocently engaging in certain transactions other than the explicit 'training' of foreign nationals in military skills or use of defense articles. Under this rubric, merely providing a foreign person with public domain information could qualify as providing a defense service." *Id.* at 23.

For any licensing requirement to meet minimum constitutional criteria when applied to the export of speech involved in collaborative basic, and certain portions of fundamental, research being conducted by U.S. and foreign citizens or entities, three procedural safeguards must be satisfied: 1) "a specific and reasonable time is set for the making of a licensing decision, 2) provision is made for prompt judicial review, and 3) the censor bears the burden of going to court and justifying a license denial."[60] As for the basic research scientist, as well as the fundamental and applied scientist, "[t]he ITAR provides for various exclusions and exemptions, but these *limited exemptions* and *exclusions* from licensing requirements *must be well understood* in order to be fully and properly utilized."[61] In fact, just simply *applying* for a license under ITAR to undertake basic research involving U.S. and foreign citizens, as well as certain aspects of fundamental research that may be covered by the ITAR non-exemptions, likely will be very difficult, frustrating, and time-

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[60] FW/PBS, Inc. v. City of Dallas, 493 U.S. 215, 227-228 (1990) (citing Freedman v. Maryland, 380 U.S. 51, 58-60 (1965)). *See* also, Claus, *supra* note 56. Claus notes the confusion in pivotal definitions by pointing out that "*fundamental r*esearch" under the ITAR is "openly conducted science and engineering research carried out at institutions of higher education in the United States…Faculty, students, collaborators and other researchers in these institutions engage in the free, constant, and lively exchange of ideas with their peers in the U.S. and abroad. This freedom of speech and association, and the openness that attends it, are fundamental to our culture and vital to the success of our research universities…." *Id.* at 1. Under National Security Decision Directive 189, *supra* note 37, "'fundamental research' is defined as basic *and* applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community…." Claus continues in footnote 1 by observing that the term "basic research" refers to "experimental or theoretical work, undertaken primarily to acquire new knowledge…without anticipating any particular use." Claus then notes that the term "applied research" is used to refer to "similar original research that will result in new knowledge, but directed primarily toward a specific practical objective." *See* Claus, *supra* note 56, at n. 1. In fact, fundamental research frequently is closer to applied research than it is to basic or "pure" scientific research.

[61] Liebman *supra* note 42, at 497, 502. Generally speaking, assert the authors, "exclusions from ITAR controls apply to all destinations, whereas exemptions from these controls apply only selectively to favored destinations. Generally, however, what is excluded from…[Department of State] licensing requirements is subject to…[Department of Commerce] jurisdiction [in which the Export Administration Regulations, or EAR, apply]….Most ITAR excluded or exempted items are less rigorously controlled by Commerce…The ITAR implicitly relies on the business community to apply rigorous self-classification procedures to determine whether a given commodity or technology is subject to ITAR export controls." *Id.*

consuming. Moreover, as emphasized by Claus, "just agreeing to this type of restriction could result in an overly-cautious consideration of the proposal from the moment of submission of the proposed research onward." Claus also notes that, pursuant to 22 C.F.R. § 120.11(8)(ii), the acceptance of dissemination restrictions precludes characterizing the research as "fundamental."[62]

In another area of the ITAR, it also has been observed that, "[d]espite the attention paid to deemed export licensing and compliance, and notwithstanding the general increase in BIS and Directorate of Defense Trade Controls (DDTC) enforcement in other areas, the deemed export rules have not been enforced strictly. Officials have said that a number of cases are being investigated, but there have been few charges or settlements involving deemed exports."[63] In the context of the basic and fundamental research exception,

> [I]nformation resulting from corporate funded research, which is almost always proprietary, rarely qualifies under the 'public domain' definition. such information, however, may not be subject to the ITAR if the research relates to generic scientific matters rather than to items that are specifically designed, adapted or modified for a military application.[64]

One of the principal concerns with overbreadth and vagueness is the chilling effect they can have on the willingness of scientists to test the waters. This can create a paucity of data points that would be necessary to determine just where the ITAR are impeding progress on the ground beyond implementa-

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[62] Claus, *supra* note 56, at 13. For an analysis of these issues from the perspective of a university and private sector interests, *see* R.J. Sievert, *Has the Time Finally Arrived to Overhaul the U.S. Export Control Regime?*, 37 TEX. INT'L L.J. 89 (2002).

[63] Christopher R. Wall and Pillsbury Winthrop Shaw Pittman, *Controlling the Flow of Technology in Global Operations: Deemed Exports*, 892 PLI/COMM 211, 221 (2006).

[64] *Id.* at 224, n. 4. Not surprisingly, Wall and Pittman go on to note that "[c]ompliance issues are particularly acute for companies working in areas such as aerospace where products and technology may have both commercial and military applications." *Id.* at 222. One commentator has suggested that in the context of the satellite industry there is only a small number of "repeat players" that might be better accommodated through the use of "'standard forms' of TAAs and related documents." Philip L. Spector, *Satellite Export Controls: Five Years and Counting*, 18 AIR & SPACE LAW 12, 13 (2003).

tion. The other main concern in the area of overbreadth and vagueness is arbitrary or selective enforcement. These two major concerns can often walk in lockstep as the lack of certainty in enforcement is the most powerful impetus of the chilling effect.

