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DTAG Fundamental Research Working Group

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Purpose:

The DTAG was tasked to: “Review the various U.S. Government definitions of *‘fundamental research’* in use and recommend a harmonized definition that can be used in both the ITAR and the EAR.” We interpreted this task as a request to review the different language in these regulations, consult other U.S. Government definitions, and merge areas of commonality while qualifying or clarifying other sections to eliminate confusion and remain true to the broadly-accepted concepts surrounding *“fundamental research.”*

Background and Analysis:

- In furtherance of the assigned task, the DTAG reviewed:
 - Previous DTAG analysis of “*Public Domain*” and proposed changes to “*fundamental research*,”
 - Applicable case law and law review articles related to “*fundamental research*” as summarized in the attached *Appendix*;
 - National Security Decision Directive (NSDD) 189, dated September 21, 1985;
 - U.S. Department of Defense Policy on Contracted Fundamental Research, dated June 26, 2008
 - U.S. Department of Defense Policy on Fundamental Research, dated May 24, 2010; and
 - Various definitions of fundamental research as summarized in the attached *Appendix*.
- Harmonization of this definition is complex:
 - The definition of “*fundamental research*” in the EAR and the ITAR, while different, are similar and are both harmonious with NSDD 189.
 - Certain sections of the definition of “*fundamental research*” in the EAR and the ITAR can easily be harmonized (see the *proposed definition*).
 - Other sections are not equivalent and are unique to either the EAR or the ITAR, (*see Figure 1 in Appendix below*).
 - A “*Side-by-Side Comparison*” of the definitions of “*fundamental research*” and sections relating to each regulatory regime is summarized in *Figure 1* which pictorially describes the inherent complexities of concluding a harmonized definition.
- In the EAR, “*fundamental research*” is defined and explained in multiple sections, which the DTAG found to be somewhat redundant and confusing.¹

¹ EAR §734.7 “*Published information and software*” contains 437 words; §734.8 “*Information resulting from fundamental research*” contains 882 words; §734.9 “*Educational Information*” contains 129 words; §734.11 “*Government sponsored research not qualifying as fundamental research*” contains 163 words. The DTAG notes that while we understand the intent behind the detailed nature of the EAR as explained in EAR §730.8(b), we believe brevity in defining “*fundamental research*” would add to clarity assisting both the exporter and the government agencies who must interpret and apply the regulations.

- In the ITAR, “*Fundamental research*” is a bullet embedded in the definition of “*Public Domain*” (§120.11).² Fundamental research is a critical concept significant enough to warrant its own definition. As it stands, “*basic*”, “*applied*” and “*fundamental research*” are referenced in several places throughout the ITAR³. In the interest of clarity, creating a definitive concept of fundamental research is in the best interest of ECR.
- Application of the definition of “*fundamental research*” is impacted by the interpretation of other definitions spread throughout multiple sections of the ITAR.⁴ This “interpretive burden” confuses and disjoins already complex rules, making application difficult. For example, the DTAGs harmonized definition is reliant upon the proposed changes to §124.1(a), which would remove the requirement for prior government approval if the defense service being rendered uses public domain data.
- In the interest of clarity and consistency, the ITAR definition should focus on **what** “*fundamental research*” is rather than **where** it is conducted or **who** is conducting it.

Working Group Discussions/Interpretation of Current Definition:

The DTAG investigation revealed two *significantly* different interpretations and perspectives⁵ of “*fundamental research*”. The prevailing differences revolved around interpretation of the ITAR definition:

- **Academic Institutions:** Since the purpose and intent of university research is to disseminate knowledge, universities approach academic activities from the perspective that research is presumed to be “*fundamental research*” and only becomes subject to the EAR or the ITAR if the university accepts restrictions on the research. A literal reading of the ITAR definition of fundamental research leaves some vagueness as to whether the *conduct* of research and unpublished *results* are excluded from the ITAR. When there are no restrictions on publication and no restrictions on participation, academia makes the determination that there is no basis for excluding non-U.S. researchers from research that will ultimately become publically available, as the conduct and results of “*fundamental research*” are not controlled by the ITAR or EAR.
- **Industry and Private Research Centers:** EAR and ITAR programs are treated quite differently by the private sector. For industry and private research centers (collectively, “industry”), the results of fundamental research are not controlled by the EAR⁶ except when the results are restricted from public dissemination.⁷ Meanwhile, “*fundamental research*” tasks performed at a university are not subject to the ITAR, while the equivalent activity would be subject to licensing for industry because, under the current regulation, industry is unable to claim the “*fundamental research*” exclusion available to institutions of higher learning (*see “Hypothetical Example” below*). This issue results in serious complications for collaborative U.S. government research projects under DARPA, IARPA, or other DoD research organizations, where a university participates as subcontractor to an industry prime. Where industry and universities attempt to collaborate, industry research subject to the EAR or the ITAR often taints “*fundamental research*” conducted by a university, making collaboration difficult or impossible. Industry must begin a research program by conducting an export control analysis, to determine the appropriate jurisdiction/classification. A university begins a research program by conducting a “*fundamental research*” analysis, which turns on the presence of

