SPACE-BASED FUNDAMENTAL RESEARCH AND THE ITAR: A STUDY IN VAGUENESS, OVERBREADTH, AND PRIOR RESTRAINT

Rachel Lehmer Claus, Esq.[*]

INTRODUCTION

"Fundamental research" is openly conducted science and engineering research carried out at institutions of higher education in the United States.[1] 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. Many of the extraordinary advances in science and technology of the last few decades derived from and flourished in the atmosphere of open communication that is a hallmark of academic scientific communities.[2]

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[*] Ms. Claus is University Counsel for the Stanford Linear Accelerator Center (SLAC), Stanford University; however, the opinions expressed in this paper are hers alone and do not necessarily reflect the view of Stanford University or its Linear Accelerator Center. Ms. Claus gratefully acknowledges the technical assistance of Azita Saghafi, second year student at the Santa Clara University School of Law, in bringing this article to publication.

[1] "'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, …" *National Policy on the Transfer of Scientific, Technical, and Engineering Information*, National Security Decision Directive 189 (Sept. 21, 1998) [hereinafter National Security Decision Directive 189] *available at* http://www.aau.edu/research/ITAR-NSDD189.html. For purposes of this discussion, the term "basic" refers to 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 similar original research that will result in new knowledge, but directed primarily toward a specific practical objective. ORGANISATION FOR ECON. CO-OPERATION AND DEV., FRASCATI MANUAL 2002: PROPOSED STANDARD PRACTICE FOR SURVEYS ON RESEARCH AND EXPERIMENTAL DEVELOPMENT, at 30 (2002).

[2] Maintaining this fruitful environment is of sufficient import to have prompted a number of universities to develop formal policies that preclude the acceptance of restrictions on

In fact, it is a signal mark of fundamental research that it is carried out in the public domain. During the mid-1980s, at the height of the Cold War, President Ronald Reagan issued a formal policy[3] to give primacy to the importance our nation attaches to such openly conducted research. That policy defined "fundamental research" as the conduct of basic and applied research in science and engineering, the results of which are made available to the interested scientific community. It also established that fundamental research, unclassified and nonproprietary, conducted by U.S. academies is a proper subject of international scientific exchanges not subject to the restrictions of the International Traffic in Arms Regulation.

Ultimately many of the advances derived from fundamental research and unclassified technologies have benefited the U.S. military as well as invigorated our economy. Science and technology are deemed elements critical to economic vigor.[4] That said, those dedicated to national security rightly must be vigilant to ensure that vital defense technologies are not lost to those who would use them against us. Disclosure and access restrictions on particular types of research, through classification[5] and

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the conduct and dissemination of their research. Many decline research if the sponsor thereof is able to restrict dissemination or to deny to any otherwise eligible researcher or student the ability to participate in or access the intellectually significant portions of a research project. *See* Stanford University, *Research Policy Handbook: Openness in Research*, at http://www.stanford.edu/dept/DoR/rph/2-6.html (last modified Feb. 15, 2001). This type of policy effectively eliminates proprietary, classified, or other secret research from the endeavors undertaken by fundamental research universities. As an aid to such institutions, the Council on Governmental Relations of the Association of American Universities maintains a website (with MIT) listing the types of restrictive clauses to be avoided in research contracts, *see* http://mit.edu/osp/www (last visited Jun. 8, 2004).

[3] National Security Decision Directive 189, *supra* note 1.

[4] National Science Board, *Science and Engineering Indicators*-2002, 1 SCI. AND ENG'G INDICATORS-2002 (2002).

[5] Exec. Order No. 12,958, 60 Fed. Reg. 19,825 (Apr. 20, 1995) (describing the general classification policy of the federal government), *available at* http://www.epic.org/open_gov/eo_12958.html (n.d.). Section 1.7(b) provides that basic scientific research information not clearly related to the national security may not be classified. However, Exec. Order No. 13,292, 68 Fed. Reg. 15,315 (Mar. 25, 2003),

other official forms of secrecy, have been effectively used to protect against that threat. Inevitably, however, some tension exists between the national security establishment and the open academies upon which they draw.[6] For the most part, U.S. universities have found methods to manage such conflicts. For example, as noted, some confront the dilemma by declining to undertake classified or secret research. Others establish separate entities to undertake "black box" research; the Lincoln Laboratory operated by the Massachusetts Institute of Technology is an example of this sequestering.

Recent events, however, have caused a dramatic increase in the tension between the two important national priorities of security and open academies with regard to university fundamental research that is space-based, satellite-reliant, or spacecraft related. Although space has been utilized as a research platform by universities for decades, and even though universities have been major participants in fundamental research contributing to spacecraft research throughout this time, today the openness inherent in such university-based research gives rise to more direct conflict and heightened restrictions. In this newly enflamed arena, commentators are voicing concerns about the stifling of scientific innovation, which in turn, adversely impacts both economic health and

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added a new clause to section 1.5 that permits classification of scientific, technological, or economic matters related to national security and defense against transnational bioterrorism. For a discussion on the topic of national security and classification, *see* ARVIN S. QUIST, SECURITY CLASSIFICATION OF INFORMATION: PRINCIPLES FOR CLASSIFICATION OF INFORMATION at Ch. 5 (1993) *available at* http://www.fas.org/sgp/library/quist2/index.html.

[6] For excellent discussions demonstrating the long history of this tension, *see, e.g.,* Ferguson, *Scientific and Technological Expression: A Problem in First Amendment Theory*, 16 HARV. C.R.-C.L. L. REV. 519 (1981), and Shinn, *The First Amendment and the Export Laws: Free Speech on Scientific & Technical Matters*, 58 GEO. L.J. 368 (1990).

national security.[7] An atmosphere of "secrecy and burdensome regulations" makes it difficult to recruit both domestic and foreign talent to science and technology research, even though foreign researchers have been and continue to be "critical to the vitality of American innovation."[8]

This sea-change came about in 1999 when Congress mandated that export licensing jurisdiction of all satellites and related equipment and services, irrespective of military utility, be transferred from the Department of Commerce (under the Export Administration Regulations, or EAR[9]) to the Department of State[10] (under the International Traffic in Arms Regulation, or ITAR[11]). Consequently, information about research, experimental, and scientific satellites is currently being treated as ITAR-controlled "technical data" despite the fact that much of the hardware and information about it has been in the public domain from 30 years (satellites) to 50 years (rocketry) and is not classified. Further, the ITAR itself states that information in the public domain is not subject to

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[7] *See, e.g.,* Alice P. Gast, Massachusetts Inst. of Tech., *The Impact of Restricting Information Access on Science and Technology*, *at* http://www.aau.edu/research/Gast.pdf (2003); ASHTON B. CARTER ET AL., KEEPING THE EDGE: MANAGING DEFENSE FOR THE FUTURE (2000); The Henry L. Stimson Center and Center for Strategic and International Studies, *Study Group on Enhancing Multilateral Export Controls for US National Security: Final Report*, *at* http://www.stimson.org/newpubs.cfm?PT=2&SB=0&P=0&StartRow=31 (Apr. 2001).

[8] Alice P. Gast, Massachusetts Inst. of Tech., *The Impact of Restricting Information Access on Science and Technology* 4-5, *at* http://www.aau.edu/research/Gast.pdf (2003).

[9] Export Administration Act, 50 U.S.C. § 2401 (2003 or 1979), implemented by the Export Administration Regulations, 15 C.F.R. §§ 730 -774.1, *available at* http://w3.access.gpo.gov/bis/ear/pdf/indexccl.pdf (last modified May 6, 2004). [Note: the EAA expired on August 20, 2001, but the EAR is maintained in effect under the authority of the International Emergency Economic Powers Act, Pub. L. No. 95-223, Exec. Order No.13,222, 3 C.F.R. 13,222 (2002).]

[10] Strom Thurmond National Defense Authorization Act for Fiscal Year 1999, Pub. L. No. 105-251, 112 Stat. 2267, 10 U.S.C. § 7420.