With greater certainty in implementation of the ITAR would come a greater confidence in engaging in the type of scientific exchanges which could help to sketch a more solid understanding if there are any real ITAR impediments to the VSE; certainly those beyond what might otherwise simply be regarded as a fear of overzealous application of the regulations. The fear, also, would derive from a sense of need for caution evolving from uncertainty regarding personal responsibility for potential violations of the ITAR, and the possibility of being subjected to ensuing civil and criminal sanctions and penalties. While there may be constitutional concerns about the ITAR on paper, the best remedy for purposes of the smooth working of the VSE might not be simply to overhaul the regulations, themselves, other than to concentrate uniformity of pivotal words and phrases in their definitions and applications, but also rather to focus on insulating the regulators who are implementing them, and appropriately training the scientists who, in part, are responsible for understanding and complying with them.

VIII. CRIMINAL AND CIVIL SANCTIONS: STATUTES AND CASE LAW

A. Misconceptions Regarding Criminal and Civil Sanctions under the ITAR[65]

As already discussed, the ITAR apply only to export and reexport of services and items as those terms are defined in the regulations, or if a license is otherwise required. A college or university normally asserts emphatically the goals of intellectual freedom on the part of its faculties, as well as the freedom to share openly and in a timely fashion the work of faculty

[65] For the criminal sanctions and consequent penalties, *see* International Traffic in Arms Regulations § 120.27.

members and their colleagues. But attempting to assure these freedoms may result in the university and involved faculty or staff breaching the export and re-export control laws.

Given the vagueness and uncertainty about what is covered by the ITAR, much of the subsequent and predictable concern is being borne out not just in the stifling of research pursuits, but also in the amount of attention scientists are paying to the ITAR at all. The misconception that compliance and enforcement of the ITAR is aimed only at large corporate entities, and not at seemingly innocuous university-based research is pervasive (at least until relatively recently when awareness and concern is elevating rapidly) throughout academia.[66] Even many scientists conducting basic research outside of academia are not aware of what is covered by the ITAR, and any attempt to find out might be in vain. The inevitable frustration stemming from vagueness and overbreadth issues in the ITAR has led to a lack of awareness and attention paid to the ITAR which could lead to severe penalties for scientists involved in basic research. Willful ignorance of the consequences of ITAR violations in a post-9/11 world might seem several orders of magnitude less appealing to scientists and researchers if they were better informed about the potential criminal and civil penalties of such violations.

All United States citizens who export defense articles are required to obtain a license from the Department of State.[67] Therefore, the most critical question a scientist engaged in basic research faces with respect to the ITAR compliance is whether their research constitutes a defense article.[68] Alternatively stated, the main concern of a basic research scientist is whether his/her research is exempt on the basis of the fundamental re-

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[66] For a general discussion of the problems and issues related to misconceptions regarding application of the ITAR, *see* R. Rege, Universities Should Implement Internal Control Programs to Monitor Compliance with Export Control Laws, 35 J.L. & Educ. 199 (2006).

[67] 22 C.F.R. § 120.4. A scientist involved in basic research may file a request at any time and would only have to register the project if it were deemed to be covered by the ITAR. 22 C.F.R. § 120.4(b).

[68] *See* generally Philip S. Rhoads, *The International Traffic in Arms Regulations: Compliance and Enforcement in the Directorate of Defense Trade Controls, U.S. Department of State*, 892 PLI/COMM 245, 250 (2006).

search exception. Such contemplation can lead to a great deal of confusion and uncertainty, which has led many scientists to throw up their hands and continue business as usual, perhaps all the while unaware of the grave potential penalties for ITAR violations.

The ostensibly preferred route for scientists to take whenever uncertainty arises as to whether their research is exempt is to file a commodity jurisdiction request with the Directorate of Defense Trade Controls (DTC) at the Department of State.[69] A paradoxical situation may be created however by the inherent vagueness and overbreadth of the ITAR. The more scientists, acting in good faith, are willing and able to scrutinize and dissect the complexity of the ITAR the more they will become uncertain about its coverage, thus creating the impulse to request clarification. Experience has shown however that the commodity jurisdiction request process can be both debilitating and pernicious to scientific research, both in the length of the process and in its lack of transparency.[70]

In March of 2001, the Office of Inspector General (OIG) produced a memo on the findings of an assessment of the export licensing process.[71] While the licensing process was found to be successful at protecting national security, the OIG concluded that the review process "took far too long and was not always transparent."[72] In April 1996, the National Security Council (NSC) provided the Department of State with guidelines providing that the commodity jurisdiction process was to take no longer than 60 days in a routine determination, and no more than 95 days in any situation.[73] Nonetheless, the OIG's review of twenty sample requests showed that the average processing

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[69] 22 C.F.R. § 120.4. A scientist involved in basic research may file a request at any time and would only have to register the project if it were deemed to be covered by the ITAR. 22 C.F.R. § 120.4(b).

[70] United States Department of State and the Broadcasting Board of Governors, Office of Inspector General, Review of the U.S. Munitions List and the Commodity Jurisdiction Process, Memorandum Report 01-FP-M-027 (March 2001) (finding that the commodity jurisdiction process needed improvement in the areas of timeliness and transparency) [hereinafter OIG Memo].