² ITAR §120.11, “*Public Domain*” contains 268 words of which 135 are specific to §120.11(a)(8) “*fundamental research*.”

³ ITAR §125.4(c)(3) “*Basic research*” and “*Applied research*”.

⁴ ITAR §120.9 “*Defense Service*”; §120.10 “*Technical Data*”; §123.16(b)(10) “*Cat XV(a) hardware fabricated for fundamental research*”; §124.1(a) “*Agreements for provisioning of defense services*”; §125.4(c)(3) “*Basic research*” and “*Applied research*”; §125.4(d) Defense services exemption for §123.16(b)(10) defense articles; §126.17 “*Defense Trade Cooperation Treaty between US and UK*”.

⁵ FFRDC impact may not be represented by this analysis.

⁶ EAR § 734.3 (b)(3)(ii).

⁷ EAR §734.8(c),(d) and §734.11.

restrictions on access and dissemination, to determine if the research is subject to export controls. Finally, while universities intend to publish their research and only agree to publication restrictions where absolutely necessary, the intent to place the research results into the “*public domain*” is not always known at the onset of research by industry, and therefore, industry must either license or avoid activities in its research where the same activities would be unrestricted if performed by a university.

Hypothetical Example: Company A received a U.S. Government funded contract to investigate the utilization of insects to detect Improvised Explosive Devices (IEDs) on the battlefield. The research involved the exposure of insects to munitions grade explosives to sensitize the insects to recognize such explosives in the field. Company A determined that the munitions grade explosives were Category V defense articles and treated the project as ITAR controlled. Company A would require government approval for foreign participants. When universities were asked how they would handle this hypothetical project, all respondents stated that the omission of access and dissemination restrictions from the U.S. Government sponsor led them to believe that the project work would qualify as fundamental research. Several respondents noted that the explosives may require restrictions but the project was otherwise unrestricted and the project work could be published. Universities and industry treated the same work differently from inception to publication.

Observations:

- The way the current definition of “*fundamental research*” is structured, industry and universities have difficulty collaborating.
- The interrelationship of “*fundamental research*” with other definitions (such as technical data and defense service) often makes interpretation of applicability of “*fundamental research*” confusing.
- To be effective and facilitate clear and consistent implementation, harmonization must codify the definition using the same language in the EAR and the ITAR, present clear understandable qualifiers and clarify what is/is not “*fundamental research*.” The DTAG also believes the definitions of “*basic research*” and “*applied research*” should be codified in both regulations. This will provide structure to the EAR and ITAR, in addition to aligning the concept for ECR.

Recommendations:

- Based upon these interpretations, the DTAG proposes that changes to the definition of “*fundamental research*” should:
 - Consider:
 - Character of the research being performed (e.g., basic, applied)
 - Existence of national security classifications
 - Existence of specific access and dissemination restrictions
 - Address inconsequentiality of the physical location of performance of “*fundamental research*”;
 - Recognize that fundamental research is performed by various entities;
 - Distinguish between input into the research, conduct of research and output resulting from the research; and
 - Consider when fundamental research stops being fundamental and becomes subject to export controls.
- To add clarity to implementation of any proposed change to the definition, the DTAG proposes that agencies and entities performing research be reminded to look at the character of the research and existence of national security classifications or specific access and dissemination restrictions to assess whether research is fundamental and not rely on the color of money used to fund the research as the primary indicator (e.g., 6.1, 6.2, 6.3, etc.). While the account used to fund a particular research project may be indicative of the purpose and objectives of the research, the allocation of funding is an internal

agency matter and the originating account is not necessarily determinative of the eligibility of the research as “*fundamental research*” under the ITAR and/or the EAR.