[11] The Arms Export Control Act, 22 U.S.C. § 2778 (1979), Priv. L. No. 96-72, 93 Stat 503 (Sept. 29, 1979), 22 C.F.R. §§ 120 – 130 (2002), *available at* http://www.access.gpo.gov/nara/cfr/waisidx_01/22cfr121_01.html (Apr. 1, 2001).

disclosure restrictions and access controls,[12] a position recently reiterated by the State Department[13] and also found in case law.[14]

As a result, universities operating in the public domain and carrying out unclassified spacebased research in various disciplines (environmental studies, bio-molecular research, particle and astrophysics, cosmology) may find they are not allowed to involve foreign students, faculty, and collaborators unless they first obtain an export license[15] from the State Department. Based on ITAR treatment of "associated equipment," "related systems," and "payloads," similar licensing issues emerge with regard to such academic endeavors as aero- and astronautics, robotics, nanotechnology, mechanical and electrical engineering, optics, remote sensing devices, and computing and data acquisition systems. Universities undertake such study and research in the public domain, bringing to bear on these disciplines the world's best minds and exposing their work to the stimulating rigors of peer review and intellectual competition.

This paper will explore how the ITAR only minimally implements National Security Decision Directive 189 as it relates to spacecraft-related fundamental research[16] and how it imposes licensing restrictions on the dissemination of information, falling within the realm of protected

[12] 22 C.F.R. § 120.3 (2004); 22 C.F.R. § 120.10(5) (2004); 22 C.F.R. § 120.11 (2004).
[13] 67 Fed. Reg. 15,099-15,101 (March 29, 2002) (wherein the State Department stated that it was State Department policy to not regulate fundamental research, by definition, research that is in the public domain.).
[14] United States v.Posey, 864 F.2d 1487 (9th Cir. 1989). Dismissal was granted as to the cause of action relating to export of technical information available through the Freedom of Information Act, which the Defense Department considered in the public domain and thus exempt from export control.
[15] Obtaining such a license may be difficult and time-consuming, and the process, bereft of clear standards is unpredictable. Moreover, merely submitting to such a restriction may alter forever and adversely the character and treatment of the research (22 C.F.R. § 120.11(8)(ii) provides that the acceptance of, among other things, dissemination restrictions precludes characterizing the research as "fundamental.").
[16] *See also* John R. Liebman, *Scientific Research and Technical Data Export Controls: When Two Worlds Collide*, 11 INT'L L.J. ST. B. ASS'N CAL. NO. 2 (2001-2002).

speech.[17] The restrictions may violate constitutional due process protections and constitutional safeguards against prior restraint.[18]

I. NSDD 189, PUBLIC LAW 105-261, AND ITAR

A. The POLICY

In 1985, then President Ronald Wilson Reagan signed National Security Decision Directive 189, which was released by the National Security Council pursuant to Executive Order 12,356.[19] This pivotal document establishes a national policy with regard to fundamental research. It reads as follows:

NATIONAL SECURITY DECISION DIRECTIVE 189

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

I. PURPOSE

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

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

[17] For an interesting discussion of scientific information as protected speech, see Bernstein v. Department of State, 945 F. Supp. 1279 (N.D. Cal. 1996) and Bernstein v. Department of Justice, 176 F.3d 1132 (9th Cir. 1999), *reh'g granted en banc and opinion withdrawn*, 192 F.3d 1308 (9th Cir. 2000), in which the District Court and the Court of Appeals discuss public domain information, speech, and export controls.

[18] For an analysis of these issues from a private sector perspective, see Ronald J. Sievert, *Has the Time Finally Arrived to Overhaul the U.S. Export Control Regime?*, 37 TEX. INT'L L.J. 89 (Winter 2002).

[19] Exec. Order No. 12,356, 3 C.F.R. 12,356 (1982), *at* http://www.epic.org/open_gov/eo_12356.html (Apr. 2, 1982).

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

II. BACKGROUND

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

III. POLICY

It is the policy of this Administration that, to the maximum extent possible, the products of fundamental research remain unrestricted. It is also the policy of this Administration that, where the national security requires control, the mechanism for control of information generated during federally funded fundamental research in science, technology and engineering at colleges, universities and laboratories is classification. Each federal government agency is responsible for: a) determining whether classification is appropriate prior to the award of a research grant, contract, or cooperative agreement and, if so, controlling the research results through standard classification procedures; b) periodically reviewing all research grants, contracts or cooperative agreements for potential classification. No restriction may be placed upon the conduct or reporting of federally funded fundament research that has not received national security classification, except as provided in applicable U.S. Statutes.

Executive Order 12,958, "Classified National Security Information"[20] (17 April 1995) describes the general classification policy of the federal government.[21] In section 1.7(b), it states that basic scientific research information not clearly related to the national security may not be classified.

The policy enunciated in NSDD 189[22] has been reaffirmed by every Administration since 1985, including the current one (George W. Bush). In a letter dated November 1, 2001, to Dr. Harold Brown, co-chairman of the Center for Strategic & International Studies (CSIS), Condoleeza Rice, National Security Advisor to President George W. Bush, wrote:

> "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 U.S. national security is undeniable. This linkage is especially true as our armed forces depend less and less on internal research and development for the innovations they need to maintain the military superiority of the United States. In the context of broad-based review of our technology transfer controls that will begin this year, this Administration will review and update as appropriate the export control policies that affect basic research in the United States. In the interim, **the policy on the transfer of scientific, technical, and engineering information set forth in NSDD-189 shall remain in effect, and we will ensure that this policy is followed."[23]** [emphasis added]

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[20] Exec. Order No. 12,958, 60 Fed. Reg. 19,823, *at* http://www.epic.org/open_gov/eo_12958.html (Apr. 17, 1995).

[21] Interestingly, ITAR strictures, discussed *infra*, are often more stringent than would be required if the information or technology had been classified, due to ITAR's vague,imprecise, and inconsistent requirements, generally interpreted by an administrative official untrained as to constitutionally protected speech. Unlike those operating within the ITAR regime, those operating in a classified environment, regulators and the regulated alike, know exactly how to proceed and what to expect.

[22] National Security Decision Directive 189, *supra* note 1.

[23] Condoleezza Rice Letter on NSDD-189, *at* http://www.aau.edu/research/Rice11.1.01.html (Nov. 1, 2001).

B. The LEGISLATION

In the wake of the Cox Report[24] and the allegations of spying at the Los Alamos National Laboratories, Congress legislatively reiterated the importance of the Missile Technology Control Regime: "[D]ue to the sensitivity of technologies involved, it is in the national security interests of the United States that United States satellites and related items be subject to the same export controls that apply...to munitions."[25] That Act further stated that all satellites and related items that were on the Commerce Department dual-use list were to be transferred to State Department Munitions List and made subject to the International Traffic in Arms Regulation.[26] Prior to the changes, the ITAR generally had jurisdiction over satellites of specific military design or capability. The 1999 changes to the implementing regulations (the ITAR) expressly listed for the first time "experimental, scientific, and research" satellites, associated systems, and related equipment.[27] Most of this technology and its related information had served a preponderantly civilian purpose for decades; information on how to build these types of satellites and rockets had been in the public domain for 30 and 50 years, respectively.[28]

The Arms Export Control Act (AECA) authorizes the President to control the import and export of defense articles and defense services by

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[24] H.R. REP. NO. 105-851 (Jun. 14 1999), *available at* http://www.gpo.gov/congress/house/hr105851-html/index.html (Jun. 14, 1999) and http://hillsource.house.gov/CoxReport/report/welcome2.html (1999).
[25] Strom Thurmond National Defense Authorization Act for Fiscal Year 1999, Pub. L. No. 105-251, 112 Stat. 2267, 10 U.S.C. § 7420.
[26] *Id.*
[27] *See also* 15 C.F.R. § 774 Supp.1 n.4 [ECCN 9A004] (delegating licensing jurisdiction of satellites and their payload to the Office of Defense Trade Controls of the Department of State.). See http://www.pmdtc.org for more on treatment of "space qualified" items.
[28] Specifications and other technical information concerning fabrication of Delta-series rockets had been available on a publicly accessible website, having previously been approved for release by the Secretary of the Air Force. Those websites were recently dismantled, but you can get a flavor of what they once were by visiting http://antwrp.gsfc.nasa.gov/apod/ap951213.html and http://www.universetoday.com/html/topics/delta.html.

designating such items to the United States Munitions List (USML).[29] The USML resides in the ITAR at Part 120, and the expressly stated purpose of ITAR is to control export/import of defense articles and defense services.[30] Furthermore, anything that is to be added to the USML must be designed or intended for military use (or activities intended to support military use) and not have a predominant civilian use or civilian performance equivalence.[31]

C. The REGULATIONS

The general rule is that a license or other approval must be obtained from the State Department in order to export a defense article or to provide a defense service.[32] In parsing the ITAR for this discussion, I have emphasized in boldface any language of particular import to this discussion.