[71] *Id.*

[72] *Id.* at 7.

[73] *Id*. at 2-3.

time was almost six and a half months, well over three times the amount prescribed for a routine determination.[74]

Irrespective of the NSC's guidelines, the ITAR themselves state that DTC

> [W]ill provide a preliminary response within 10 working days of receipt of a complete request for commodity jurisdiction. If after 45 days the Directorate of Defense Trade Controls has not provided a final commodity jurisdiction determination, the applicant may request in writing to the Director, Office of Defense Trade Controls Policy that this determination be given expedited processing.[75]

Apparently, the ambitious drafters of the ITAR were confident that they could not only meet, but also exceed, the NSC's temporal guidelines for request processing. If the actual processing time in practice under this ITAR provision is in any way proportionate to the response time in the sample OIG cases in relation to the NSC guidelines, scientists still interested in sending requests to the Department of State will be left with much to be desired by way of expediency in the process. The OIG study also concluded that transparency problems exist in the request for commodity jurisdiction process. Simply put, scientists conducting basic research under time pressure imposed by grants and competing researchers have neither the time nor the patience necessary to freeze their projects while awaiting clarification. These constraints might very well simultaneously serve to encourage scientists to remain willfully ignorant of the ITAR compliance issues while at the same time discouraging them from becoming entangled in a lengthy and confusing review process. The catch-22 for those engaged in basic research is that it is the very vagueness of the ITAR coverage itself that

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[74] *Id.* at 7. Much of the reason for the delays was found to be the amount of time that it took the Department of Defense and the Department of Commerce to respond to referrals from DTC. According to the NSC guidelines, except in extraordinary circumstances, both Departments are supposed to return referrals to DTC within 35 days. No such deadlines were ever imposed on the Departments by DTC. In the twenty sample cases examined by the OIG, Commerce averaged 110 days to respond to such referrals, and Defense 88 days.

[75] 22 C.F.R. § 120.4(e).

creates the need to request clarification to avoid non-compliance; either researchers take a chance of being penalized, or guarantee themselves a protracted delay for review that may be the functional equivalent to nullification of their research project.[76]

It would not be surprising if even the most learned and informed scientist privy to all of the long and winding corridors of the ITAR compliance might be enticed to just ignore it all together and plead ignorance if an issue were to arise. Given the severe penalties that could be levied on individual scientists, however, which appear woefully disproportionate to anyone but the largest habitual corporate offenders, the issue of ITAR enforcement is one that scientists ignore at their own peril. Many scientists still believe that the employing university would be subject to the penalties, and not the scientists themselves.

If an item or commodity is covered by the ITAR, then the first step of compliance is registration with the Department of State.[77] Another twist in the ITAR definitional labyrinth crops up again here, however, as one of the ITAR hydra-headed definitions of "research" flirts with the notion of "basic research" in the context of registration. Specifically, "[r]egistration is not required for . . . [p]ersons who engage only in the fabrication of articles for experimental or scientific purpose, including research and development."[78] In making a determination if his or her research qualifies for this exception to registration, a scientist finds oneself having come full circle to where they entered the ITAR maze; at the blurred distinction between basic and applied research.[79]

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[76] Until recently, many individuals engaged in basic scientific research thought it worth the gamble to proceed without clarification. The balance of interests may be shaped by lack of awareness of the severity of the penalties coupled with the misperception that sanctions would only be imposed on large corporations, the exports of which could pose serious national security threats. Further, many scientists still believe that the employing university would be subject to penalties and not the scientists, themselves.

[77] 22 C.F.R. § 122.

[78] 22 C.F.R. § 122.1(b)(4).

[79] As one scholar points out, "one must determine at what point experimentation and product development cross the line from pure research into the 'manufacturing' of a defense article." *See* Rhoades, *supra* note 68, at 252. (discussing the exceptions to the registration requirement). The same scholar wisely suggests at p. 253 that "[w]ith an

However verbose and mind-numbingly complicated the ITAR may be, lawmakers have made it abundantly clear in no equivocal terms that violations will be dealt with severely. With even a single isolated violation of any part of the ITAR carrying criminal penalties of up to $1,000,000 in fines and up to a ten year prison sentence,[80] it behooves even the most casual scientific researcher to pay attention to compliance with the ITAR. Any conviction of a criminal compliance violation also results in immediate statutory debarment, explained below. Each civil violation could result in a maximum fine of $500,000 per violation[81] and could also result in seizure and forfeiture of items, administrative debarment and cross-debarment, and the loss of the right to contract with the U.S. Government.[82] For each violation, the Department of State assesses the circumstances and seriousness of the violation to determine whether to pursue criminal or civil penalties, or both. As one scholar has noted:

> An understanding of the purpose and use of the defense article, defense service and technical data is essential for a proper assessment of potential harm to national security that can be caused by unauthorized exports. The Directorate calls on the expertise of the Defense Technology Security Administration (DTSA) for this purpose. For consideration in determining the appropriate enforcement response, DTSA provides DTCC a harm assessment of ITAR violations based on the specific munitions at issue and national security harm that access by specified end-users to the defense article, defense services and/or technical data may have caused.[83]

It used to be the case that the Department of State usually would only pursue civil penalties in conjunction with a criminal plea agreement.[84] However, a recent trend has emerged whereby

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emphasis at many universities on identifying profit opportunities for products and processes developed in research laboratories, ITAR registration and concomitant licensing requirements must be taken into account when products and technology that emerge from this academic setting are introduced into global markets." *Id.* at 253.