- A majority of the DTAG further proposes that the proprietary nature of research or the results of research should not impact whether the conduct or results of the applicable research is fundamental. The DTAG did not explore this issue in depth as this was outside of our tasking to harmonize the definition but we propose DDTC review and consider whether proprietary nature should have any bearing on the export control status of research or results.

Suggested Changes:

To harmonize the regulations:⁸ The DTAG members suggest:

1. Define each of: *basic, applied, fundamental* and *restricted research* in §772.1 of the EAR and create new ITAR sections (120.XX) for these definitions.
2. Clarify and consolidate Supplemental Guidance in the EAR Supplement No. 1 to Part 734 and create fundamental research guidance for the ITAR to facilitate consistent interpretation and implementation.
3. Create guidance for funding entities (government agencies and other research sponsors) to provide:
 - a. Commerce and State have jurisdiction over export control determination;
 - b. Classification is the mechanism for controlling results of fundamental research where there is a national security concern;
 - c. Contractual restrictions on research should only be proposed when they are strictly necessary and directly related to national security concerns as these restrictions unnecessarily impair the ability to perform fundamental research.
4. Clarify that the conduct of fundamental research cannot be deemed performance of a defense service/clarify the interplay between fundamental research and defense services.
5. Modify the EAR §734.8 and 734.11 and the ITAR §120.11 and ITAR §120.XX to adopt the following language:

§ 120.11 Public Domain

(a) *Public Domain* means...

(8) Through fundamental research as defined in §120.XX.

§ 120.XX Basic Research

(a) *Basic research* is a systemic⁹ study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts.¹⁰

§ 120.XX Applied Research

(a) *Applied research* is a systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met. It is a systematic application of knowledge toward the creation¹¹ of useful materials, devices, and systems or methods, including

⁸ The structure presented is drafted for the ITAR. Inclusion in the EAR of the defined terms will appear in alphabetical order in Part 772. §734.8 will need to be revised to reflect this definition as specified in the white paper.

⁹ FAR Title 32, Part 272.3 and OMB Circular A-110 reference “systematic” not systemic. Note that guidance should be issued to clarify the use of “systemic” in the basic research definition so the definition is consistent in all instances of its use.

¹⁰ Modified from 32 CFR 272.3 DoD Definition of “*basic research*”; §125.4(c)(3) definition of “*basic research*”; and proposed definition suggested by the DTAG at the June 2009 Plenary.

¹¹ The term “*creation*” replaces “*production*” because not everyone “*produces*” a product in applied research.

design, development and improvement of prototypes and new processes to meet specific requirements.¹²

§ 120.XX Fundamental Research

- (a) *Fundamental research* is basic and applied research the results of which may be disseminated¹³ without restriction (*see* “*Research Restrictions*¹⁴” in § 120.XX(b) of this subchapter) [or] (See EAR § [new section of the EAR] and, accordingly, such research is not subject to U.S. export controls.¹⁵
- (b) *Fundamental Research* is not limited to performance at accredited U.S. institutions of higher learning and may be conducted by other persons (*see* 120.14)..
- (c) The information resulting from *fundamental research* shall remain unrestricted to the maximum extent possible and; where 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 national security classification.¹⁶

§ 120.XX Research Restrictions

- (a) Research is restricted if:
 - 1) The research is funded by the U.S. government and includes specific access and dissemination controls to protect information resulting from the research¹⁷; ~~or~~
 - 2) ~~Dissemination of the information resulting from the research is restricted or not published for proprietary reasons, (with the exception of prepublication editorial review to ensure proprietary information is not released or patent rights compromised).~~¹⁸
- (b) The following prepublication reviews are not *research restrictions*:
 - 1) Reviews to ensure that protected information subject to specific access or dissemination controls (such as Controlled Unclassified or Sensitive But Unclassified Information) is not released, when such information is provided by the U.S. Government for research, so long as the researcher and the U.S. Government have not agreed to withhold research results from publication [*example provided below*];
 - 2) Reviews to ensure compliance with statutory or funding agency requirements other than export controls [*example provided below*];²⁰

¹² 125.4(c)(3) and cross-referenced in Subpart 126 Supplement, Note 12 (previously §126.5(c)(6)(iii) definition of “*applied research*” in the “Canadian Exemption – Defense Services)

¹³ Replaces “*ordinarily published*” language of the ITAR because not all research is published or shared. The intent is to have the **ability** to disseminate.