> "Export" means:
> (1) Sending or taking a defense article out of the United States in any manner, except by mere travel outside of the United States by a person whose personal knowledge includes technical data; or
> (2) Transferring registration, control or ownership to a foreign person of any aircraft, vessel, or satellite covered by the U.S. Munitions List, whether in the United States or abroad; or
> (3) Disclosing (including oral or visual disclosure) or transferring in the United States any defense article to an embassy, any agency or subdivision of a foreign government (e.g., diplomatic missions); or
> (4) Disclosing (including oral or visual disclosure) or transferring technical data to a foreign person, whether in the United States or abroad (this would affect foreign students, scientists, and researchers admitted to the U.S.

[29] 22 U.S.C. § 2778(a)(1) (2004).
[30] 22 C.F.R. § 120.1 (2004).
[31] 22 C.F.R. § 120.3 (2004).
[32] 22 C.F.R. § 123.1 (2004).

> by the State Department on the appropriate visa to pursue a particular course of study or research); or
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> (5) Performing a defense service on behalf of, or for the benefit of, a foreign person, whether in the United States or abroad.[33]

As a general proposition, I will use the term "deemed export" to describe the situation where a foreign national on U.S. soil may be exposed to or have access in any manner to an export-controlled item or export-controlled information, as described at (4) above.

> A "Defense Article" is anything on the United States Munitions List (USML).[34] The term includes technical data recorded or stored in any physical form, as well as models, mockups or other items that reveal technical data directly relating to items on the USML.[35]

> A "Defense Service" may consist of any of the following: (1) 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; (2) furnishing to foreign persons of any technical data controlled by the ITAR, whether in the United States or abroad; or (3) military training of foreign units and forces, regular and irregular, including formal or informal instruction of foreign persons in the United States or abroad or by correspondence courses, technical, educational, or **information publications and media of all kinds**, training aids, orientation, training exercise, and military advice.[36]

It is noteworthy that the training activity described by item (3) may involve utilization of information in the public domain. In fact, elsewhere

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[33] 22 C.F.R. § 120.17 (2004) (emphasis added).
[34] 22 C.F.R. § 120.6 (2004).
[35] *Id.*
[36] 22 C.F.R. § 120.9 (2004) (emphasis added).

in the ITAR it is stated that the provision to a foreign national of even public domain information otherwise exempted from licensing requirements is designated a defense service requiring a license.[37]

> The term "Technical Data" means any of the following:
> (1) Information, other than software (defined elsewhere), which is required for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance or modification of defense articles (this includes blueprints, drawings, photographs, plans, instructions and documentation);
> (2) Classified information relating to defense articles and defense services;
> (3) Information covered by an invention secrecy order; or
> (4) Software directly related to defense articles.
> ITAR expressly **excludes from this definition information concerning general scientific, mathematical or engineering principles commonly taught in schools, colleges and universities, information in the public domain**, and basic marketing information on function or purpose or general system descriptions of defense articles.[38]
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> "Public Domain" is the term used to describe information which is published and which is generally accessible or available to the public through a variety of familiar means:
> (1) Through sales at newsstands and bookstores;
> (2) Through subscriptions which are available without restriction to any individual who desires to obtain or purchase the published information;
> (3) Through second class mailing privileges granted by the U.S. Government;
> (4) At libraries open to the public or from which the public can obtain documents;
> (5) Through patents available at any patent office;
> (6) Through unlimited distribution at a conference, meeting, seminar, trade show or exhibition, generally accessible to the public, in the United States;
> (7) Through public release (i.e., unlimited distribution) in

[37] 22 C.F.R. § 124.1(a) (2004).
[38] 22 C.F.R. § 120.10(5) (2004) (emphasis added).

any form after approval by the cognizant U.S. government department or agency;[39]

(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. In keeping with NSDD 189, Fundamental Research 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.[40]** University research will not be considered fundamental research if the University or its researchers accept restrictions on publication of scientific and technical information resulting from the project or activity, or the research is funded by the U.S. Government and specific access and dissemination controls are applicable to the information resulting from the research.[41]

"Spacecraft Systems and Associated Equipment" in ITAR includes scientific, research, and experimental satellites.[42] These are deemed Significant Military Equipment (SME) **if** intended for use by foreign armed services (SME is a designation which may make anything subject to special restrictions based on substantial military utility or capability).[43] Finally, the term "Associated Equipment"[44] encompasses a wide variety of items (such as mechanical adapters and interface hardware commercially available in the private sector), test equipment used in other arenas, ground control elements, tracking systems, Global

[39] For example, specifications and other technical information concerning fabrication of Delta-series rockets had, until just recently, been available on a publicly accessible website, having previously been approved for release by the Secretary of the Air Force. Those websites have been dismantled, but you can get a flavor of what they once were by clicking on http://antwrp.gsfc.nasa.gov/apod/ap951213.html and http://www.universetoday.com/html/topics/delta.html.
[40] 22 C.F.R. § 120.11 (2004) (emphasis added).
[41] *Id.*
[42] 22 C.F.R. § 121.1, XV (2004) (emphasis added).
[43] *Id*.
[44] 22 C.F.R. § 121.1, XV(e) (2004).

> Positioning Systems, and any scientific or research "payload."[45]
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> "Registration" with the Department of State, Office of Defense Trade Controls, is required for any person (a natural person, corporation, business association, partnership, society, trust, organization, group, governmental entity, or any other group[46]) who either manufactures or exports defense articles or defense services. Registration is a prerequisite to the issuance of an export license, or other approval or authorization.[47] However, **persons who engage only in the fabrication of articles for experimental or scientific purpose, including research and development, are not required to so register**.[48]

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[45] 22 C.F.R. § 121.1, XV(e) (2004). The State Department has amended the ITAR with regard to Spacecraft Systems and Associated Equipment fabricated only for fundamental research purposes and which involve research, experimental, and scientific satellites also appearing on the Munitions List (International Traffic in Arms Regulations, 67 Fed. Reg. 15,099-15,101 (Mar. 29, 2002)). The State Department noted in its discussion of the Final Rule that it was State Department policy to not regulate fundamental research and that the "…the March transfer of commercial communications satellites to the USML did not change this policy." None of this language appears in the Final Rule itself. Moreover, the new exemptions of general applicability provided by the Final Rule (22 C.F.R. section 123.16(b)(10) and section 125.4(d)(1)) are limited to public domain information, which is not subject to ITAR controls in the first place.

[46] 22 C.F.R. § 120.14 (2004).

[47] 22 C.F.R. § 122.1 (2004).

[48] *Id.* (emphasis added).

