



**Comments of the
Semiconductor Industry Association
on**

**Advanced Notice of Proposed Rulemaking regarding
Review of Controls for Certain Emerging Technologies**

83 Fed. Reg. 58201 (Nov. 19, 2018)

83 Fed. Reg. 64299 (Dec. 14, 2018)

RIN 0694-AH61

Docket # 180712626-8840-01

January 10, 2019

The Semiconductor Industry Association (SIA) is the trade association representing the semiconductor industry in the United States. SIA member companies are engaged in the research, design, and manufacture of semiconductors. The U.S. is the global leader in the semiconductor industry, and continued U.S. leadership in semiconductor technology is essential to America's continued global economic and technology leadership. More information about SIA and the semiconductor industry is available at www.semiconductors.org.

Semiconductors are complex products critical to the functioning of everyday consumer electronics, communications, and computing devices, and they are also increasingly critical components in the automotive, industrial, financial, medical, retail, and all other sectors of the economy. Few industries, if any, have a supply chain and development ecosystem as complex, geographically widespread, and intertwined as the semiconductor industry. Furthermore, the U.S. semiconductor industry is characterized by an ever-diversifying range of business models and relationships crossing national and regional boundaries. It is, therefore, critical to ensure that U.S. export controls are designed to achieve specific national security objectives in a manner that does not undermine the U.S. innovation and technology base. Maintaining a strong U.S. semiconductor research, design, manufacturing and supplier base is, in itself, a national security issue, as evidenced by the Department of Defense's "Microelectronics Innovation for National Security and Economic Competitiveness" strategy.¹ It is

¹ See https://www.acq.osd.mil/se/initiatives/init_micro.html. As stated in a report by the President's Council of Advisors on Science and Technology: "Cutting-edge semiconductor technology is also critical to defense systems and U.S. military strength, and the pervasiveness of semiconductors makes their integrity important to mitigating cybersecurity risk." "Report to the President: Ensuring Long-Term U.S. Leadership in Semiconductors" (Jan. 2017), available at

important, therefore, that government and industry work together to ensure that U.S. policies are crafted in a manner that can both enhance our national security as well as continue to allow the semiconductor industry in the U.S. to grow and innovate.

To that end, SIA has long been a partner of the U.S. Government to provide support regarding reforms and modernization of export control policy, particularly with respect to semiconductors. SIA appreciates the opportunity to provide its comments in response to the Advance Notice of Proposed Rulemaking (ANPRM) regarding the Review of Controls for Certain Emerging Technologies. SIA supports the effort the Administration is undertaking to draw upon all available government, industry, and academic resources to identify and propose controls on uncontrolled emerging technologies essential to the national security of the United States so long as the effort is consistent with the standards set forth in the Export Control Reform Act of 2018 (ECRA), 50 U.S.C. §§ 4801-4851.

Executive Summary of Comments

As set forth in more detail below, and in response to BIS's requests for comments, SIA respectfully asks BIS to:

- *SIA Comment 1* – Confirm that our understanding of the legal standards that govern this effort are correct, such as that BIS must, before proposing a unilateral control on “emerging” technology, consider its foreign availability, consider its impact on domestic research, fully consider its impact on the U.S. economy, determine whether it would be effective, and exclude proposed or final controls over fundamental research, software, or commodities;
- *SIA Comment 2* – Propose and adopt a definition of “emerging technologies” that is consistent with ECRA’s standards for what should and should not be subject to export controls; SIA’s proposed definition is set forth on pp. 8-9;
- *SIA Comment 3* – Justify how each proposed and final emerging technology control meets the standards in ECRA, including: (i) why the technology proposed to be controlled is “essential” to U.S. national security; (ii) what the specific weapons-, military-, or intelligence-related application the control is designed to address; (iii) why the unilateral control would not harm domestic research; (iv) why the rule would be effective at stemming the proliferation of the identified technology to countries of concern; and (v) the results of BIS’s full consideration of the impact on the U.S. economy that would result from the unilateral control;
- *SIA Comment 4* – Demonstrate with specificity why a technology proposed for or imposed as a unilateral control is “essential” to U.S. national security;

- *SIA Comment 5* – Limit proposed and final controls to those necessary to address national security concerns, not trade policy concerns;
- *SIA Comment 6* – Limit proposed or final unilateral controls to technologies that are exclusive to the United States;
- *SIA Comment 7* – Explain why the proposed or final unilateral control would not harm domestic research, and give great weight to industry statements regarding how a proposed or final unilateral control would harm such research or its U.S. business;
- *SIA Comment 8* – Describe the results of BIS’s full consideration of the impact on the U.S. economy that would result from a new unilateral control;
- *SIA Comment 9* – Propose and impose controls that are tailored to well-defined technologies in a manner consistent with the structure and definitions in the EAR;
- *SIA Comments 10* – Delay the imposition of any new controls until the technology can be controlled multilaterally;
- *SIA Comment 11* – Rescind any unilateral controls not agreed to by a regime after three years unless for well-supported national security reasons;
- *SIA Comment 12* – Research numerous public sources of information in identifying emerging technologies;
- *SIA Comment 13* – Create a mechanism for industry to file non-public comments;
- *SIA Comment 14* – Impose any new controls that meet the standards of ECRA as quickly as possible in a transparent, well-supported manner, and with adequate licensing and other resources to address the new obligations;
- *SIA Comment 15.A.* – Devote additional funding and other resources to conduct this highly complex process properly;
- *SIA Comment 15.B. and 15.C.* – Consider addressing some of the policy concerns through specific transaction controls, end-use controls, and end-user controls rather than industry-wide list-based controls;
- *SIA Comment 15.D.* – Conduct the process with as much transparency, outreach, and certainty as possible;
- *SIA Comment 15.E.* – Tailor new licensing policies to destinations of concern;