¹⁴ The DTAG was split on whether to create a separate definition for “Research Restrictions” or to add these restrictions as a subparagraph of the Fundamental Research definition. We believe either format would work equally well.

¹⁵ Modified from OMB Circular A-133, the EAR 734.8, ITAR §120.11(a)(8) and NSDD 189

¹⁶ Taken directly from NSDD-189.

¹⁷ From ITAR §120.11(a)(8)(ii) and EAR §734.8(5) and §734.8(6) and §734.11(b) “restrictions on participation of non-U.S. persons in the research” is stricken from language because the **intent** of dissemination of results (regardless of medium) is the driving factor. Many facilities exclude or prohibit operation of lab equipment subject to the ITAR, but the fruits of the research are nevertheless fundamental.

¹⁸ The majority of the DTAG believes that the proprietary nature of research and/or research results has no bearing on whether it is export controlled. As our task was only to harmonize, we left the proprietary language in the definition but propose striking this restriction.

¹⁹ EAR 734.8(b)(4) “the initial transfer of information from an industry sponsor to university researchers is subject to the EAR where the parties have agreed that the sponsor may withhold from publication some or all of the information so provided.”

²⁰ This subsection is intended to address self-imposed pre-publication review for compliance associated with Dual Use Research of Concern (DURC) or other self-imposed review to ensure compliance with other regulatory requirements.

- 3) Reviews to ensure that publication would not inadvertently divulge trade secret information furnished by the sponsor; or
- 4) Reviews to ensure that publication would not compromise patent rights.

[NOTE: The footnotes and examples referenced in the proposed definition are provided as explanatory references for general understanding as part of this Working Group’s effort. The footnotes are not meant to be part of the final version published in the regulations.]

120.XX(b)Examples:

- 120XX(b)(1): For example, a researcher is provided a Subject Matter Expert’s data, and this data is identified by a Distribution Statement or bears some other restrictive legend (e.g., FOUO, SBU, etc.), but the data is only used to inform design or conduct of the research and is not included or referenced in the research results.
- 120XX(b)(2): For example, review to ensure compliance with Institutional Review Board (IRB) requirements, Dual Use Research of Concern (DURC) review, HIPPA, FERPA, or the removal of references of sponsorship or funding by specific sponsor or U.S. Government agency prior to publication.

Additional Changes Specific to the ITAR:

In performing this task, the DTAG reviewed the ITAR and, at a more cursory level, the EAR, to assess whether other sections might be impacted by its proposed definition of “*fundamental research*.” Based upon this assessment, the DTAG believes the sections listed below would also require change. The DTAG recommends a final, comprehensive review of both regulations prior to implementing any change to “*fundamental research*” to confirm there are no other sections that also require revision. The DTAG would perform this review if tasked to do so.

- Section 123.16(b)(10) currently provides that U.S. institutions of higher learning may, without a license, permanently or temporarily export and return to the United States, articles fabricated only for fundamental purposes but otherwise controlled by Category XV(a) or (e) in 121.1. The DTAG members suggest that this section should be revised to delete the words “by accredited U.S. institutions of higher learning.”
- 125.4(c)(3) delete definition of “*basic*” and “*applied*” and include the reference to the proposed DTAG definitions
- 125.4(d) delete “*accredited U.S. institutions of higher learning*” throughout this section in each instance where it appears, [except 125.4\(b\)\(10\) which is indeed specific to institutions of higher learning.](#)
- USML Category VIII(f) needs to clarify application of “*fundamental research*” under U.S. Department of Defense contracts.²¹

Assumptions:

The proposed harmonized definition presupposes that both the proposed definition of “*Defense services*” or similar variant will become a final rule and the proposed revisions to 22 CFR 124.1(a) will be implemented to remove the requirement to seek U.S. Government approval for defense services rendered using public domain data or data otherwise exempt from ITAR licensing requirements. Accordingly, the DTAG did not address “*defense services*” or “*technical assistance*” in its proposed definition of “*fundamental research*.” If the proposed revisions to “*defense services*” or 22 CFR 124.1(a) are not adopted, the DTAG suggests language be added to the proposed definition of “*fundamental research*” as well as clarification to the exemption found at

²¹ Due to the proximity of this White Paper’s publication and the pending publication of Final Rule published in 76 FR 68694 supporting changes to USML Category VIII, the DTAG did not provide suggested language, but can if requested.