Licenses[49] are required for the export of technical data and classified and unclassified defense articles[50] and defense services,[51] unless

[49] Licenses for the Export of Defense Articles. 22 C.F.R. § 123.1 (2004).
(a) Any person who intends to export or to import temporarily a defense article must obtain the approval of the Office of Defense Trade Controls prior to the export or temporary import, unless the export or temporary import qualifies for an exemption under the provisions of this subchapter. Applications for export or temporary import must be made as follows:
(1) Applications for licenses for permanent export must be made on Form DSP-5 (unclassified);
(2) Applications for licenses for temporary export must be made on Form DSP-73 (unclassified);
(3) Applications for licenses for temporary import must be made on Form DSP-61 (unclassified); and
(4) Applications for the export or temporary import of classified defense articles or classified technical data must be made on Form DSP-85.
(b) Applications for Department of State export licenses must be confined to proposed exports of defense articles including technical data.
(c) As a condition to the issuance of a license or other approval, the Office of Defense Trade Controls may require all pertinent documentary information regarding the proposed transaction and proper completion of the application form as follows:
(1) Form DSP-5, DSP-61, DSP-73, and DSP-85 applications must have an entry in each block where space is provided for an entry. All requested information must be provided.
(2) Attachments and supporting technical data or brochures should be submitted in seven collated copies. Two copies of any freight forwarder lists must be submitted. If the request is limited to renewal of a previous license or for the export of spare parts, only two sets of any attachment (including freight forwarder lists) and one copy of the previous license should be submitted.
(3) A certification letter signed by an empowered official must accompany all application submissions (see Sec. 126.13 of this subchapter).
(4) An application for a license under this part for the permanent export of defense articles sold commercially must be accompanied by a copy of a purchase order, letter of intent or other appropriate documentation. In cases involving the U.S. Foreign Military Sales program, three copies of the relevant Department of Defense Form 1513 are required, unless the procedures of Sec. 126.4(c) or Sec. 126.6 of this subchapter are followed.
(5) Form DSP-83, duly executed, must accompany all license applications for the permanent export of significant military equipment, including classified hardware or classified technical data (see Secs. 123.10 and 125.3 of this subchapter).
(6) A statement concerning the payment of political contributions, fees and commissions must accompany a permanent export application if the export involves defense articles or defense services valued in an amount of $500,000 or more and is being sold commercially to or for the use of the armed forces of a foreign country or international organization (see part 130 of this subchapter).
(d) Provisions for furnishing the type of defense services described in Sec. 120.9(a) of this subchapter are contained in part 124 of this subchapter. Provisions for the export or temporary import of technical data and classified defense articles are contained in part 125 of this subchapter.

the export is of public domain information.[52] A license is also required for a disclosure, on U.S. soil, of technical data to any person or entity that is not a lawful permanent resident or a protected individual.[53] The requirement applies to oral, visual, or documentary disclosure, regardless of the manner in which the information is transmitted. **The provision to a foreign national of even public domain information <u>otherwise exempted from licensing requirements</u> is a defense service requiring a license.[54]** The licensing provisions of the ITAR also state that the **"exemptions of general applicability" otherwise available do not extend to applied research.[55]**

Early in 2002, the State Department amended the ITAR with regard to Spacecraft Systems and Associated Equipment fabricated only for fundamental research purposes – but which involve research, experimental, and scientific satellites also appearing on the Munitions List.[56] The State Department noted that, as a matter of policy, it did not regulate fundamental research and that the "…the March transfer of commercial communications satellites to the USML did not change this policy." However, none of this language appears in the Final Rule itself. Moreover, the new exemptions of general applicability provided by the Final Rule (22 C.F.R. section 123.16(b)(10) and section 125.4(d)(1)) are limited to public domain information, which by definition is not subject to ITAR controls in the first place.[57]

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[50] 22 C.F.R. § 125.1 (2004).
[51] 22 C.F.R. pt. 124 (2004).
[52] 22 C.F.R. pt. 125 (2004).
[53] 22 C.F.R. §§ 125.2(c), 120.16 (2004).
[54] 22 C.F.R. § 124.1(a) (2004) (emphasis added).
[55] 22 C.F.R. § 125.4(c)(3) (2004) (emphasis added).
[56] 67 Fed. Reg. 15,099 (Mar. 29, 2002) (to be codified at 22 C.F.R. pts. 123, 125).
[57] 22 C.F.R. § 120.10(a)(5) (2004).

II. THE QUANDARY

Anyone reading the ITAR will be understandably perplexed and confused by the conflicting, vague, and ambiguous provisions encountered therein, especially when attempting to align the regulations with the concept of fundamental research.

As an express statement of national policy, NSDD 189 accords special treatment to the conduct of basic and applied research in science and engineering, the results of which are in the public domain, in the form of relief from many of the deemed export restrictions that might otherwise apply. This is done in order to facilitate niversity-based international collaborations, among other things. Furthermore, according to the authorizing statute[58] and the ITAR's statement of purpose,[59] anything that is to be added to the USML should not have preponderant civilian use or civilian performance equivalence.

In addition to confounding a national policy and its own statement of purpose with regard to university-based satellite-reliant or –related fundamental research, ITAR's scattered and various provisions on the same subject are contradictory. ITAR purports to have no jurisdiction over information in the public domain.[60] ITAR also states that technical data for ITAR purposes does not include "information concerning general scientific, mathematical, or engineering principles commonly taught in schools, colleges, and universities or information in the public domain…"[61] Those who fabricate an article for a scientific or experimental purpose need not register with the State Department (a precursor to licensing). Yet nonmilitary satellites appear to be subject to ITAR's licensing and nondisclosure requirements by virtue of their recent

[58] 22 U.S.C. § 2778 (2004).
[59] 22 C.F.R. § 120.3 (2004).
[60] 22 C.F.R. § 120.10(a)(5) (2004).
[61] *Id.*

inclusion on the USML. These satellites, information about which has been in the public domain for decades, are intended to carry (and have historically carried) university space-based research payloads and do not meet the "defense article" criteria. Yet providing even public domain information about space-based research to a foreign student presumably might land the discloser in jail as the unlicensed provision of a defense service.[62]

The ambiguous treatment of fundamental research creates quite a quandary for those involved in university-based unclassified aeronautics and astronautics programs, as well as in courses in the fields of electrical engineering, computing, optics, and mechanical engineering, which deal with principles and applications that are not classified or secret. Those involved in university-based spacecraft-related research or teaching are not able to determine, no matter how carefully they parse the ITAR, whether their activities are subject to ITAR restrictions that will affect who may participate in those courses or have access to that research.

Although beyond the scope of this article, it should be noted the decision to transfer back to the State Department jurisdiction over the export of satellites and related equipment and services has had an adverse effect on the US satellite (and related) industry.[63] Within months of that enactment, that industry lost almost half of its market due to export licensing issues, and many of those needing such services have since turned to satellite and launch providers in Europe and elsewhere, which are advancing their technologies and market share free of such constraints. This causes a further question to arise: Did the transfer of preponderantly

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[62] *See* 22 C.F.R. pt. 127 (2004).
[63] Final Report of the Comm'n on the Future of the U.S. Aerospace Industry, *at* http://www.ita.doc.gov/td/aerospace/aerospacecommission/aerospacecommission.htm (Nov. 2002).

civilian use satellites to the USML remove a threat or create a vulnerability?

A. PUBLIC DOMAIN SCIENTIFIC EXCHANGE IS CONSTITUTIONALLY PROTECTED SPEECH

A seminal question is whether public domain "scientific speech" is protected by the Freedom of Speech guarantees of the First Amendment. There is little case law directly on the subject of public domain scientific information,[64] but an affirmative answer to this question appears in a memo issued by the Justice Department in the late 1970s, in the context of publishing publicly available information about encryption.[65]

In 1977, public key cryptography was virtually unknown outside of the National Security Administration and academia. When an NSA employee opined that academic publication of an article on that subject would violate export control laws, the Justice Department, Office of Legal Counsel (OLC), issued a series of opinions on the issue.

The first of these, known as the "Harmon Memo," concluded that "the regulatory provisions present questions of overbreadth and vagueness,", and that "[t]he ITAR requirement of a license as a prerequisite to 'exports' of cryptographic information clearly raises First Amendment questions of prior restraint."[66] The Harmon memo found that dissemination restrictions on this admittedly publicly available

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[64] The Supreme Court has not decided whether scientific speech is so protected, but the factors it discussed in Va. State Bd. of Pharmacy v. Va. Citizens Consumer Council, 425 U.S. 748, 770 (1976) have been pointed to by commentators as suggesting such protection would be available. *See also* Kleindienst v. Mandel, 408 U.S. 753 (1972); Richard Delgado & David R. Millen, *God, Galileo and Government: Toward Constitutional Protection of Scientific Inquiry*, 53 WASH. L. REV. 349 (1978).

[65] OLC Memorandum to Dr. Frank Press (May 11, 1978), *reprinted in The Government's Classification of Private Ideas: Hearings Before a Subcomm. of the House Comm. on Gov't Operations*, 96th Cong., 2d Sess. 268 (1980) [hereinafter Harmon Memo].