[80] 22 C.F.R. § 127.3; 22 U.S.C. § 2778(c).

[81] 22 U.S.C. § 2778(e).

[82] Rhoades, *supra* note 68, at 267.

[83] Id. at 281, n.63.

[84] Id. at 269.

the Department has begun seeking civil sanctions absent an ongoing criminal case, or instead of pursuing criminal actions.[85] This should be interpreted as a warning to individuals who may have developed a false sense of security that the Department will only go after the establishment juggernauts who or which have the potential to create a gaping breach in national security. The gauntlet has been thrown down and in a post-9/11 United States, the willingness to pursue civil sanctions in circumstances where criminal action may not be warranted, serves as notice that no one can expect to fly safely under the radar anymore.

In addition to pecuniary and imprisonment penalties, violations may also result in the loss of the privilege to export in the future, a penalty referred to as debarment. Debarment can be defined as the act of prohibiting "any person from participating directly or indirectly in the export of defense articles, including technical data, or in the furnishing of defense services for which a license or approval is required."[86] The term debarment includes both statutory and administrative debarment. At the top of this list are the mandatory license denials and revocations of §126.7(a). These are the actions defined in the ITAR as "statutory debarment." Persons convicted for violations of the Arms Export Control Act face an immediate lockdown of their defense trade. Debarment is automatic upon conviction. DTCC generally follows up with a letter to the debarred party and publication of a notice in the Federal Register.

Aside from very narrowly defined grounds for an exception, license requests will be denied for all applications in which the debarred party, and an affiliated or successor entity, appears as the applicant, source or manufacturer of the defense article or defense service, or has a significant interest in the transaction.[87]

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[85] *Id*.

[86] 22 C.F.R. § 127.7(a).

[87] Debarment following any conviction under the Arms Export Control Act is based on sound reasoning. Criminal violations require a showing of willful conduct, a clear indication that convicted companies and individuals cannot be relied upon to export U.S.-origin defense articles, services, and technology in a responsible manner. Although the debarred party may apply for reinstatement three years after the date of conviction, export privileges are not automatically reinstated once that time has passed. Significant

Statutory debarments are mandatory and immediate license denials and revocations follow a criminal conviction of any violation of the ITAR.[88] A debarred party may apply for reinstatement three years after their conviction but must be able to demonstrate rehabilitation.[89] By contrast, a civil violation carries with it the possible imposition of administrative debarment. The Arms Export Control Act "authorizes the Secretary of State to revoke, suspend or amend licenses or other written approvals whenever the Secretary deems such action to be advisable."[90]

A wide degree of latitude has been granted to the Department of State "[b]ecause the exercising of the foreign affairs function, including the decisions required to implement the Arms Export Control Act, is highly discretionary, it is excluded from review under the Administrative Procedure Act."[91] Consequently, debarment may be imposed without prior notice in certain situations, including the following category of circumstances, which can only be described as a "catch-all" provision of monolithic proportions:

> Any license or other approval or exemption granted under this subchapter may be revoked, suspended, or amended without prior notice whenever . . . [t]he Department of State deems such action to be in furtherance of world peace, the national security or the foreign policy of the United States, or is otherwise advisable.[92]

With increasing focus on accountability of scientists, as well as academic and commercial/industrial entities, under the ITAR, encouraged in part even by the unclassified version of the 2006 U.S. National Space Policy, scientists involved in basic and fundamental research are not in a position to ignore the com-

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rehabilitative steps must be taken and fulfilled that mitigate law enforcement concerns. Because the exercising of the foreign affairs function, including the decision required to implement the Arms Export Control Act, is highly discretionary, it is excluded from review under the Administrative Procedures Act, whereby the U.S. Government normally enforces implementing regulations for legislative acts (5 USC chp. 5, §§ 511-599).

[88] 22 C.F.R. § 127.7(c).

[89] Id. *See* also, Rhoades, *supra* note 68, at 262-63.

[90] 22 C.F.R. § 128.1.

[91] Id.

[92] 22 CFR § 126.7(a)(1).

plexities of the regulations, or rely totally on someone else to ensure their compliance. Several scientists have attested to the past practices of indifference to the personal accountability of scientists and engineers under the civil and criminal penalties of the ITAR, and their increasing frustrations with the lack of continuity in the interpretation of the regulations and their applications to research proposals, research under way, and traditional avenues of collaboration among colleagues involved in basic and fundamental research.[93]

IX. INDEMNIFICATION RESOLUTIONS AND DIRECTORS AND OFFICERS LIABILITY INSURANCE: AN ESSENTIAL TOOL FOR SCIENTIFIC RESEARCH IN ACADEMIA AND INDUSTRY

Given the complexity, inconsistency, and resulting confusion created by the broad disparity in interpretation and application of national defense security laws and regulations to all types of scientific research in endlessly different types of fact situations, it is imperative that the scientists involved in such research be provided necessary and reasonable protection and support. It is the *minimum* requirement to ensure that such research, particularly unblemished basic research in its purest form, is continued by the best and most appropriate individuals available. A frontline approach to providing the necessary protection of, and encouragement to, scientists falls under the traditional protective clothing of "indemnification resolutions."