- *SIA Comment 15.F.* – Adopt (i) an inter-company exception for affiliates and (ii) an intra-company deemed export exception for bona-fide full-time regular foreign national employees;
- *SIA Comment 15.G.* – Take into account the comments in response to this ANPRM when preparing the ANPRM on foundational technologies;
- *SIA Comment 15.H.* – Devote substantial new resources to regularly review, revise, and update the CCL consistent with the standards and requirements of ECRA;
- *SIA Comment 15.I.* – Expedite the process of creating the ETTAC;
- *SIA Comment 15.J.* – Address in the proposed rule how companies should deal with newly controlled technologies that are outside the United States or in the possession of foreign persons in the United States; and
- *SIA Comment 16* – Consider the consequences of past experiences – such as the controls imposed on commercial satellite commodities, software, and technology in the late 1990s – in tailoring controls on emerging technologies related to semiconductors.

We acknowledge that the standards in this summary establish high standards for new emerging technology controls; however, these standards are no more than a distillation of the relevant standards in ECRA and related collateral implications. We believe that Congress created the standards because, as stated several times in ECRA, unilateral controls should be rare and only respond to specific or emergency situations essential to our national security. All other list-based controls are better addressed through the regular order and the well-tested process of working with our multilateral regime partners to develop and implement multilateral controls to (i) enhance their effectiveness and (ii) keep the United States on a level playing field with such countries, particularly with respect to commercial technologies.

The global semiconductor industry is concentrated in a few major countries, with U.S.-headquartered companies commanding approximately 50 percent of global market share. Nonetheless, the industry is globally competitive with leading companies located around the world and dependent on a complex and globally integrated supply chain. As a result, the U.S. industry does not have a monopoly in the design, manufacture, and development of semiconductor technology. It is important for the Government to recognize that any unilaterally imposed export controls will primarily affect the operations of semiconductor companies in the U.S., limiting their ability to export semiconductor technologies, but not necessarily preventing emerging technologies going to countries of concern from other leading nations.

I. Relevant Statutory and Regulatory Provisions

A. Statutory Standards Governing the Identification and Control of “Emerging” Technologies

To guide our responses to BIS’s requests, it is important to set out the statutory standards governing this effort because they set the guardrails for which technologies should and should not be identified and controlled as “emerging.”² Specifically, ECRA section 4817(a) requires the Administration to conduct an interagency effort to identify “emerging” technologies that “are *essential* to the national security of the United States” (emphasis supplied) and that are not now subject to a multilateral control on the Commerce Control List (CCL) of the Export Administration Regulations (EAR) or described on one of the other lists of technologies the U.S. controls for export. After a public notice and comment process, it requires the imposition of controls on their export, reexport, and in-country transfers consistent with the standards in the section and elsewhere in ECRA. *Id.* § 4817(b). Although ECRA does not define “national security,” the ANPRM includes illustrative examples of now-uncontrolled commercial technologies of national security concern to be addressed by the effort, *i.e.*, those that “have potential conventional weapons, intelligence collection, weapons of mass destruction, or terrorist applications, or [that] could provide the United States with a qualitative military or intelligence advantage.” These examples track ECRA’s definition of a “dual-use” item, which is an item that has “civilian applications and military, terrorism, weapons of mass destruction, or law-enforcement-related applications.” *Id.* § 4801(2).

In deciding whether to identify such a technology as “emerging” and impose unilateral controls on its export, reexport, and in-country transfer, ECRA section 4817(a)(2)(B) requires the Administration to take in to account the:

- (i) development of emerging technologies in foreign countries;
- (ii) effect export controls imposed pursuant to this section may have on the development of such technologies in the United States; and
- (iii) effectiveness of export controls imposed pursuant to this section on limiting the proliferation of emerging technologies to foreign countries.

Section 4817 is an element of the broader ECRA statement of policy for export controls in section 4811(1), which is that the United States should “use export controls only after full consideration of the impact on the economy of the United States and only to the extent necessary – (A) to restrict the export of items which would make a significant

² The statutory standards for Commerce’s evaluation of “foundational” technology are identical. Commerce should, therefore, apply these same standards when considering which technologies should and should not be identified and controlled as “foundational.” See SIA Comment 15.G. below.

contribution to the military potential of any other country or combination of countries which would prove detrimental to the national security of the United States; and (B) to restrict the export of items if necessary to further significantly the foreign policy of the United States or to fulfill its declared international obligations.” As the association representing the fourth largest exporting industry in the United States, SIA places great emphasis on Congress’s next statement in ECRA section 4811(3) that “the national security of the United States requires that the United States maintain its leadership in the science, technology, engineering, and manufacturing sectors. . . . Such leadership requires that United States persons are competitive in global markets.” This concept is fundamental to the ability of our member companies to continue investing in jobs and advanced research in the U.S. and should be a guiding principle for BIS and the other agencies as they study, identify, propose, and impose controls on technologies.

B. Unilateral List-Based Controls May Only Be Used to Address Specific National Security or Foreign Policy Concerns and Only if Submitted for Multilateral Control

ECRA sections 4811(5) states that “[e]xport controls should be coordinated with the multilateral export control regimes. Export controls that are multilateral are most effective, and should be *tailored* to focus on those *core technologies* and other items that are capable of being used to pose a *serious* national security threat to the United States and its allies.” (emphasis supplied). Subsection (6) goes on to state that “[e]xport controls applied unilaterally to items widely available from foreign sources generally are less effective in preventing end-users from acquiring those items. Application of unilateral export controls should be limited for purposes of protecting *specific* United States national security and foreign policy interests.” (emphasis supplied).