[66] Harmon Memo, *supra* note 60, at 5.

information would be "justifiable under the First Amendment only to the extent that the information is properly classified or classifiable."[67] It concluded "that the present ITAR licensing scheme does not meet constitutional standards."[68]

Following revision of the ITAR in December of 1980,[69] OLC issued its second series of opinions on the constitutionality of the ITAR regime.[70] The 1981 opinion stated that "if speech is arguably protected by the First Amendment, it may not be subjected to prior restraint except in the most extraordinary cases" and that "[p]rior restraint . . . is presumptively unconstitutional."[71] Because it did not "impose on the government the burden of obtaining prompt judicial review of any State Department decision barring the communication of cryptographic information," the OLC concluded that a requirement that a license be obtained before publication was an impermissible prior restraint.[72]

No revision of the ITAR to address the issues raised in the OLC memos has occurred. The Justice Department, even though it revisited the issues in 1984 to review them light of later decisions, has neither retracted this memo nor recanted its substance. This, combined with the known related cases discussed herein[73] supports the position that (hitherto)

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[67] *Id.* at 7.
[68] *Id.* at 11.
[69] Revision of the Traffic in Arms Regulation, 45 Fed. Reg. 83,970 (Dec. 19, 1980).
[70] Constitutionality of the Proposed Revision of the International Traffic in Arms Regulations, 5 Op. Off. Legal Counsel 202 (1981).
[71] *Id.* at 212.
[72] *Id.* at 205 (the present regulations still do not require the government to initiate a prompt judicial review of the denial of an export license for cryptographic data).
[73] First Amendment protection is not limited to political speech – as the following sections demonstrate, scientific speech may be a form of self expression as well as the means of exposition of ideas contributing to social and political developments. *See also* Nebraska Press Ass'n v. Stuart, 427 U.S. 539 (1976); Bernstein v. U.S. Dep't of Justice, 176 F.3d 1132 (9th Cir. 1999), *reh'g granted en banc and opinion withdrawn*, 192 F.3d 1308 (9th Cir. 2000); Roger Funk, Comment, *National Security Controls on the Dissemination of Privately Generated Scientific Information*, 30 UCLA L. REV. 405 (1982).

publicly available scientific information related to university-based work involving experimental, research, and scientific satellites (and associated equipment, related systems, and scientific payloads) is a form of protected speech.

B. THE ITAR IS VAGUE AND OVERBROAD IN VIOLATION OF CONSTITUTIONAL DUE PROCESS REQUIREMENTS

1. VAGUENESS

Under American law, statutes and regulations must clearly define their terms and proscriptions, to ensure that people "of ordinary intelligence will have a reasonable opportunity to know what is prohibited."[74] Consequently, they are to be written clearly, without ambiguity, and free of internal inconsistencies, because a law with such defects fails to give warning to those who wish to act lawfully. A vague law is therefore objectionable on that basis alone.[75] However, vaguely written regulations are additionally objectionable because they permit arbitrary and discriminatory application.[76]

A vague law or regulation touching on first amendment rights is particularly pernicious as it inhibits the exercise of those rights by rendering uncertain what expression is permissible.[77] Greater clarity is required of laws affecting first amendment interests.[78]

a. Clear, Unambiguous, Consistent

Scientific communication of public domain information clearly should enjoy First Amendment protection[79] and the ITAR exemption for

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[74] Grayned v. City of Rockford, 408 U.S. 104, 108 (1972).
[75] *Id.*
[76] *Id.* at 108-09.
[77] *Id.* at 109.
[78] Buckley v. Valeo, 424 U.S. 1, 77 (1976).
[79] Notwithstanding the preeminence of political expression with regard to affording First Amendment protection, such protection is not limited to political speech – scientific

public domain information would seem to be aimed at this concern.[80] (Whether dissemination of space-based or satellite-related fundamental research poses a compelling or substantial threat to national security sufficient to justify the imposition of disclosure restrictions is discussed elsewhere in this article; see "Licensing Controls on Fundamental Research Constitute an Unconstitutional 'Prior Restraint'). However, the ITAR's treatment of public domain information is inconsistent, and in particular founders with regard to what may be considered a "defense service."

"Fundamental Research" is comprised of basic and applied research in science and engineering, the results of which are placed in the public domain.[81] This concept is similar to the exemption for "general scientific, mathematical or engineering principles" commonly taught in schools and universities.[82] The definition of ITAR-controlled technical data also excludes information in the public domain. But tucked away 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

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speech may be a form of self-expression as well as the means of exposition of ideas contributing to social and political developments. *See infra* notes 65-68. *See also* Nebraska Press Association v. Stuart, 427 U.S. 539 (1976); Bernstein v. U.S. Department of Justice, 176 F.3d 1132 (9th Cir. 1999), *reh'g granted en banc and opinion withdrawn*, 192 F.3d 1308 (9th Cir. 2000); Roger Funk, Comment, *National Security Controls on the Dissemination of Privately Generated Scientific Information*, 30 UCLA L. REV. 405 (1982).

[80] Indeed, executive branch agencies funding fundamental research generally require that the research be published promptly and with wide dissemination. *See, e.g.,* The Nat'l Science Foundation, *National Science Foundation Grant General Conditions (GC-1)*, p. 17 (July 1, 2002); Nat'l Institutes of Health, *NIH Grants Policy Statement* (Rev. 03/01), U.S. Dep't of Health and Human Services, p. 122 (Mar. 2001); Office of Naval Research, *Educational Institutions, Nonprofit Institutions, and For-Profit Organizations: Research Grant Terms and Conditions,* U.S. Dep't of Defense, p. 6 (July 2001).

[81] 22 C.F.R. § 120.11(a)(8) (2004).

[82] 22 C.F.R. § 120.10(a)(5) (2004).

> (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)."[83]

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.

Many research universities have aero-astro departments and teach courses in a wide variety of related disciplines. Universities also undertake research carried out in earth-orbit or outer space, which requires the development of scientific equipment to detect and record information in that extreme environment. This research equipment must be affixed to (and become the payload in) the satellite that will be its platform in space, a satellite with a preponderant civilian use. Both these types of university-based endeavors constitute basic and applied research in science and engineering, the conduct and results of which are in the public domain. In both types of space-related activity, the interdisciplinary synergy produces vibrant research, which expands knowledge in many fields. This research naturally generates an abundance of scientific and technical papers, which are presented at conferences, published in the appropriate journals, and widely disseminated within the interested academic and scientific communities.

This kind of publicly conducted research would appear to fall squarely within the exceptions to licensing found at 22 CFR 120.11 (2),

[83] 22 C.F.R. § 124.1(a) (2004).

(3), (6) and (8). It would also appear to be a form of protected speech.[84] Certainly anyone taking to heart the language of NSDD 189, or the fundamental research exemption found at 22 CFR 120.11(8) for "basic and applied research in science and engineering," would believe that, for example, a new silicon wafer particle detector that they had been developed to conduct space-based research would be an advance they were free to discuss with their peers everywhere.

Indeed, publications involving these disciplines necessarily contain information about spacecraft and associated equipment and scientific payloads. It is often the case that openly conducted research, especially where collaboration is involved, will be the subject of daily postings to more-or-less public websites. That same information will become part of the curriculum and thus also constitutes "general scientific, mathematical or engineering principles" commonly taught in schools and universities. Given the conflict between the ITAR definition of fundamental research as encompassing "applied research in science and engineering"[85] and the ITAR statement elsewhere that its exemptions from licensing do not apply to "applied research,"[86] are new research devices or technological advances that may have relevance to spacecraft actually defense articles? Would a disclosure about the new application be a "defense service" or "technical assistance" as per 22 CFR 124.1(a) if there is an international cohort among one's students? Would the conduct of an international

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[84] *See, e.g.,* Bernstein v. United States Dep't of State, 945 F. Supp. 1279 (N.D. Cal. 1996) ("Cryptographic algorithms and theory are often published in scientific journals. … however, cryptographic algorithms are also covered by … the USML. Given these two facts, it would be hard for scientists to discern when their work was a defense article and when it was exempt from the ITAR … In fields of applied science, what is commonly taught in universities may well overlap with what the government might choose to regulate. In this instance, the deterrent effect on expression appears both real and substantial (citations omitted).").
[85] 22 C.F.R. § 120.11(a)(8) (2004).
[86] 22 C.F.R. § 125.4(c)(3) (2004).

collaboration to develop and emplace a new space telescope (which is, after all, a remote sensing device) violate the provision that says a foreigner may not be given access to public domain information unless one first obtains a license?[87] Is this the case even though the device has a preponderant civilian use?