More often than not, scientists, particularly those who believe properly or mistakenly that their research is basic in the context of science and security regulations, can be subjected to extraordinary expenses once an investigation or accusation against the individual under the ITAR has been initiated. The objective should be to ensure that, under the proper circumstances, scientists working in academia and industry are protected from unnecessary and extraordinary personal expenses in defending themselves from the incipient stages of an ITAR violation investigation through legal procedures involving criminal and civil sanctions and penalties, or both.

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[93] *See* generally, SPACE SCIENCE AND THE INTERNATIONAL TRAFFIC, *supra* note 10.

Normally, the greatest expense at the outset to an individual conducting scientific research, basic and/or applied, and who finds himself/herself the subject of potential civil or criminal wrongdoing, is the expense of retaining legal representation. Most universities, other non-profit entities, and industries address this concern and expense by relying on state statutes requiring certain types of legal expense reimbursement or advances, or by adopting their own indemnification policies covering officers and employees. The vagueness, complexities, and time-consuming aspects involved with the ITAR, even if covered by indemnification resolutions and legal representation and damages/penalties insurance, are sufficient to discourage even the most attentive and knowledgeable scientist, not to mention foreign colleagues, students, and research associates.

A. What does the Average Indemnification Policy Cover?

What does the standard indemnification resolution and policy usually cover with respect to protecting employees, keeping in mind that Federal employees do not "enjoy" this kind of protection in carrying out their perceived duties? With variations that can be significant, the discussion, below, addresses certain provisions usually found in indemnification resolutions of educational and other non-profit entities.

> Employees [presumably including scientists and their respective staffs], and specifically-named individuals who are acting as *designated agents* of an organization, are normally covered by that organization's indemnification resolution policy. Usually, any covered person who was or is a party, or is threatened to be made a party to any threatened, pending, or completed action, suit, or proceeding, whether civil, criminal, administrative, arbitrative, or investigative, by reason of the fact that he or she is or was a covered person *found to be acting within the scope of his or her employment and in furtherance of his or her official duties*, will be reimbursed or advanced *necessary* expenses or *otherwise indemnified* by the employing organization (including attorneys' fees), judgments, fines, penalties, and amounts paid in settlement actually and *reasonably incurred* by him or her *in connection with such* action, suit, or proceeding *if* he or she *acted in good faith* and in a manner he

> or she *reasonably believed* to be in or not opposed to the *best interest* of the employer will be indemnified by the employing organization, and, with respect to any criminal action or proceeding, had *no reasonable cause to believe his or her conduct was unlawful*; provided, however, that no indemnification shall be made in respect of any claim, issue, or matter as to which such covered person shall have committed *intentional, willful, or reckless misconduct or gross negligence* in the performance of his or her duty to the employing organization, unless and only to the extent that a court of competent jurisdiction shall determine upon application that, despite the adjudication of liability, but *in view of all the circumstances* of the case, such covered person is *fairly and reasonably* entitled to indemnity for such expenses which the court shall deem proper.[94]

All of the italicized words and phrases demand definition and interpretation, both standing alone and in the context of what is usually a very complex and unfolding fact situation. Phrases such as "reckless misconduct" and "gross negligence" have volumes of statutory and case law surrounding their interpretations in varying contexts. A scientist may well consider another line of professional endeavor after just looking at the italicized words and phrases. But that is not all. The following terms of coverage also are standard in some form in most indemnification policies and resolutions:

> Notwithstanding any other provision of this Policy, a covered person who has been successful, on the merits or otherwise, in the defense of any action, suit, or proceeding (referred to above) to which he or she was a party shall be indemnified against expenses (including attorneys' fees) actually and rea-

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[94] These provisions are extracted, and modified as appropriate, from the January 24, 2000 "Revised Smithsonian Institution Indemnification Policy" approved by the Institution's Board of Regents. In several respects, even this indemnification resolution may be considered deficient in its coverage of Smithsonian scientists and other staff employees. *See*, Smithsonian Institution Board of Regents, *Revised Smithsonian Institution Indemnification Policy* (Jan. 24, 2000) (on file with the Smithsonians' Office of General Counsel, Washington, D.C.) (emphasis added).

> sonably incurred by him or her in connection with such action, suit, or proceeding.[95]

Usually, before a scientist or other covered person under the indemnification policy resolution can seek outside counsel, they must contact the university or foundation legal counsel and the State attorney-general's office to discuss the matter. Once those individuals decide there might be a conflict of interest, for example, between the scientist/staff member(s) and the employing university or non-profit entity, the scientist may be authorized or otherwise encouraged to retain private counsel, with or without approval of the employing entity. And that is where the truly damaging personal expenses start, along with the professional disparagement (more frequently than not unjustified) that may well ensue *regardless of the element of guilt*. Finally, many, if not most, indemnification policies and resolutions might include the following type of provision:

> Reasonable expenses incurred in defending any threatened, pending, or completed civil or criminal action, suit, or proceeding, shall be paid by the employer in advance of the final disposition of such action, suit, or proceeding, if the covered person shall undertake to repay such amount in the event that it is ultimately determined he is not entitled to such indemnification. The advance payments will be terminated if at any time it is determined that such covered person acted in bad faith and in a manner opposed to the best interests of the employing organization, or, with respect to any criminal proceeding, such covered person had reasonable cause to believe that his or her conduct was unlawful.[96]

