Sent electronically to publiccomments@bis.doc.gov

3 August 2015

Hillary Hess
Director, Regulatory Policy Division
Bureau of Industry and Security, Room 2099B
U.S. Department of Commerce
Washington, DC 20230

RE: Revisions to Definitions in the EAR (RIN 0694-AG32)

Dear Madam:

We applaud the U.S. Department of Commerce (DOC) for its efforts through the Export Control Reform Initiative to enhance clarity of Export Administration Regulations (EAR) definitions and establish consistency between EAR and terms found in the International Traffic in Arms Regulations (ITAR). We appreciate the opportunity to provide a formal response to the proposed revisions to the definitions of "fundamental research," "technical data," "technology," and "public domain."

With approximately 195,000 members residing in the United States, The Institute of Electronics and Electrical Engineers – USA (IEEE-USA) is an organizational unit of the Institute of Electrical and Electronics Engineers, Inc. (IEEE), the world's largest organization for technical professionals, and a leading educational and scientific association for the advancement of technology. A large contingent of our membership in academe, industry, and commercial services conduct fundamental research and export technologies under the current EAR definitions.

In our analysis, the proposed definitions would unintentionally expand EAR's authority to include research and technologies that are currently exempt. We strongly believe such an expansion in the increasingly competitive global technology market would unnecessarily impede progress in the research environment, restrict exports of technologies that do not possess dual-use characteristics, and ultimately jeopardize U.S. technological leadership.

With the understanding that this is not the intention of the DOC, IEEE-USA offers its analysis and provides several suggestions for improvement in the following pages. We would be happy to answer any questions you might have regarding our analysis or suggestions. We further offer to provide subject matter experts to assist in further development of these definitions, including leaders in fundamental research and technology development.

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Fundamental Research

The BIS has requested comments on whether the alternative definition of fundamental research suggested in the preamble should be adopted.

Based on the analysis of IEEE-USA, presented below, the proposed language will impose new restrictions upon the conduct of fundamental research that is exempt under the current EAR definitions. DOC's proposed definition of "fundamental research" is:

> "'Fundamental research' means nonproprietary research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community."

IEEE-USA believes that the elimination of explicit reference to "basic" and "applied" research in the DOC's proposed definition would inadvertently subject certain fundamental research endeavors to the EAR. IEEE-USA believes that this conflicts with the spirit of the definition afforded in the National Security Decision Directive 189: National Policy on the Transfer of Scientific, Technical, and Engineering Information, which also does not reflect the character of modern fundamental research. The following are our principal concerns:

1. The "and" between "science" and "engineering" inherently implies that both terms need to be satisfied in order for the research to be deemed "fundamental." As DOC/BIS is aware, there exist fundamental research efforts that are purely scientific or purely engineering. To ensure sufficient clarity and coverage for all possibilities that encompass what is commonly accepted as fundamental research, the IEEE-USA recommends replacing the word "and" with "or" to read "science or engineering."

2. The proposed definition fails to acknowledge fundamental research of mathematical nature. While mathematics underpins science[1] and engineering[2], it also is embodied by and within mathematical algorithms, such as financial forecasting or cryptography. IEEE-USA recommends that the DOC either make clear that its use of the word "scientific" includes mathematics, or explicitly include the word "mathematics."

3. "Scientific community" excludes publishing or sharing broadly within the mathematical or engineering communities as well as the general public. The IEEE-USA suggests the DOC use the "research community or in the public domain" as alternate language to ensure the broadest acceptance of openly-available public information.

[1] Science is knowledge about the natural world that is based on facts learned through experiments and observation.

[2] Engineering is the application of scientific and mathematical principles to practical ends such as the design, manufacture, and operation of efficient and economical structures, machines, processes, and systems.

4. The IEEE-USA, therefore, suggests revised language, "'Fundamental research' means research in science, mathematics, or engineering, the results of which ordinarily are published or shared broadly within the research community or in the public domain."

"Arises During or Results From"

The IEEE-USA is concerned over the proposed revision's use of the description "arises during or results from fundamental research." While the DOC intends to "make clear that technology that arises prior to a final result is subject to the EAR," we believe that this has unintended consequences when combined with the proposed fundamental research definition, wherein the word "nonproprietary" is used.

Withholding the release of research results until the results are confirmed is general practices during the conduct of fundamental research. Without a specific definition for "nonproprietary," IEEE-USA is unable to determine whether the proposed definition will constitute a problematic change to the EAR.

Applied Research

BIS has requested comments on whether the alternative definition of applied research suggested in the preamble should be adopted, or whether basic and applied research definitions are needed given that they are subsumed by fundamental research.

IEEE-USA supports the use of the National Science Foundation definition of applied research.

> *Applied research is defined as systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.*

IEEE-USA has significant concerns about the adoption of Defense Federal Acquisition Regulation (DFAR) Supplement (48 CFR part 31.205–18) for the definition of "applied research." DFAR defines "applied research" to mean an:

> *"effort which (1) normally follows basic research, but may not be severable from the related basic research, (2) attempts to determine and exploit the potential of scientific discoveries or improvements in technology, materials, processes, methods, devices, or techniques, and (3) attempts to advance the state of the art."*

This proposed definition has many very significant failings that would negatively affect the conduct of fundamental research at large.

- First, the phrase "may not be severable from the related basic research" imposes a fundamental requirement to have a tie to basic research. While it is often the case that applied research follows from basic research, it is not universally true.

There are instances wherein applied research is conducted as following other applied research; and, therein may be inherently distant from basic research at that point. Without further clarification of what constitutes "severable" and how close the applied research must be to the basic research, the public is left to guess what is intended here.

- Second, the phrase and following enumeration of "*technology, materials, processes, methods, devices, or techniques*" could become restrictive as only the word "technology" is presently defined in the EAR.

- Third, the presence of "and" prior to the phrase "attempts to advance the state of the art" is greatly problematic. A standard practice within the fundamental research community is to reproduce prior art to validate other researchers' results, often using alternate techniques. As such, this kind of applied research might not necessarily attempt to "advance the state of the art."

The IEEE-USA suggests using the NSF definition for both "basic" and "applied" research and retaining some specific reference to those definitions within the description of what constitutes fundamental research.

Deletion of the Clarifications and Questions and Answers

IEEE-USA is concerned about the proposal to delete clarifying questions and answers that address the definition of "Publicly Available Information" and "Technology and Software Subject to the EAR" in EAR 734 Supplement 1. The answers offer clarifications that are necessary to avoid misinterpretation of the EAR. While we understand the intention of the answers is to afford the public with illustrative examples instead of serving a regulatory purpose, from the perspective however, from the perspective of academia and industry, the presence of the answers within the regulations does serve as legally-binding guidance, whereas a website which may be less frequently visited is – in general – not legally-binding. Thus, we recommend maintaining the presence of the answers to prior questions that have relevancy under the proposed rules.

Thank you for giving us the opportunity to provide this information. Feel free to contact IEEE-USA's Director of Government Relations, Mr. Russell Harrison, at r.t.harrison@ieee.org for further assistance.

Respectfully submitted,

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