Even highly knowledgeable and experienced people, and certainly those of us of ordinary intelligence, would have enormous difficulty determining what behavior or speech would be prohibited or permitted after reading the ITAR. Consequently, they will be uncertain as to what speech is subject to regulation. The resulting anxiety will have a chilling effect, inhibiting such speech – especially if the penalty for certain violations of the ITAR can be imprisonment as well as a fine.[88]

This chilling effect has already caused academicians to reconsider whether to engage in informal scientific exchanges with their international colleagues, whether and how to engage their foreign students in research projects, and whether to present papers at conferences where there may be an international audience (almost any conference will have such a make-up). Foreign academic researchers reportedly have been denied access to fundamental research at U.S. universities due to fears that it might be subject to ITAR disclosure restrictions, and some American researchers were uncertain as to whether they needed to obtain a license from the State Department for potential conversations, discussions, meetings or other

[87] Obtaining a license is a tortured, prolonged, and difficult process, and if granted, the license will generally be shot through with restrictions based on nationality, country of origin, ethnicity, or citizenship. Persons from certain countries, although they have been given a visa to study or research here, based on a State Department process that requires the government processor to know exactly what is going to be studied or researched and where, may still be excluded from an export license pertaining to that very activity pursuant to ITAR. With regard to international collaborations, the ever-shifting cast of participants makes the timely obtaining of a license almost impossible. Finally, once registered with the Department of State for licensing purposes, an entity may lose all ability to invoke the fundamental research exclusion for its work thereafter.

[88] 22 C.F.R. § 120.27 (2004) and 22 C.F.R. pt. 127 (2004).

informal scientific exchanges with foreign colleagues about fundamental research that might arguably (someday, maybe) have a defense-related potential.[89]

This has not been the limit of the impact. As recently noted in the journal "IEEE Spectrum Online" by Eugene B. Skolnikoff, Professor Emeritus at MIT:

> "ITAR has hurt the U.S. satellite industry, mainly through lost markets share. It has also battered the academic space-science community. Proposed projects have been delayed; some talented non-U.S. scientists have decided not to try to work with their counterparts in the United States; non-U.S. graduate students in U.S. universities have been excluded from some scientific meetings related to their projects; discussions at some international scientific meetings have been constrained or aborted; and university-industry collaborations have been disrupted."[90]

The internal inconsistencies just described render the ITAR impermissibly vague and ineluctably uncertain as to the applicability of the law with regard to space-based or satellite-reliant fundamental research carried out as U.S. universities.

b. <u>Arbitrary Application</u>

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[89] Association of American Universities, *ITAR and Universities: Universities are Educational Institutions, Not Munitions Manufacturers, at* http://www.aau.edu/sheets/ITAR.pdf (last visited Jan. 9, 2004); The State Department issued "clarification" in the spring of 2003 (International Traffic in Arms Regulations: Exemptions for U.S. Institutions of Higher Education, 60 Fed. Reg. 15,099-15,101 (Mar. 29,2003)). State reiterated that it was State Department policy to not regulate fundamental research and that the "…the March transfer of commercial communications satellites to the USML did not change this policy." However, this language does not appear in the so-called clarifying regulations, and the new exemptions of general applicability provided by the Final Rule (22 C.F.R. § 123.16(b)(10) (2003) and § 125.4(d)(1) (2003)) are **limited to public domain information**, which nominally is not subject to ITAR control in the first place.

[90] Eugene B. Skolnikoff, *Security and Sanity*, IEEE SPECTRUM, April 2003, at 14.

As noted at the outset of this section, vaguely written regulations are additionally flawed because they permit arbitrary and discriminatory application. Moreover, the resulting arbitrary and discriminatory enforcement is in violation of the due process requirements of our constitution, because one cannot know with any confidence what activity is prohibited. The regulations are not clear to those being regulated, and they are no more clear to those doing the regulating.

Because of the lack of consistent, clear guiding principles, a regulator has complete discretion to establish the degree of protection that he or she may feel is appropriate. Many appear to assume that, in any dialog that occurs between a U.S. person and a foreign person, the U.S. person has superior knowledge that must be safeguarded. Under this scenario, consider whether a U.S. student, employed as a lab assistant to a visiting Ph.D. physics professor from abroad, should be required to obtain a license to provide a "defense service," in spite of the fact that she would be performing trivial duties associated with carrying out public domain fundamental research (and advancing her academic career by working) with the foreign physicist.

The vagueness of the regulations makes the regulators unsure, and this uncertainty is an incentive to err on the side of conservatism. Understandably, in the current environment,a regulator is likely to be entirely concerned about failing to prevent the nefarious exploitation of our information and technology and thus require a license regardless of what the ITAR may permit. It is anecdotally reported that this concern, placed in the vague and twisting maze of the ITAR and bereft of instruction as to constitutional constraints, has led to rulings that defective foreign components cannot be returned to their country of origin for repair without an export license from the State Department.

Similarly, approval for a transfer of an on-orbit satellite (that is, one already placed in earth orbit), to provide communications services to India languished for a year at the State Department, even though the satellite was French built (rendering the issue of technology transfer moot), reportedly because it contained some U.S. components – which had already been vetted for release pursuant to the license that approved sale of the components to the French in the first place.[91]

2. OVERBREADTH

A law is overbroad if it reaches a substantial amount of constitutionally protected conduct in attempting to restrain legitimately prohibited activity.[92] Where the enactment "unquestionably attaches sanctions to protected conduct, the likelihood that the statute will deter that conduct is ordinarily sufficiently great to justify an overbreadth attack."[93] In 1984, just as the ITAR reissued, the Justice Department revisited the Harmon Memo to consider two intervening Supreme Court decisions, Metromedia, Inc. v. San Diego, 453 U.S. 490 (1981) and Bolger v. Youngs Drug Products Corp., 463 U.S. 60 (1983); it concluded that the revised ITAR would still "appear to us to present sensitive constitutional issues" and that there was still an unconstitutional "remaining overbreadth."[94]

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[91] For an interesting discussion of other examples, *see* Alice P. Gast, Mass. Inst. Tech., *The Impact of Restricting Information Access on Science and Technology, at* http://www.aau.edu/research/Gast.pdf (last visited Jan. 9, 2003) and Genevieve J. Knezo, *Sensitive but Unclassified' and Other Federal Security Controls on Scientific and Technical Information: History and Current Controversy*, Congressional Research Service, The Library of Congress, *available at* http://www.fas.org/sgp/crs/RL31845.pdf (last modified July 2, 2003).

[92] Vill. of Hoffman Estates v. Flipside, Hoffman Estates, Inc., 455 U.S. 489, 494 (1982).

[93] Members of City Council of Los Angeles v. Taxpayers for Vincent, 466 U.S. 789, 801 n.19 (1984) (citing Erznoznik v. City of Jacksonville, 422 U.S. 205, 207 (1975)).

[94] Office of the Deputy Assistant Attorney General, *Memorandum for Davis R. Robinson Legal Adviser [sic] Department of State at Section IV, at* http://www.eff.org/Activism/FOIA/ITAR_FOIA/simms_robinson.memo (Jul. 5, 1985). Related letters that are similarly interesting reading may be found at

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. 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,[95] 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.

C. LICENSING CONTROLS ON FUNDAMENTAL RESEARCH CONSTITUTE AN UNCONSTITUTIONAL "PRIOR RESTRAINT"

As acknowledged earlier in this discussion, some scientific communication may be so embedded in a legitimately regulated transaction that such speech itself may be restricted "as a necessary incident" to regulating the export of munitions.[96] Even fully protected speech may be disclosure restricted as a compelling threat to national

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http://www.eff.org/Activism/FOIA/ITAR_FOIA/olson_mcconnell.letter and http://www.eff.org/Activism/FOIA/ITAR_FOIA/mcconnell_garn.letter.

[95] 22 C.F.R. pt. 127 (2004).