Simply put, there are too many ambiguous escape clauses for any potential scientist beneficiary of the average indemnification policy and resolution to rely on it as a source of legal and other fees. State and federal employees may not have the benefit of these payments if state or federally appropriated funds are relied on. Non-appropriated private funding must be used. And the state and federal governments are the entities interpreting,

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[95] *Id.*
[96] *Id.*

applying, and enforcing the ITAR. If they make a mistake, are they immune from investigation, prosecution, and applicable penalties? If they are completely relied upon to make an ITAR determination regarding the basic or applied (fundamental) research proposal from the outset and at incremental phases along the avenue of pursuing the research, can they share in any of that immunity, unlawful activity, ill motivation, and gross negligence, etc., notwithstanding? Numerous complex legal, factual, and fiscal questions must be asked by a scientist and involved colleagues, and satisfactorily answered, before the scientist/colleagues can decide whether and how to undertake the financial onus personally when the ITAR issue might arise. Nevertheless, a careful and close assessment and fine-tuning of a standard indemnification policy and resolution ought to be pursued by NASA and other relevant agencies, universities, industries, and non-profit organizations that would properly protect scientists from the vagueness, vagaries, and extraordinary personal costs of the ITAR and their interpretations and applications.

B. How is the Coverage Financed?

Normally, under an indemnification resolution, an entity is authorized to purchase and maintain insurance on behalf of any covered person with respect to liability asserted against him or her, or incurred by him or her, in the covered capacity. This is true of other covered individuals regarding activities arising out of his or her status, regardless of whether the employing entity would have the power to indemnify him or her against such liability under the various provisions of the indemnification policy, such as those noted above. Such insurance would normally come in the way of a standard Directors and Officers liability policy, or specifically tailored provisions of such a policy suited to the insured entity. Given the potential breadth of coverage in an ITAR action, and the significant fiscal penalties that may be involved, the policy would be comparatively expensive; often a deterrent.

Another avenue is to have the employing entity set aside a specific fund that all employees pay into routinely for indemnifi-

cation purposes. Finally, individual employees can take advantage of private insurance plans to protect them from financial losses arising from ITAR implementations and civil penalties. Unfortunately, the limits placed on such private protection policies are too low to make them viable options when complex and potentially lengthy legal representation is likely to be required. These exposures to personal financial losses over protracted proceedings that may not reveal the existence or extent of liability or wrong-doing until the end of the proceedings over a period of years can frequently lead to otherwise inadvisable plea-bargaining in the case of criminal sanctions. Civil penalty settlements might be negotiated that may not be justified except for convenience and lessening the impact of protracted proceedings and seriously compromised professional reputations that would likely occur, depending upon the fact situation.

C. Appeals Procedures

Under Sec. 120.4 of the ITAR, the jurisdiction and procedures are set forth involving the U.S. Government if any doubt exists regarding an article or service that might be covered by the U.S. Munitions List. It also can be used for consideration of a redesignation of an article or service currently covered by the USML. Nevertheless, the Department of State is required to provide notice to Congress at least 30 days before any item is removed from the List. Further, upon written request, the Directorate of Defense Trade Controls "shall provide a determination of whether a particular article or service is covered" by the USML, and the determination has to be consistent with Secs. 120.2, 120.3, and 120.4 of the ITAR. The process requires "consultation among the Departments of State, Defense, Commerce and other U.S. Government agencies and industry in appropriate cases."[97]

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[97] *See* Directorate of Defense Trade Controls, www.pmdtc.org. *See also* an unclassified executive summary of a review of the U.S. Munitions List and the commodity jurisdiction process in March 2001 by the Department of State, Office of the Inspector General stating that the "National Defense Authorization Act for FY 2000, Public Law 106-65, Title XIV, Section 1402, Annual Report on Transfers of Militarily Sensitive Technology to Countries and Entities of Concern, requires the Inspectors General of the De-

Upon completion of a 1993 review, the OIG determined that the policies and procedures for developing, maintaining, and revising the USML were adequately protecting the export of militarily sensitive technologies. Nevertheless, the Defense Trade Control had not performed a comprehensive review of the USML since 1993, and the list reflected an attempt to control too many items and services unnecessarily. Herein rests the second significant delay in the ITAR process that must be overcome to allow scientists and research administrators to conduct necessary basic and fundamental research in a reasonably timely fashion.[98]

X. CURRENT STATUS OF ITAR REVIEW AND CORRECTIVE ACTIONS BY THE U.S. GOVERNMENT

An interesting approach to helping solve the confusion, complexities, and fears of civil and criminal actions being endured, or potentially so, by scientists involved in basic research and the traditional need and practices of open dialogue and international collaboration among peers, as well as many of the ITAR enforcement officials concerned with the growing lack of continuity in interpretation and application of the ITAR, is one of developing formal treaty relationships with specific U.S. military/political allies, and also select partners in the global economy. A longstanding relationship has existed between the United States and Canada regarding ITAR exemptions relating to the latter's defense trade control practices, and as of 2007, after lengthy assertions of concern surrounding such issues as who qualifies as a "foreign resident" under Canadian law, the restoration of ITAR exemptions for Canada have been addressed satisfactorily.