Consistent with these standards, section 4817(c) states that the Administration “shall propose that any technology identified pursuant to [this emerging technologies identification effort] be added to the list of technologies controlled by the relevant multilateral export control regimes.” Although the provision allows for consideration of continued unilateral controls if the regime efforts are unsuccessful after three years, an implication of this provision is that the Administration should identify emerging technology controls with which the relevant multilateral regimes are reasonably likely to agree and that are consistent with the regimes’ scopes of authority.

C. The Emerging Technologies Identification and Control Effort is Limited to Identifying and Controlling Emerging “Technologies”

Although ECRA gives the Administration authority to impose controls over commodities and software, the ANPRM and the specific ECRA provision at issue in the current effort refer only to possible additional controls on emerging “technology.” ECRA section 4801(11) defines “technology” as including “information, in tangible or intangible form, necessary for the development, production, or use of an item.” Section 4801(7) defines “item” as a “commodity, software, or technology.” Thus, the three types of items do not

overlap as a definitional matter. “Technology” is not a “commodity,” for example. The EAR reinforces this point in its definition of “commodity,” which is “any article, material, or supply *except technology and software.*” 15 C.F.R. § 772.1. Thus, the scope of the ANPRM and our comments in response are limited to possible new controls on *information* that is within the scope of the term “technology” and does not include possible new controls on commodities or software.

D. List-Based Controls Should Not Include Technology that is “Published” or that Arises During, or Results from, “Fundamental Research”

BIS states in the ANPRM that it is not attempting to “expand jurisdiction over technologies that are not subject to the EAR.” 83 Fed. Reg. at 58202. EAR section 734.3(b)(3) states that the following types of information are not “subject to the EAR,” regardless of their content: (i) “published” information; (ii) information that arises during, or results from, “fundamental research;” (iii) information released by instruction in academic institutions; (iv) information in patents and published patent applications; (v) information that is a non-proprietary system description; and (vi) certain types of telemetry. Each of these elements of the regulatory exclusion is further defined in this and related EAR provisions. We reiterate BIS’s points in our comment here to allay concerns by some that BIS’s effort to identify and control emerging and foundational technologies might somehow affect the uncontrolled status of published information or information that results from fundamental research.

SIA Comment 1: Given that a common understanding of the law and regulations governing the the effort to identify emerging technologies is critical to its success, SIA respectfully requests BIS to confirm in its next publication on this issue (such as in the preamble to a proposed rule) that the foregoing description of the applicable law and regulations is correct and complete. If our understanding is not correct or complete, SIA respectfully requests BIS to identify what other legal standards govern this effort and to clarify our reading and interpretation of the relevant ECRA and EAR provisions.

II. How “Emerging Technologies” Essential to the National Security of the United States” Should be Defined and Supported

A. An EAR Definition of “Emerging Technologies” Should be Tied to the Standards and Terms in ECRA and the EAR

BIS requests comments on how the Administration should define emerging technologies that are “essential to the national security of the United States.” 83 Fed. Reg. at 58201. While there are academic efforts to define this term,³ SIA suggests that BIS adopt a

³ Scientific literature and other sources have many definitions revolving around, for example, undeveloped technologies that could change the status quo. For example, an academic paper, “What is an Emerging Technology,” states: “[t]here is considerable and growing interest in the

definition for export control purposes based on and bounded by the statements of policy in ECRA for why the export control system exists and what it and this emerging technologies effort are statutorily designed to accomplish.

SIA Comment 2: In light of the foregoing, SIA's proposed definition is the following:

“Emerging technologies” are specific core “technologies” in “development” which the Bureau of Industry and Security has demonstrated to be essential to the national security interests of the United States and:

- (a) are “required” for the “development” of specific and identifiable potential conventional weapons, intelligence collection applications, weapons of mass destruction, or terrorist applications;**
- (b) would provide the United States with a specific and identifiable qualitative military or intelligence advantage;**
- (c) are not available in or otherwise being developed in foreign countries; and**
- (d) are not within the scope of any existing multilateral controls.**

Note 1: A “technology” must not be identified or controlled as “emerging” unless it is within the scope of policy statements in ECRA for which “technologies” should be controlled for export. In particular, a “technology” must not be identified as “emerging” if a unilateral export control over it would:

- (a) harm domestic research on the identified “technology;”**
- (b) be ineffective at preventing countries of concern from developing it indigenously or otherwise acquiring comparable “technology” from third countries;**
- (c) be imposed without a full consideration of the impact on**

emergence of novel technologies, especially from the policy-making perspective. Yet as an area of study, emerging technologies lacks key foundational elements, namely a consensus on what classifies a technology as 'emergent' and strong research designs that operationalize central theoretical concepts.” Rotolo, Daniele and Hicks, Diana and Martin, Benjamin R., What is an Emerging Technology? (February 11, 2015). SWPS 2015-06. Available at SSRN: <https://ssrn.com/abstract=2743186> or <http://dx.doi.org/10.2139/ssrn.2743186>

the United States' economy of such a control;

- (d) be of a type that is not likely to be considered acceptable by the multilateral regime allies or that is inconsistent with the standards for the types of controls that are subject to the multilateral regimes; or**
- (e) apply to “production” “technology” or any aspect of “use” “technology” for “items” in “production.”**

Note 2: This definition does not apply to an exporter’s determination of whether a “technology” is “emerging.” Rather, it governs BIS determinations regarding whether a specific “technology” should be added to the Commerce Control List as an “emerging technology.”

Each of the elements in the proposed definition is taken from the standards in ECRA and BIS’s notice. It also uses as many of the existing EAR definitions and concepts as possible to avoid confusion in its application. In addition, the proposed definition reinforces the core policy element of ECRA that unilateral controls are disfavored. This places on BIS the burden of demonstrating that each of the statutory standards for the imposition of such controls has been met. The definition also reflects logical and factual points, as discussed below, that the U.S. Government, rather than industry, should identify what the national security threat is that needs to be addressed through the use of unilateral controls.