[96] United States v. Edler Indus., Inc., 579 F.2d 516, 520 (9th Cir. 1978).

security if its disclosure would result in a danger that is immediate[97] and certain.[98]

For purposes of this discussion, the question of whether the expression of scientific information derived from fundamental research qualifies as protected speech is answered in the affirmative.[99] Although there is a dearth of cases on this point,[100] the issue of disclosure of scientific information is not a new one and much has been written about the subject over the years.[101] Notwithstanding the preeminence of political expression with regard to affording First Amendment protection,[102] such protection is not limited to political speech. For example, the First Amendment protects the rights of union members to

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[97] *See* New York Times Co. v. United States, 403 U.S. 713, 726-27 (1971), (Brennan, J., concurring) (stating that a threat to national security will not justify "even the issuance of an interim restraining order" unless the threat will "inevitably, directly, and immediately cause the occurrence of an event kindred to imperiling the safety of a transport already at sea."). *See also id. at* 730, (Stewart & White, JJ. Concurring) (stating that the threat must result in "direct, immediate, and irreparable damage to the nation.").

[98] *See id*. at 726-27.

[99] The constitutional infirmities which the Justice Department repeatedly identified in the ITAR remain there today. There is still no provision for prompt judicial review, at the government's instigation, of decisions to prohibit dissemination of cryptographic information outside the United States. *See* 8 Op. Off. Legal Counsel 7,8 (1984).

[100] *See generally* Bernstein v. Dep't of State, 945 F. Supp. 1279 (N.D. Cal. 1996) (discussing protected scientific speech). *See also* Bernstein v. United States Dep't of Justice, 176 F.3d 1132 (9th Cir. 1999) (discussing public domain information, speech, and export controls), *Reh'g granted en banc and opinion withdrawn*, 192 F.3d 1308 (9th Cir. 1999).

[101] *See generally* National Academy of Sciences, *Report for the Department of State – Science and Foreign Relations*, U.S. Dep't of State, Washington, D.C. (1950); Edward Teller, *Secrecy: The Road to Nowhere*, TECH. REV., October 1981, at 12; Committee on Science, Engineering, and Public Policy (U.S.) – Panel on Scientific Communication and National Security, *Scientific Communication and National Security: A Report*, National Academy Press, Washington, D.C. (1982); Association of American Universities, *ITAR and Universities: Universities Are Educational Institutions, Not Munitions Manufacturers, at* http://www.aau.edu/sheets/ITAR.pdf (last visited Jan. 9, 2004); Shiela Widnall, *In the Public Interest: Report of the MIT Ad Hoc Faculty Committee on Access to and Disclosure of Scientific Information, at* http://web.mit.edu/faculty/reports/publicinterest.pdf (June 12, 2002); Charles M. Vest, *Response and Responsibility: Balancing Security and Openness in Research and Education, at* http://web.mit.edu/president/communications/rpt01-02.html (last visited Jan. 10, 2004).

[102] *See, e.g.,* New York Times Co. v. Sullivan, 376 U.S. 254 (1964).

associate for the purpose of discussing the hiring of an attorney,[103] an act that is merely a management decision not intended to advance a political or social agenda. That scientific speech may constitute self-expression and the exposition of ideas contributing to the general social good has been discussed most recently in the Bernstein case,[104] but it has also been a subject of legal discussion for decades.[105] Assuming scientific expression is protected speech, and that fundamental research (public domain) discussions constitute scientific expression, this inquiry turns directly to the question of whether dissemination of fundamental research that is space-based or satellite-related poses a compelling threat to national security, sufficient to overcome its protected status.

1. An Immediate and Certain Danger Sufficient to Permit Restriction on Otherwise Protected Speech?

We are concerned here with basically two types of spacecraft-related information: first, that which is owned (and was generated by) a private party or entity and needed by a university researcher to successfully seat an experiment in a satellite provided by the third party (a vendor's "interface information"), and second, that which derives from the diligent application of general principles of mathematics, science, and engineering in aeronautical and astronautical disciplines in a U.S. institution of higher education ("university-generated information").

An earlier commentator opined that scientific information poses an immediate threat if it meets three criteria: 1) the time from its receipt by a foreign power to its actual application is short as measured on an appropriate time scale of technological development; 2) it has identifiable

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[103] *See* United Mine Workers v. Illinois State Bar Ass'n, 389 U.S. 217, 223 (1967).
[104] Bernstein v. Dep't of Justice, 176 F.3d 1132 (9th Cir. 1999), *reh'g granted en banc and opinion withdrawn*, 192 F.3d 1308 (9th Cir. 1999).
[105] *See generally* James R. Ferguson, *Scientific and Technological Expression: A Problem in First Amendment Theory*, 16 HARV. C.R.-C.L. L. REV. 519, 533-43 (1981) (discussing, among other things, the political value of free scientific expression).

direct military uses or related production applicability; and 3) it would give the enemy an identifiable, material military advantage over the United States.[106] He also proposed the additional condition that the United States be the exclusive source of the information (on the basis that it would be pointless to suppress information available in other countries).[107] Given the reasonableness and utility of this approach, it is adopted here.

With these criteria in mind, consider this: Design and manufacturing information about the satellites and rockets generally used by universities to provide a platform for their spacebased research had been in the public domain for a considerable amount of time before such data was suddenly declared disclosure restricted by the State Department. Moreover, when utilizing these "workhorse" spacecraft, the interface between the scientific apparatus and the satellite in which it will be seated is limited largely to the interface area alone. Recall much of this interface information had previously been a matter of public knowledge, along with information about heat, vibration, and radiation hardening requirements (also known as "shake and bake" data).[108]

a. <u>Interface Information</u>

With regard to space-based research projects that require only a relatively simple means to reach and maintain a location in space, the disclosure to university researchers,collaborators and students of the interface layer and the requisite "shake and bake" information, seems unlikely to result in any danger. These satellites have had a preponderant civilian application, never were intended to serve a military purpose, and

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[106] Roger Funk, Comment, *National Security Controls on the Dissemination of Privately Generated Scientific Information*, 30 UCLA L. REV. 405 (1982).
[107] *Id.*
[108] ITAR limits those to whom this interface information may be disclosed, which means that foreign collaborators or students who design and develop the very scientific apparatus that is to carry out the research may not be told important fabrication details. 22 C.F.R. § 125.4(b)(10) (2004).

have well-known (public) specifications as a result of prior disclosure. Being able to visually access the interface area of such a transport vehicle would not result in the identification by the observer of direct military uses and would not provide the observer's military with a specific military advantage. Even if all the interface information were made immediately available to a foreign military, an immediate threat would not result; one cannot reverseengineer a satellite, even an "old technology" satellite, from this interface information. Additionally, this type of information is readily available from commercial foreign sources. Therefore, a vendor's unrestricted provision of satellite interface information to a university's researchers, as an aid in their fabrication of an experimental apparatus, would not pose a compelling threat to national security.

b. University-Generated Information

University aero-astro departments and the ancillary programs in departments of mechanical engineering, optics, and electrical engineering, have steadily provided innovation after innovation. The Global Positioning System is but one example of university-based fundamental research giving rise to a useful technology, one with clear civilian applications and performance equivalence as well as military utility. Often military applications derive from a new technology that came from initial civilian application and purpose. This type of research is openly conducted and is comprised of "basic and applied research in science and engineering" of the type vouchsafed by NSDD 189. That is, it is to proceed largely unfettered by deemed export constraints, precisely in order to facilitate the bringing of the best available minds to bear on any problem. It is worthwhile to repeat that policy here, a policy which expressly took into account the possibility that United States' enemies

might obtain some advantage by participating in our universities or their products and which concluded that the benefits outweighed the risk:

> It is the policy of this Administration that, to the maximum extent possible, the products of fundamental research remain unrestricted. It is also the policy of this Administration that, where the national security requires control, the mechanism for control of information generated during federally funded fundamental research in science, technology and engineering at colleges, universities and laboratories is classification. Each federal government agency is responsible for: a) determining whether classification is appropriate prior to the award of a research grant, contract, or cooperative agreement and, if so, controlling the research results through standard classification procedures; b) periodically reviewing all research grants, contracts or cooperative agreements for potential classification. No restriction may be placed upon the conduct or reporting of federally funded fundament research that has not received national security classification, except as provided in applicable U.S. Statutes.[109]

In other words, the President and the National Security Council determined, at the height of the cold war, thoughtfully and with deliberation, that keeping fundamental research in the public domain did not pose a compelling threat to national security.