§125.4(d) regarding what qualifies as a defense service during the course of conducting fundamental research.²²

Summary of Results:

The proposed definition is interoperable in both the EAR and the ITAR. It is derived from common definitions of basic and applied research (*see Appendix*). It significantly reduces the wordy language in the EAR while reducing the vagueness of the ITAR. It summarizes and maintains key concepts consistent in both the EAR and the ITAR while adding clarity. It recognizes that “*fundamental research*” is currently performed by a variety of persons in a variety of locations and expands the *fundamental research* exclusion to cover this reality and preserve free speech rights of all performers. For Government, it preserves access and dissemination restriction as the distinguishing characteristic of *fundamental research* and allows for further analysis of whether such tangible materials used in the conduct of research are subject to the CCL or USML. For universities, it clarifies that in absence of such access and dissemination restrictions, research is fundamental and should comply with the policy mandates of the Ashton Carter Memo concerning the Department of Defense Policy on Fundamental Research, the John Young Memo concerning the Department of Defense Policy on Contracted Fundamental Research and NSDD-189, the National Policy on Fundamental Research. It allows for self-review by researchers to ensure that Dual Use Research of Concern (DURC) is compliant with other regulatory requirements and other types of self-imposed pre-publication review do not otherwise disqualify the research as fundamental research.

The attached appendix includes:

- side-by-side comparison of EAR and ITAR sections related to fundamental research;
- proposed decision trees which may be considered for inclusion in any guidance issued with the final harmonized fundamental research definition;
- key fundamental research history reviewed by the DTAG; and
- list of definitions of fundamental research reviewed by the DTAG.

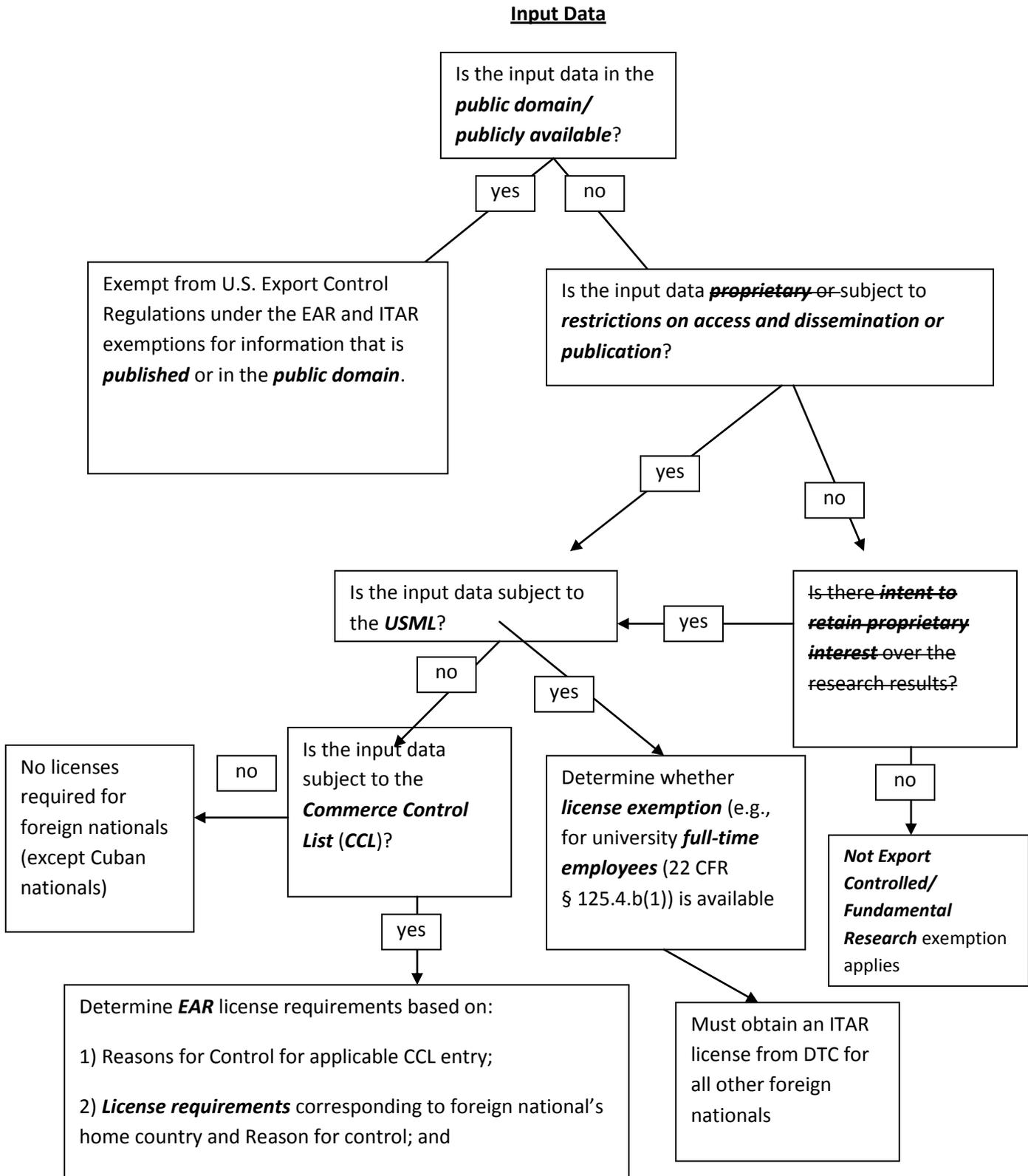
²² Federal Register Proposed Rule, RIN 1400-AC80, pages 20590-20593, dated April 13, 2011.