B. SIA Comment 3 – BIS Bears the Burden of Justifying How Each Technology Proposed for Control as “Emerging” Meets ECRA’s Standards

For each technology identified in a proposed rule to be controlled as “emerging,” BIS has the burden of providing sufficient information justifying why the proposal meets each of the relevant statutory standards that are distilled into our proposed definition. Thus, in each notice proposing or imposing a technology for control as “emerging,” BIS should demonstrate (without, of course, revealing any classified information):

- (i) why the technology proposed to be controlled is “essential” to U.S. national security;
- (ii) what the specific weapons-, military-, or intelligence-related application the control is designed to address;
- (iii) why the unilateral control would not harm domestic research;
- (iv) why the rule would be effective at stemming the proliferation of the identified technology to countries of concern; and

- (v) the results of BIS's full consideration of the impact on the U.S. economy that would result from the unilateral control.

In the absence of such information, SIA member companies and other stakeholders would not be able to provide useful comments consistent with the standards and goals of ECRA.

Industry and other stakeholders may offer comments related to the criteria set forth in ECRA, for example, with regard to factors such as foreign availability or the impacts on domestic research. BIS must respond with specificity and bears the burden of demonstrating why, in light of such information, BIS should nonetheless proceed with proposing controls for a particular emerging technology. Another reason for BIS having such burdens is that most of those potentially affected by a control will not be able to or willing to comment on the proposed control for a variety of reasons.⁴ BIS is asking for an unprecedented and massive amount of difficult-to-assemble information and analysis on a wide variety of non-mature, hard-to-define technologies and seeking assessments of national security concerns known only to a few outside of government in an extraordinarily brief amount of time.

III. Criteria BIS Should Use When Determining Whether There are Specific Technologies that Are Essential to the National Security of the United States

- A. SIA Comment 4 – The Administration Must Identify the *Specific National Security Threats to be Addressed by New Emerging Technology Controls That are Not Already Being Controlled*

The ANPRM refers to the need to impose technology controls to address concerns regarding “conventional weapons, intelligence collection, weapons of mass destruction, or terrorist applications or [other items that] could provide the United States with a qualitative military or intelligence advantage.” 83 Fed. Reg. at 58201. The International Traffic in Arms Regulations (ITAR), however, already control all technical data, including developmental technical data, that are directly related to any defense article described on the U.S. Munitions List, including, for example, Application Specific Integrated Circuits that are subject to the ITAR. 22 C.F.R. §§ 120.10 and 121.1, USML Category XI(d). Similarly, the EAR already control all technology required for the development, production, operation, installation, maintenance, repair, overhaul, or refurbishing of all other military items, including semiconductors not subject to the ITAR that are specific to or specially designed for military items. 15 C.F.R. Supp. No. 1 to Part 774; see, e.g., ECCN 3E611. These ECCNs also include controls over all technology required for the development of a production equipment of any sort that is specially designed to develop

⁴ As discussed below, SIA requests that BIS provide for a mechanism to enable confidential submissions of information on emerging and foundational technologies.

or produce military items is also already export controlled.⁵ The EAR also contains comprehensive controls on technology required for the production or development of commercial semiconductors, including various types of dual-use equipment required to develop or produce semiconductors. See, e.g., *id.* at ECCN 3E001.

Both the ITAR and the EAR define their controls over “development” technical data/technology to include information at “all stage prior to serial production.” See 22 C.F.R. § 120.41 (Note 2) and 15 C.F.R. § 772.1. The significance of these citations is that existing regulations already control all technology of any sort, whether emerging or mature, directly related to or required for the development of all military items or other controlled dual-use items. It also means that that the universe of directly related and required technologies for emerging technologies that is not now controlled but should be pursuant to ECRA must, by definition, be very small.

It is, therefore, incumbent upon BIS to outline the gaps that exist between (i) these and other existing specific and catch-all export controls and (ii) the current and emerging threats motivating the expedited technology identification and unilateral control effort ECRA requires. The ANPRM does not identify the specific national security threats that are the basis for contemplating new controls that are not adequately addressed by existing controls. Rather, the ANPRM states general, traditional security concerns and lists representative technology categories that may include specific emerging technologies. The notice does not connect the two issues. Without this critical information, our members cannot adequately respond to the ANPRM or a related proposed rule.

SIA’s members do not have the national security expertise of the U.S. Government or access to its intelligence resources. We appreciate that the government cannot release classified information to the public regarding threat assessments, but the government is in a better position than industry to identify the problem to be solved by a new control. Once identified, government and industry technologists can then work backwards together to identify the specific chokepoint and enabling technologies that should be controlled to address the threat. Such partnerships, primarily through the standard notice and comment process, can develop and refine industry-standard definitions of key terms that will enable compliance with the controls and help advance the national security objectives of the controls. Once the threats to be addressed by new controls are identified, SIA stands ready to assist the government in such efforts.

⁵ These comprehensive production equipment technology controls were created by the previous Administration to track equally comprehensive controls in the new B Group 600 series ECCNS that control *all* production equipment -- which includes semiconductor production equipment -- that have been specially designed for the development or production of a military item.

B. SIA Comment 5 – Proposed Controls Should be Limited to Addressing National Security Concerns, not Trade Policy Issues

We underscore the importance of ECRA's primary statement of policy in sections 4811(1) and 4817 – *i.e.*, that this exercise and export controls in general are limited to achieving specific national security and foreign policy objectives. These standards are reflected in ECRA's definition in section 4801(2) of "dual-use" items, which are items that have both "civilian applications and military, terrorism, weapons of mass destruction, or law-enforcement-related applications." The export control system is not designed to be -- and has not been used as -- a tool of trade policy, industrial policy, trade protectionism, or otherwise as part of any government efforts to pick economic winners and losers among American companies and their foreign competitors. We therefore urge the Administration to maintain this separation, and to avoid creating even the impression that any proposed export controls on particular technologies may be motivated by trade policy concerns unrelated to the ECRA's national security or foreign policy standards.