One recent attempt, presently extant but with expectation that it will enter into force in 2008, is the draft US-UK Defense

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partments of Commerce, Defense, Energy, and State to audit the U.S. Government policies and procedures for export of technologies and technical information to countries and entities of concern." Office of Inspector General, Review of the U.S. Munitions List and the Commodity Jurisdiction Process, Memorandum Report 01-FP-M-027 (Mar. 2001) (on file with author) [hereinafter *Review of the U.S. Munitions List*].

[98] *Review of the U.S. Munitions List, supra* note 97, at Executive Summary.

Trade Co-operation Treaty.[99] The general objective of the document is to formulate an operating framework that will allow smoother and closer defense and general security cooperation between the two countries. This would be achieved primarily by reducing the number and types of restrictions to relevant exchanges of defense goods and services, including information, between the two nations. Similar agreements between the United States and Australia, as well as other defense allied nations, have been signed or otherwise addressed as partial resolutions of the problems created by the current implementation of the ITAR and EAR requirements.

In February 2008, a briefing report of the Working Group established by the Center for Strategic & International Studies (CSIS), Washington, D.C., to review and offer recommendations regarding The Health of the U.S. Space Industrial Base and the Impact of Export Controls[100], was published and made available to the public. The principal objective of the expert study group, in the context of U.S. National Space Policy of August 31, 2006,[101] was to "[1] review previous and ongoing studies on export controls and the U.S. space industrial base and [2] assess the health of the U.S. space industrial base and determine if there is any adverse impact from export controls, particularly on the lower-tier contractors." This expert working group was also tasked with reviewing "the results of the economic survey of the U.S. space industrial base conducted by the Department of

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[99] On June 26, 2007, President George W. Bush and U.K. Prime Minister Tony Blair signed the U.S. – U.K. Defense Trade Cooperation Treaty. It was forwarded to the United States Congress at the end of 2007 for advice and consent and ratification. *See*, U.S. Department of State Fact Sheet, The U.S. – U.K. Defense Trade Cooperation Treaty (Aug. 10, 2007), http://www.state.gov/t/pm/rls/fs/90740.htm.

[100] Pierre Chao, *Health of the U.S. Space Industrial Base and the Impact of Export Controls* (Feb. 18, 2008), *available at* http://www.csis.org/index.php?option=com_csis_pubs&task=view&id=4381.

[101] The Statement of Task of the Working Group was formulated in the context of the preamble to the 2006 U.S. National Space Policy, i.e., "In order to increase knowledge, discovery, economic prosperity, and to enhance the national security, the United States must have robust, effective, and efficient space capabilities." Nowhere in this Space Policy are the words "knowledge" and "discovery" defined, whether carefully or even within a reasonably general context. The Statement of Task in the CSIS Working Group briefing of February 2008 refers only to reviews of export controls impacting the U.S. space industrial base. Nowhere is the word "base" in this context broken down to include "basic" research, i.e., knowledge solely for the sake of knowledge.

Commerce and analyzed by the Air Force Research Laboratory…."[102]

In its Executive Summary, the CSIS Working Group did make a vague reference to the potential for basic research being an area of concern "within the broader health of the industry."[103] Further, in recommendations made by the Working Group, it was asserted that

> The Secretary of Defense and NASA Administrator, in addition to the Secretary of State, should have the authority to grant real-time, case-by-case, specific time period exemptions for anomaly resolutions deemed to be in the national interest based on criteria from the National Space Policy. [104]

Again, no definitive characterizations appear in the briefing report of what constitutes an "anomaly" and an "anomaly resolution"; at least sufficiently definitive to invoke the necessary constitutional clarity required for application of criminal penalties under the ITAR. At best, these terms invoke a certain amount of curiosity and guesswork as to what they might include, but do suggest more that the regulatory exemptions for basic, if not fundamental, research would not be applicable.

Lack of specificity in definitions of basic, applied, and fundamental research, in addition to vague words and phrases such as "innovation" and "anomalous resolutions", should not be the basis for invoking penalties for failure to comply with the applicable ITAR provisions relating to exemption criteria. Again, the Working Group briefing refers to the 2nd and 3rd tier of industry that is being adversely affected in global economic competitiveness by the export control laws, and that these tiers of industry are "the source of much innovation." Clearly, the focus of the study and recommendations remains on directed or applied research.

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[102] Briefing of the Working Group on the Health of the U.S. Space Industrial Base and the Impact of Export Controls, at 3, *available at* http://www.csis.org/index.php?option=com_csis_pubs&task=view&id=4381.

[103] *Id.* at 7.

[104] *Id.* at 40, at Recommendation 6.

Again, there is no definition of what constitutes "innovation," except that it must be the product of 2nd and 3rd tier companies that are "the most engaged in the global market place in the aerospace/defense sector." This is hardly a term one would use, then, to describe "basic" research.[105] Further, does reference to "industrial base" include basic research? Does reference to exemptions for "anomaly resolutions" incorporate the criteria for conducting basic research?[106] Again, it is posited here that there is lack of specificity and clarity sufficient to invoke serious civil and criminal penalties for violations of the ITAR.