On that basis, one may confidently assert that university-generated spacecraft-related fundamental research does not present an immediate and certain danger. And it must be clear that the U.S. is not the only country in the world with universities that engage in, and whose researchers have the full complement of knowledge about, spacecraft and associated systems.[110] Therefore, the expression of scientific information

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[109] National Security Decision Directive 189, *supra* note 1.

[110] In this regard, it may be warranted to recall that terrorist impacts such as that experienced on Sept. 11, 2001 in the United States were neither reliant on high technology nor satellite-related.

about fundamental research in spacecraft constitutes protected speech that does not pose a national security threat of such status as to warrant imposition of disclosure restrictions.

2. Appropriate Disclosure Restrictions, or Impermissible Prior Restraint?

We now turn to the issue of whether such public domain scientific exchange is impermissibly subjected to prior restraint by virtue of the ITAR controls that may appear to apply to that speech.

a. License Prerequisite to Protected Speech

While the bulk of the ITAR scheme is aimed not at expression but at containment of defense-related commodities, a licensing requirement that would apply to disclosure of even public domain information is clearly likely to capture a particular type of protected expression: scientific exchange in the realm of fundamental research conducted openly within a university context. Prior restraint may be found when the restriction has a "close enough nexus to expression, or to conduct commonly associated with expression, to pose a real and substantial threat of identified censorship risks."[111] A regulation requiring that a license be obtained before one may discuss public domain information with a foreign person in the US, as does the ITAR at 124.1(a), would seem to demonstrate exactly that relationship between speech and censorship and thus constitutes a prior restraint.

The Supreme Court has consistently held that any prior restraint on expression "comes to this Court with a 'heavy presumption' against its constitutional validity."[112] Justice Brennan, in the Pentagon Papers case, concluded that the First Amendment's ban on prior restraints could only

[111] City of Lakewood v. Plain Dealer Publ'g Co., 486 U.S. 750, 759 (1988).
[112] Org. for a Better Austin v. Keefe, 402 U.S. 415, 419 (1971) (citing Carroll v. Princess Anne, 393 U.S. 175, 181 (1968) and Bantam Books, Inc. v. Sullivan, 372 U.S. 58, 70 (1963)).

be overridden in times of war and even then, according to Justice Stewart, only when disclosure would "surely result in direct, immediate, and irreparable damage to our nation or its people."[113] While national security is and should be accorded a great deal of deference and some speech may be properly restricted when it is "a necessary incident" to the controlling the export of weapons,[114] the mere brandishing of the term "national security" without more is too amorphous a rationale to abrogate the protections of the First Amendment.[115]

Consequently, at a minimum, any attempt to license, censor or restrain protected speech must satisfy a series of procedural and substantive requirements.

b. <u>A Lack of Procedural Safeguards</u>

If a licensing scheme controlling the export of speech or public domain publication (a prior restraint) does not employ sufficient procedural safeguards, it must be invalidated. The licensing scheme would be invalid, not because it is necessarily content based, but because it bestows on a government official too much discretionary power to procedurally hinder or even prevent expression by virtue of multiple or periodic licensing requirements.[116]

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,

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[113] New York Times Co. v. United States, 403 U.S. 713 at 726, 730 (1971).
[114] United States v. Edler Indus., Inc., 579 F.2d 516 (9th Cir. 1978).
[115] New York Times Co. v. United States, 403 U.S. at 719.
[116] *Plain Dealer Publ'g Co*., 486 U.S. at 760.

2) provision is made for prompt judicial review, and 3) the censor bears the burden of going to court and justifying a licensing denial.[117]

The Arms Export Control Act excludes from the Administrative Procedures Act the functions to be implemented in the ITAR.[118] 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.

III. OTHER CONSIDERATIONS

Openness in fundamental research is a critical element of most universities' teaching and research mission (certainly a hallmark of those, like Stanford University, which are not engaged in any classified research). Integral to openness, and just as critical, is participation by an international array of faculty, students, and collaborators. Those with comparable education, experience, and skills earned abroad bring their accomplishments and intellectual capital to U.S. academies in order to further their studies or the studies of our students. The result is an exchange of ideas and concepts among peers of equal intellectual strength; these ideas and concepts are challenged, scrutinized, encouraged, criticized and honed. As recently stated by Bernard Bailyn, albeit in a

[117] 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)).
[118] 22 U.S.C. §§ 2752, 2778, 2780, 2792, 2797. "Because 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." 22 C.F.R. § 128.1 (2004).

somewhat different context, ". . .most often the creative imagination does not flare in isolation. Creative minds stimulate each other, interaction and competition have a generative effect, sparks fly from disagreement and rivalry, and entire groups become creative."[119] Nowhere is this more apparent than in mathematics, the hard sciences, engineering, and related disciplines. No price can be placed upon the value of such an environment.

It is possible that the protections afforded protected speech by the national policy covering fundamental research may not prevail and that the dissemination and participation restrictions of a "deemed export" may be brought to bear on the disciplines mentioned. If so, a cascade of adverse effects may flow. If important courses are consequently eliminated, for example, and class sizes and research projects diminish due to restrictions on participation by foreigners, then U.S. students may choose to go abroad, where they can obtain the full complement of courses in their disciplines. Their foreign peers, unable to complete their studies or fully participate in research here, may remain abroad. Moreover, if a university accedes to ITAR's disclosure restrictions for its space-based or satellite-reliant/related research, it may find that thereafter ALL its research is subject to such controls. Why? Because ITAR provides that the acceptance of dissemination, participation, and access restrictions on research may destroy entirely the "fundamental research" character of the work – it is as yet unknown whether this "taint" would result in ITAR application in areas not satellite-related.[120]

As has been asked elsewhere:

> [D]oes secrecy actually begin to erode national security when it chokes off the exchange of information that enables

[119] BERNARD BAILYN, TO BEGIN THE WORLD ANEW: THE GENIUS AND AMBIGUITIES OF THE AMERICAN FOUNDERS 3 (2003).
[120] 22 C.F.R. § 120.11(8)(ii). Government imposition of access and dissemination controls destroys the "fundamental research" character of the endeavor.

> a vital research community to thrive and innovate. … Under ITAR, even discussing information about controlled technology with a non-U.S. citizen is a crime punishable by imprisonment or steep fines. And, strangely, it doesn't matter if the information has already been published and is freely available on the Internet.… In countless technologies, from nuclear bombs to encryption software, the genie is out of the bottle. It is flitting around the Internet and lurking on the shelves of science libraries all over the world. Uncertain times call for prudent restrictions. But pretending that violent extremists and the enemies of progress and freedom cannot read or use the Internet might very will harm the security we are striving to maintain.[121]

Perhaps of gravest concern is the potential for further diminishment of our academies' ability to produce U.S. graduates in rocketry, satellite technology, and similar fields that draw upon mathematics, the hard sciences, and engineering. The best and brightest American minds in any discipline reliant on space-based research (for example, aeronautics, astrophysics, and environmental and biological sciences related to space exploration) may end up developing and contributing their research talents elsewhere. Thus, there will be far fewer of these talented U.S. citizens in domestic academies to engage in federally funded research, which may ultimately have adverse consequences for national security interests.

In concluding, I would like to again quote Dr. Skolnikoff:

> [O]f course, restrictions on publication or sharing of information are sometimes necessary. When they are, they must be designed intelligently and in consultation with the affected industry and universities. They must have a clear and realistic purpose, and be formulated in the realization that the nation, and its technical and scientific establishments, have been incredibly well served by maintaining open channels of communication. We must not

[121] *Secret Enough for You?,* IEEE SPECTRUM, April 2003, at 9.

> lose sight of the fact that the strength of science and technology in the United States is one of its greatest assets in the fight against terrorism.[122]

[122] Eugene B. Skolnikoff, *Security and Sanity*, IEEE SPECTRUM, April 2003, at 14.