The Administration's 2017 National Security Strategy (NSS) asserts that economic security is an essential component of national security, and recognizes that "a growing and innovative economy allows the United States to maintain the world's most powerful military and protect our homeland." (p. 17). The NSS also recognizes the risk that significant government intrusion can disadvantage American companies against foreign competitors and hinder the private sectors' efforts to grow and innovate. For example, the NSS states that a "strong economy protects the American people, supports our way of life, and sustains American power. American workers thrive when they are free to innovate . . . [and] operate in markets free from excessive regulation and unfair foreign trade practices." (see NSS Pillar II p.17). Similarly, the first "priority action" states that "Departments and agencies will eliminate unnecessary regulations that stifle growth, drive up costs for American businesses, impede research and development, discourage hiring, and incentivize domestic businesses to move overseas." (see NSS, p. 20).

Inherent in the creation and imposition of unilateral export controls is the risk that the objectives articulated in the NSS, and reflected in Congress's statement of policy in ECRA, will be compromised if the scope of controls is not narrowly tailored to specific, clearly identifiable national security threats with clear justifications. In 2017, the Presidential Council of Advisors on Science and Technology stated that "[u]nilateral action [on, e.g., export controls] is increasingly ineffective in a world where the semiconductor industry is globalized."⁶ If the scope of new emerging technology controls is too broad or vague, then those controls will stifle growth, drive up costs, impede research, and motivate domestic businesses to move technology development overseas. For example, the Artificial Intelligence (AI) semiconductor market is forecast

⁶ "Report to the President: Ensuring Long-Term U.S. Leadership in Semiconductors," January 2017, p.14.

to grow to \$33 billion by 2022. While the U.S. industry currently leads in AI investment (with \$15-23 billion), the AI semiconductor market is already seeing fierce global competition, with other regions and governments prioritizing and supporting AI development.⁷ In addition, semiconductors are a key enabling technology for the Internet of Things (IoT) and the devices that leverage the power of IoT. IoT is estimated to produce a total economic impact of \$3.9 to \$11 trillion per year globally by 2025.⁸ If the U.S. takes actions or sends signals that discourage multinational companies from using U.S.-developed or -made semiconductors for these and other commercial applications, our industry's economic output, and thus our national security, would be harmed.

To the extent that the semiconductor industry in the U.S. is blocked -- whether as a matter of law or perception -- from engaging in these high-growth markets, the success of U.S. companies and the jobs and research investments that depend on our ability to compete for business in these fields will be at risk. Member companies have reported that some multinational customers are designing their products to "design out" U.S. semiconductor technology because of a perception that U.S. companies may no longer be reliable suppliers as a function of new controls on technology or for reasons unrelated to export control concerns. Because semiconductors are components in the hardware for many of the representative technologies in the ANPRM, semiconductor companies must work with the providers of such hardware well in advance of system deployment to ensure American semiconductor products and technology are integrated in these systems of the future. Developers and vendors of commercial technologies will often not partner with U.S. semiconductor companies if their products and activities are -- or are anticipated to be -- subject to excess or unnecessary controls. Foreign end equipment manufacturers may instead choose to source and design in semiconductor components from suppliers of other allied and like-minded countries, such as South Korea, Japan, Taiwan, and many in Europe. This is a basic fact of commercial life in all sectors. That is, they will generally choose suppliers from other allied countries where such technology is not subject to controls.

C. SIA Comment 6 – Emerging Technologies Identified for Unilateral Controls Should be Exclusive to the United States

Congress required the Administration to consider the foreign availability of "emerging" technologies, and whether unilateral controls over them would be effective, for the obvious reason that the imposition of unilateral U.S. controls would be more harmful than helpful to the objectives of ECRA section 4817 if the technologies were readily

⁷ Semiconductors: A Strategic U.S. Advantage in the Global Artificial Intelligence Technology Race (August 2018), available at https://www.semiconductors.org/wp-content/uploads/2018/09/81018_SIA_AI_white_paper_-_FINAL_08092018_with_all_member_edits_with_logo3.pdf.

⁸ National IoT Strategy Dialogue, available at <https://www.semiconductors.org/wp-content/uploads/2018/06/IoTReportFinal2-1.pdf>.

available from non-U.S. sources. If export controls (including deemed export controls) prohibit or significantly limit a U.S. company's ability to export a commercial technology or hire the most capable researchers and engineers, then that company is placed at a significant competitive disadvantage to foreign companies that do not face such burdens. And the control would be ineffective because it would not, in the words of ECRA section 4817(a)(2)(B)(iii), "limit the proliferation of emerging and foundational technologies to foreign countries." Thus, to the extent that a particular technology is the subject of comparable research and product deployment by entities outside the U.S., such technologies should not be the subject of new unilateral U.S. controls.

A key goal of the NSS is to put U.S. companies on a level playing field globally. Except when absolutely necessary for a clear and specific national security reason, and in cases where the controlled technology is not available from foreign sources, imposing unilateral controls would serve to undermine U.S. economic security, and therefore national security more broadly. The global semiconductor industry is concentrated in a few major countries, with companies U.S.-headquartered companies commanding approximately 50 percent of global market share. Nonetheless, the industry is globally competitive with leading companies located around the world and dependent on a complex and globally integrated supply chain. As a result, the U.S. industry does not have a monopoly in the design, manufacture, and development of semiconductor technology. It is important for the Government to recognize that any unilaterally imposed export controls will primarily affect the operations of semiconductor companies in the U.S., limiting their ability to export semiconductor technologies, but not necessarily preventing emerging technologies going to countries of concern from other leading nations.