Appendix:

Figure 1: Comparison of definitions and terminology between the ITAR and the EAR

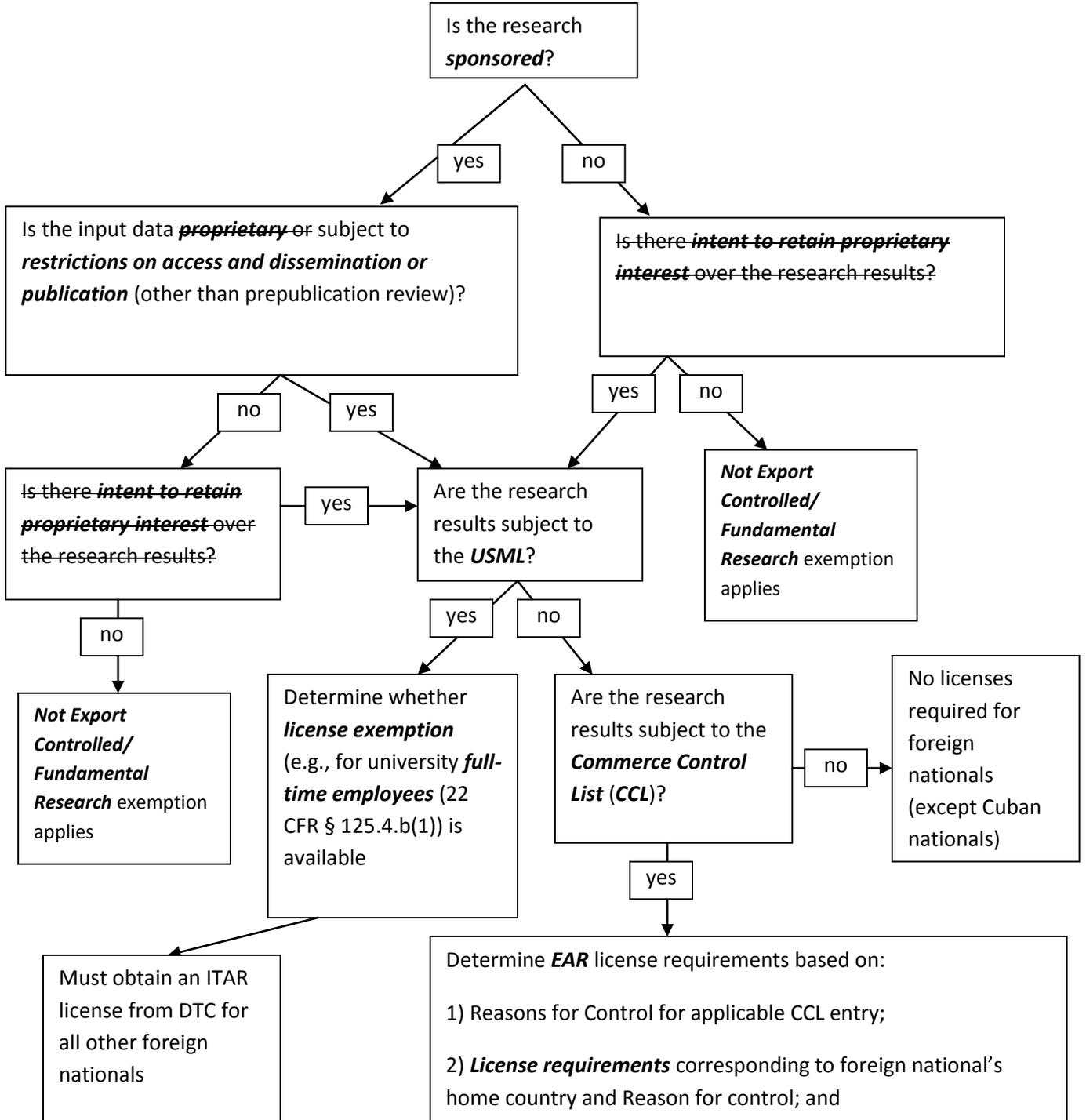
		SIDE BY SIDE COMPARISON		
		EAR	ITAR	
Definitions	734.3(b)(2), (3) "Publicly Available"		120.11(a) "Public Domain"	Not part of tasking
	734.7 "Published information and software"		120.11 "Public Domain"	
	- 734.7(a) "Accessible to Public"		- 120.11(a) "accessible to public"	
	- 734.7(a)(1) "Publications available for general distribution"		- 120.11(a)(1) "on sale at newsstands" and 120.11(a)(2) "subscriptions" (a)(3) mailing privileges	
	- 734.7(a)(2) "Available at libraries"		- 120.11(a)(4) "at libraries open to the public"	
	- 734.7(a)(3) "Patents and patent applications" (see also 734.10)		- 120.11(a)(5) "Patents available at any patent office"	
	- 734.7(a)(4) "Open conference, seminar, tradeshow"		- 120.11(a)(6) "Conference, meeting, seminar, tradeshow accessible to public"	
	- Spread across multiple sections: 734.8(a), (b)(2)(3), (d)(2)(3)(4)		- 120.11(a)(7) "Public Release"	
	734.8(a) "Fundamental Research"		120.11(a)(8) "Fundamental Research"	
	734.8(b) "University based research"		120.11(a)(8) "Fundamental Research"	
	734.8(c) "Research based at federal agencies"		<i>No Equivalent</i>	
	734.8(d) "Corporate Research"		<i>No Equivalent</i>	
	734.8(e) "Research based elsewhere"		<i>No Equivalent</i>	
	734.9 Educational Information		120.10(a)(5) and 120.11(a)(6) "General Scientific Principles"	
	734.10 Patent Applications		120.11.(a)(5) "Patents"	
734.11(a) Government-sponsored research covered by contract controls.		120.11(a)(8)(i), (ii) "University Restrictions on Publications"		