In many respects, the CSIS Working Group briefing of February 2008 perpetuates the confusion relating to what constitutes basic research, and is focused almost exclusively on the end of the fundamental research spectrum that transitions into applied research. Nevertheless, under its "Findings 7: U.S. leadership in space benefits significantly from access to foreign innovation and human capital, but access is becoming increasingly difficult," the Working Group noted that "The key to maintaining U.S. technological preeminence is to encourage open and collaborative basic research. The linkage between the free exchange of ideas and scientific innovation, prosperity, and national security is undeniable."[107] This is the only reference to basic research in its proper context, but still without specific definition, and only with reference to prosperity and national security, which seems more like directed or applied research than research seeking knowledge purely for the sake of having that knowledge. It is clear that the only issues relating to the ITAR and basic research exemptions being focused upon by the CSIS Working Group are those with direct and often immediate relevance to national security and relatively quick enhancement of U.S. economic competitiveness in the global space industry. Protection, encouragement, and cultivation of the foundation upon which directed or applied research is dependent, i.e., basic research, remains at best a diminishing remnant of the history

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[105] *Id.* at 10.
[106] *Id.* at 11.
[107] *Id*. at 25.

of hominid evolution. And, yet, contemporary basic research is a critical not only to the survival of civilizations, but perhaps to the species, Homo sapiens, itself.

XI. CONCLUSIONS

Unfortunately, much confusion continues on the part of the regulated individuals and entities, and even on the part of many of the regulating authorities. Controlling the flow of weapons and weapons-related technology by various nations and civilizations has a long history, mostly of failures. Under the U.S. Arms Export Control Act and the implementing ITAR and EAR, there is a confusing disparity in definitions, interpretations, and applications at many levels of the export control process, with a resulting chilling effect on the initiatives of private commercial interests resulting in the loss of business opportunities by U.S. industry.

When the ITAR responsibilities were picked up by the Department of State, a very significant part of the U.S. competition in the international high tech marketplace was placed in the hands of exceedingly cautious and "hyper-legalistic" staff of the Department's routine bureaucracy. The implementation of the ITAR was, at best, sluggish, and mostly at the expense of industry and the often time critical requirements of those involved in scientific research. But lost opportunities also are experienced by those individuals and institutions involved in conducting truly basic research. A resulting "brain drain" reversal away from the United States and its interests has been under way at a steadily increasing rate since 1999 when Congress transferred ITAR responsibilities for the space-related activities, among others, from the Department of Commerce to the Department of State.[108]

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[108] *See* SPACE SCIENCE AND THE INTERNATIONAL TRAFFIC, supra note 10, at 1 ("contravening U.S. interests in attracting foreign students to U.S. universities, the capture of space technology by ITAR has caused serious problems in the teaching of university space science and engineering classes, virtually all of which include non-U.S. students"). As noted in the CSIS Working Group Briefing, "Given that foreign students earn more than half of the science, technology and engineering PhD's and foreign-born workers make up more than a quarter of the U.S. ST&E workforce…the inability to access this

The fiscal and professional costs incurred simply by the lengthy documentation of Fundamental Research Exemptions; the negotiations and costs of implementing the ITAR; costs of educating faculties and university/industry management about the ITAR and their implementation; lack of useful and timely guidance to scientists and administrators; non-resolution of contract "flow down" issues; restrictions on professional publications; and the costs of walking away from the burgeoning expenses of implementing the ITAR and achieving Fundamental Research Exemptions, are all remaining or becoming increasingly unacceptable realities, both for universities and private industry. There are times and circumstances when the implementation of the ITARS can be self-defeating for the very interests they were intended to protect.

Just as important, and perhaps even more so, is the serious and growing indifference to, and lack of recognition by, the U.S. public and private sectors that *basic* research is critical to the survival and evolution of its civilization…any civilization. Justifiably or not, basic research tends to be sacrificed rather easily for the sake of pressing, but for the most part legitimate, short term requirements of national defense interests, international economic competitiveness of the United States, and the long term public benefits that derive from unintended or unforeseen consequences of seeking knowledge purely for the sake of knowledge. But pressing needs of this nature cannot justify dispensing altogether, or even in a significant fashion, with the critical requisite for on-going basic research conducted in the traditional, globally-transparent manner.

As discussed above, certain localized and short term "fixes" have been initiated and some have been implemented. Nevertheless, the White House and the Congress will have to come together during the post George W. Bush presidency to formulate and pass comprehensive remedial legislation, perhaps of the nature suggested in the CSIS February 2008 "Briefing of the Working Group on the Health of the U.S. Space Industrial Base and the Impact of Export Controls," that will become effective as

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group automatically shrinks the available talent pool….Furthermore the total applications of foreign graduate students to U.S. universities was down 19% in 2004-2007."

soon as possible. If there is any unnecessary delay in addressing this need, the issues and problems created by the current confusion and inconsistencies of the ITAR applications, particularly with respect to the conduct of space activities and space-related basic research, may well cost the United States significant leads in certain areas of space technology, national defense interests, and international economic competition in the long as well as short run. "Serendipity" in all likelihood will be eliminated from the free world's scientific lexicon of uninhibited curiosity and open basic research collaboration, and the survival of civilizations based upon unrestricted collegial inquiry occurring in the global public domain once again will become a subject of intense lamenting.