For example, many SIA member companies have a global footprint that has evolved over decades, and these global operations have evolved to include R&D-oriented activities, such as chip design, software creation, and several other aspects of semiconductor product development. Many semiconductor companies augment their internal R&D activities with third-party engineering services firms, including non-U.S. firms. While much of this technology development is conducted in the United States, foreign nationals from many countries are involved in creating a company's intellectual property (IP). The ability to leverage the best and brightest scientists and engineers from around the world is an inherent part of the competitive advantage of the semiconductor industry in the United States. As a result, the IP underlying many of the representative technology categories listed in the ANPRM are both U.S. technology and foreign technology, and thus not exclusive to the United States. For example, "microprocessor technology" is the subject of intense global competition among companies, universities, and other research entities such as Phytm (China), HiSilicon (Huawei) (China), and Fujitsu (Japan). Similarly, regarding "stacked memory on chip,"⁹

⁹ "Stacked memory on chip" is not an industry-standard term with a clear definition, and we request further guidance on what specific technologies BIS is considering before we can provide

such memory technology (whether for design, development, or production) is possessed by memory manufacturers both in and outside the United States. Appendix A to our comments is a partial list of examples of semiconductor technology being developed outside the United States. Any controls imposed on now-uncontrolled technologies developed by such entities would only harm the economic interests of U.S. producers without limiting the development or proliferation of the technology outside the United States.

When considering the issue of foreign availability for specific technologies, we note that commenters will rarely have complete information about the technical capabilities of their competitors and will not have proprietary information about the technologies that their competitors may be developing. Thus, the best way to address the issue of foreign availability is to ask companies which foreign competitors or entities could readily step in and fill the gap should export controls be imposed on a particular technology. If the company or entity can identify one or more foreign competitors, and reasonably support the basis for the statement, then the comparable technology is generally not the type that should be subject to new unilateral controls. For example, it is common in the semiconductor industry for buyers to want to ensure uninterrupted supply by having at least two different suppliers in different countries. In such cases, U.S. companies may know if one or more foreign competitors may step in to fill the gap even without having access to the competitors' blueprints and other technical data. If, on the other hand, a company is able to reasonably demonstrate that a particular technology is unique to the United States, then such technology is a worthy candidate for consideration. In any event, BIS has the burden of demonstrating that any proposed or final unilateral technology control is over technology exclusive to the United States.

D. SIA Comment 7 – Emerging Technologies Should Not be Identified and Restricted if a Unilateral Control Would Harm Research into the Technology in United States – and Great Weight Should be Given to Industry Comments about Such Harms

ECRA sections 4811(1), 4811(3), and 4817(a)(2)(B)(ii) essentially require BIS to ensure that any new unilateral controls not harm domestic research into the very technologies ECRA requires be protected. The U.S. semiconductor industry invests, on average, 18 percent of its revenue into research and development of microprocessor and related technologies. Such investments are among the highest amounts devoted to research of any U.S. industry sector. The R&D pace in the semiconductor industry also tends to be significantly faster than that of other industries. The ability of semiconductor companies to continue funding cutting-edge research, however, depends on their ability to access global markets and sell products and related technologies around the world.

As discussed above, the ability of U.S. semiconductor companies to leverage the best

substantive comments. We request BIS elaborate whether this refers to volatile or nonvolatile memory, for example, as well as any applications of specific interest to BIS.

and brightest scientists and engineers from around the world is also an inherent part of their competitive advantage. If significant controls were to be imposed on the ability of such companies to develop newly controlled emerging technologies with such employees for the benefit of their U.S. employer, then the employees will usually choose to leave the United States and take their skills to foreign competition. Moreover, the semiconductor development industry is an intensely multinational effort because customers are all over the world. Having foreign national employees who often can better understand local needs and issues is also critical to the success of the U.S. companies.

Thus, unilateral technology controls that would harm, whether as a legal, practical, or economic matter, the ability of U.S. semiconductor companies to conduct research in the United States would be inconsistent with ECRA. Given that this is an economic and business standard, BIS should give great weight to statements by those best positioned to comment on how or whether a unilateral control would affect them economically, such as the U.S. developers of a technology proposed for a unilateral control. Industry generally knows best what would impose unnecessary competitive harms on business, stifle growth, drive up costs, impede hiring of American workers, and create incentives to move work overseas. Finally, if a commenter states that a proposed unilateral control would harm it or the industry economically and BIS nonetheless proceeds with imposing the control, BIS should be required (i) to refute such statements with specificity and (ii) to revoke or amend the control if it receives sufficient additional information supporting the statements of economic harm.

E. SIA Comment 8 – BIS Should Neither Propose nor Impose New Emerging Technology Controls Unless it has Fully Considered the Impact Such Controls Would Have on the U.S. Economy

ECRA section 4811(1) states that “it is the policy of the United States . . . to use export controls only after full consideration of the impact on the economy of the United States. . . .” Similarly, ECRA section 4811(3) goes on to state that the impact of the implementation of new controls on emerging technologies on U.S. leadership and competitiveness “must be evaluated on an ongoing basis and applied in imposing controls...to avoid negatively affecting such leadership.” These requirements are similar to the objectives of the section 4817 standards described above, but have a procedural element to them that warrant a separate comment. SIA therefore respectfully requests that BIS clearly demonstrate that it has fully assessed the overall impact to the U.S. economy, and document how this was achieved, when it proposes any unilateral controls over emerging technologies that are essential to U.S. national security. An unsupported statement regarding the economic impact of a new control would not be sufficient to meet the “full consideration” requirements of ECRA.