Part 772 "Definitions of Terms" ('Basic Scientific Research') * Note, applied not defined		125.4(c)(3) "Basic Research" and "Applied Research"		
Guidance	Supplement No. 1 to Part 734		<i>No Equivalent</i>	
	- "Section C: Educational Instruction"		<i>No Equivalent</i>	
	- "Section D: Research, correspondence and informal scientific exchanges"		<i>No Equivalent</i>	
	- "Section E: Federal Contract Controls"		<i>No Equivalent</i>	
USML	<i>No equivalent</i>		121 USML Category VIII "Aircraft and Associated Equipment" Development (f),	
	<i>No equivalent</i>		121 USML Category XI "Military Electronics"	
ITAR Exemptions	<i>No equivalent</i>		122.1(b)(2), (4) "Registration Exemption"	
	<i>No equivalent</i>		123.16(b)(10) "Cat XV(a), (e) defense articles fabricated for fundamental	
	<i>Partial Equivalent,</i>		125.4(b)(10) "Bona Fide Employee Exemption"	
	Disjointed: Part 732 Steps to Follow to determine requirements.			
	<i>No equivalent</i>		125.4(b)(13) "Technical data approved for public release"	
	<i>No equivalent,</i>		125.4(c)(3) "Basic Research" and "Applied Research"	
	but Part 772 "Definitions of Terms" defines 'Basic Scientific Research'			
	<i>No equivalent,</i>		125.4(d)(1) "Defense services for 123.16(b)(10) defense articles by institutions of higher learning"	
Reliant upon definitions of "development", "production" and "use"				
<i>No equivalent,</i>		125.4(d)(2) "Space Scientific Meeting" Defense Service Exemption by institutions of higher learning" including specific limitations		
Reliant upon definitions of "development", "production" and "use"				
<i>No equivalent,</i>		126.17 Exemption Pursuant to the Defense Trade Cooperation Treaty between the U.S. and the U.K."		