F. SIA Comment 9 – BIS Should Propose and Impose Controls That are Tailored to Focus on Core, Well-Defined Technologies in a Manner Consistent with the Structure of the EAR

The requirement in ECRA for “tailored” controls on “core technologies” demonstrates that Congress recognized the need for precise and clear definitions of the new terms to be used in the proposed new controls. By definition, the new controls will pertain to technologies that are not yet mature. There will be many competing or different understandings of the words used. Thus, the usual EAR approach of relying upon industry-standard definitions of technologies will not work. We understand that BIS recognizes that the ANPRM’s descriptions of the 14 representative technologies are extraordinarily broad. Nonetheless, we want to point out that the ANPRM’s term “microprocessor” and its sub-categories are generic terms that sweep in technologies already subject to existing controls or that are otherwise available commercially worldwide such that they do not warrant any export controls.

Existing regulations already define and control “microprocessors” that possess specific functional or operational parameters, such as processing speed, clock frequency, component make-up, and component parameters. Thus, any proposed “emerging technology” over a “microprocessor” should similarly be specific and detailed. The notice also refers to Systems-on-Chip (“SOC”) technology. Unless the emerging elements of such technology are narrowly defined, a control could catch any chip that has some processing unit, input/output interfaces, memory, and other storage means. Such chips have been widely available both in the U.S. and abroad for decades, meaning that they are not emerging technology. Accordingly, SIA requests that any new definitions of such types of semiconductor technology and its subcategories be specifically defined. Without specifics on key component blocks, functionalities, and performance criteria, and applications of the chip, the definition would create uncertainty in the scope and enforcement of controls.

Another key element to ensuring that proposed controls are tailored is that they track the existing ECCN structure and EAR definitions, such as “technology,” “development,” and “required.” These elements have been worked out and refined over decades of interaction with industry and our regime counterparts. Although complex, they are nonetheless a well-tested, coherent general structure of controls and definitions. They allow the government to accomplish its national security objectives in a way that can be understood and complied with by domestic and foreign industry. The existing definition of “technology,” for example, prohibits controls from affecting non-technical or business information. The existing definition of “development” allows for the controls to apply to “know-how” and other pre-production technology that was at the center of the legislative discussions about FIRMA and ECRA. The existing definition of “required” largely prevents inadvertent over-controls on technology that is merely capable for use with a sensitive item but does not warrant control because it was developed to be common to non-sensitive applications.

On this latter point, SIA strongly requests BIS to exclude from this and all other technology control efforts the use of open-ended and difficult-to-comply-with control parameter phrases such as “capable for use with.” For export controls to further their national security objectives, U.S. exporters and foreign reexporters will need to be able to understand the control parameters in order to be able to comply with them. If parameters require a level of knowledge about national security concepts or military applications not generally available to the public, then the control is a failure. For example, a control over semiconductors “capable for use with military item X” will mean nothing to a commercial company that does not know what is needed for military item X. Moreover, any semiconductor could, theoretically, be used with any application if the application is built around the semiconductor. Such uncertainty in control status generally creates unnecessary regulatory burdens for the U.S. companies and incentives for foreign customers to source from non-U.S. suppliers.

In addition, we respectfully ask BIS to recognize that semiconductors are components that are incorporated into products and systems made by original equipment manufacturers (OEMs). Often our devices are for mass market consumption and are commercial “off the shelf” products that enable functionality in a broad range of products. Given the commodity-like nature of many semiconductor products, they may be found in numerous commercial products as well as several of the representative technology categories listed in the ANPRM. It is imperative that BIS identify core technologies and tailor controls on these technologies in a manner that minimizes impacts on broadly used commercial products.

G. SIA Comment 10 – Delay the Imposition of Any New Controls Until the Technology Could be Controlled Multilaterally

ECRA clearly emphasizes the well-tested policy conclusions that (i) multilateral controls are far more effective than unilateral controls and (ii) unilateral controls should be used only in exceptional cases because they generally harm U.S. companies more than their competitors without necessarily depriving a country of concern the technology at issue. Given the potential harm unilateral controls could impose on the U.S. semiconductor industry in light of rapid innovation cycles and worldwide capabilities and supply chains, we strongly request BIS to delay implementation of any controls over newly identified emerging technologies until *after* the relevant multilateral regime has also agreed to identify the same technology on its control list. Such a decision would be consistent with a core element of the NSS, which is to keep U.S. companies on a level playing field with its foreign competitors.

H. SIA Comment 11 – Unless for Well-Supported National Security Reasons, BIS Should Rescind Any Unilateral Controls Not Agreed to by a Regime after Three Years of Effort

Should the Administration determine that a unilateral U.S. control is warranted based on a clear and specific national security rationale, we request that any new control be

proposed to the relevant multilateral regime in the most immediate available regime cycle following the issuance of a final rule. In such cases where a U.S. unilateral rule is implemented, we note that, pursuant to ECRA section 4817(c)(2), if the “emerging technology” control is not adopted multilaterally three years after it is proposed, “the applicable agency head may determine whether national security concerns warrant the continuation of unilateral export controls with respect to that technology.” In such cases, we strongly urge the Administration to immediately review any such export control that is not adopted multilaterally within three years and to automatically withdraw it unless BIS can demonstrate a compelling reason to maintain it. While ECRA does not prohibit unilateral controls, it makes clear that Congress sought to discourage them unless absolutely necessary. As a result, if U.S. unilateral controls are not adopted on a multilateral basis, SIA believes that the burden should shift to BIS to articulate with specificity how continued unilateral controls continue to advance the policy and security goals, and control standards, of ECRA. In the absence of such a showing, we believe that the unilateral controls should be rescinded.