Fundamental Research Exemption Decision Tree



Fundamental Research Exemption Decision Tree

Research Results (Output)



Applicable Case Law, Law Review Articles and Fundamental Research History Reviewed:

- 1919, *Debs v. United States*, 249 U.S. 211 (1919) - Set the precedent for the governments right to prohibit first amendment protected speech if the danger to national security, in light of all the facts and circumstances, justifies the prohibition.
- 1949, Export Control Act enacted and identified three reasons for imposing export controls
- 1969, Export Administration Act enacted, which was perceived to be less restrictive than ECA
- 1976, Arms Export Control Act and International Traffic in Arms Regulations enacted
- 1978 DOJ Office of General Counsel legal opinion which found certain applications of the ITAR to be unconstitutional impositions on the dissemination of scientific ideas.
- 1978, *United States v. Edler Industries, Incorporated* (579 F. 2d 516), the 9th circuit opines that refusal to comply with the ITAR licensing scheme for technical data may be punished only when the violator is knowing and intentional. The narrow interpretation of licensing is believed to cure the potential constitutional problems of the application of a licensing system to routine publication of scientific ideas.
- 1978, Memo to Dr. Frank Press (Science Advisor to the President) re Constitutionality under the First Amendment of ITAR Restrictions on Public Cryptography
- 1981 testimony of H. Miles Foy, from DOJ office of Legal Counsel, discussing the ITAR and the ability to regulate fundamental research, Department of State indicates that it interprets the ITAR narrowly and will not “attempt to apply the regulation to bona fide domestic publication of technical data by scientists or others. ITAR is intended to regulate the direct and knowing assistance of foreign enterprises in the manufacture and use of defense articles and services.”
- 1982 memo from Richard DeLauer, Undersecretary of Defense for Research and Engineering concluding that no restriction can be placed upon conduct or reporting of research that has not received national security classification. Also,
- 1984 memo from Richard DeLauer clarifying that fundamental research means “research supported by DOD’s 6.1 budget category” and that “unclassified research performed on campus at a university and supported by 6.2 funding shall be, with rare exceptions, considered fundamental and exempt from restrictions.”
- 1985, NSDD-189, states that where national security requires control, the mechanism ought to be classification.. No restriction may be placed upon the conduct or reporting of federally funded fundamental research that has not received national security classification, except as provided in applicable US Statutes.
- 1989, start of efforts to reform the Act as both those who want to liberalize and those who want to tighten controls, are concerned the Act is vulnerable to legal challenge.
- 2008, memo from John Young, intended as guidance to Department of Defense program managers, citing NSDD 189 to ensure that DoD will not unduly restrict disclosure of the results of contracted fundamental research.
- 2010 memo from Ashton Carter, intended as guidance to Department of Defense program managers, citing NSDD 189 and stating that the products of fundamental research are to remain unrestricted to the maximum extent possible, when control is necessary for national security reasons, classification is the only appropriate mechanism, and corresponding DoD funding categories with fundamental research.

Various Definitions of Fundamental Research Reviewed:

- ITAR, 22 CFR Section 120.11
- EAR, 15 CFR Section 734.8
- Federal Acquisition Regulation Title 32 – National Defense Part 272 (section 272.3)
- OMB Circular A-110
- OMB Circular A-133
- 45 CFR 74.2
- NIH website glossary
- DHHS definition (45 CFR 46.102)
- FDA definition (21 CFR 50.3(c))
- Merriam-Webster dictionary

- American Heritage Dictionary
- Collins English Dictionary
- Department of Defense, 32 CFR Section 272.3
- NSDD-189; National Policy on the Transfer of Scientific, Technical and Engineering Information
- DARPA definition (http://www.darpa.mil/Opportunities/Universities/Fundamental_Research.aspx)

In addition, the DTAG researched existing opinions on the definition of “*fundamental research*” and application of the fundamental research exemption within the export control community and discerned the existing definitions are vague and, therefore, hard for researchers to apply before and during research and hard for the government to apply in assessing whether funding opportunities should contain restrictions.