IV. SIA Comment 12 – Additional Resources to be Reviewed as Part of the Emerging Technologies Identification Process

In response to BIS’s request for sources on emerging technologies and how to identify them, SIA suggests BIS benefit from the relevant resources at:

1. The U.S. Patent and Trademark Office (PTO)
2. The National Institute of Standards and Technology (NIST)
3. The Small Business Innovation Research (SBIR) Program
4. The Small Business Technology Transfer (STTR) Program
5. Standards bodies, such as IEEE or 3GPP
6. The Defense Advanced Research Projects Agency (DARPA)
7. Reports from market research firms such as Gartner
8. Interviews with Venture Capitalist and Entrepreneur seed money investment groups
9. Semiconductor Research Corporation¹⁰

Each of these resources, particularly PTO and NIST (which are part of the Commerce Department), exist in part to receive a regular and robust flow of information on many

¹⁰ See <https://www.src.org>.

types of technology, including the emerging technologies identified in the notice, from U.S. and foreign sources. The development of a well-funded, properly staffed office within BIS to screen such information on a daily basis against national security concerns would be a significantly valuable addition to the emerging technology identification process. Indeed, ECRA specifically requires that the emerging and foundational technologies effort be an “*ongoing* interagency process.” (ECRA § 4817(a)(1) (emphasis added)). Trying to do this statutorily mandated effort on an *ad hoc* basis will fail; such controls will eventually become stale and counter-productive. BIS must come up with well-resourced *systems* to acquire and gather such information, which, by definition, evolves quickly or springs into existence later. BIS is the perfect agency to lead this effort because one of the core missions of the Commerce Department -- referred to by the Secretary as “America’s Data Agency” -- is to collect, store, and analyze massive amounts of government and industry data for a variety of goals important to the United States. Indeed, Commerce leads the Federal Data Strategy to “leverage data as a strategic asset.”¹¹ Given the massive scope of such data, we speculate that most of the answers to BIS’s questions within the notice may already be within the government’s various collections of information from industry.

There are also numerous industry conference papers, trade show collateral materials, technical publications specific to individual technologies, and other sources of information on the status of the listed technologies in the U.S. and other countries. For example, the feature article of the December 2018 edition of “Scientific American” was called “Emerging Technologies of 2018.” Not only would the information and commentary on emerging technologies be of use to BIS, but the article also identified experts on the issue that comprised the “Emerging Technologies Steering Group.” SIA also suggests that BIS contact universities with engineering, computer science, and other departments with active research programs in semiconductor technology. For the reasons mentioned above, BIS should have a systematic process to review PhD dissertations and published papers, and the proceedings of academic conferences for leads on emerging technologies. In addition, we recommend BIS review the Technology Readiness Level (TRL) standards adopted by other parts of the U.S. government to estimate technology maturity of Critical Technology Elements of government programs. These programs have standards of technology evaluation that could be useful for the emerging technologies definition and evaluation efforts.¹²

Additional specific references to information about foreign sources of technology within the scope of the ANPRM are set forth in Appendix A.

¹¹ See <https://strategy.data.gov>.

¹² See, e.g. https://www.nasa.gov/directorates/heo/scan/engineering/technology/txt_accordion1.html

V. SIA Comment 13 – Create a Mechanism for Industry to File Non-Public Comments

SIA requests that BIS establish a mechanism for the submission of confidential comments in response to the questions raised in the ANPRM and future proposals regarding emerging and foundational technologies. We make this request because some SIA member companies have indicated that they are reluctant or unwilling to submit comments responsive to some of the ANPRM's questions because doing so would require the disclosure of information that is confidential, business proprietary, or otherwise sensitive competitive information. Others may be concerned about discussing in a public filing uncontrolled, unclassified technology that may nonetheless be considered sensitive for national security reasons.

Because such information would be responsive to the questions asked in the notice, we respectfully request that BIS create a process that would allow for the submission of responsive comments -- both for this ANPRM and for any proposed rules on the issue of emerging or foundational technologies -- that would be shielded from public disclosure if they met certain standards. We note that BIS provides for procedures for making non-public comments in different contexts.¹³ Several other agencies also enable concerned parties to submit non-public comments containing confidential business information in addition to a public version.¹⁴ This request is particularly important because, given the complexity of the technology topics at issue and the simple truth that industry has far more information than the government about the technologies and their commercial applications, the quality of any new emerging technology controls will be a direct function of the quality and volume of inputs.

VI. SIA Comment 14 – Impose New Controls that Meet ECRA's Standards Quickly and With Sufficient Resources to Implement and Enforce Them

If BIS identifies and provides reasonable support for why and how a proposed new control meets each of the above-referenced elements in ECRA, then we respectfully request that the control be imposed as quickly as possible in a transparent, well-supported manner and with adequate licensing, outreach, and other resources to regulate, explain, and enforce the new obligations.

¹³ For example, the process for requesting exclusions to the March 2018 Section 232 Aluminum Investigation includes a provision for the submission of non-public comments. See 83 Fed. Reg. 12,106 (March 19, 2018).

¹⁴ For example, the Office of the U.S. Trade Representative allowed concerned parties to submit a public version of a comment as well as a "business confidential version" of that same comment when it initiated its Section 301 Investigation last year. See 82 Fed. Reg. 40,213, 40,215 (August 24, 2017). Similarly, the Federal Communications Commission has standard regulations that allow concerned parties to supplement public filings with non-public filings containing confidential business information. See 47 C.F.R. § 0.457.

VII. SIA Comment 15 – Other Issues for BIS to Consider as Part of Its Effort to Identify Uncontrolled Emerging Technologies that are Essential to the National Security of the United States

As the Administration works through the best ways to address the national security and ECRA issues at hand, we suggest consideration of the following additional actions.

SIA Comment 15.A. – Commerce and the Export Control Agencies Need Additional Funding to Conduct this Effort Properly

New export controls, even if properly tailored to address a specific national security threat, can end up undermining their stated goal if their administration and enforcement are not well-funded and properly staffed. The effort to merely understand the content of, and read the referenced citations in, our and all the other comments and the details of all the related technology areas will require a massive commitment of existing and new BIS and other export control agency staff. Moreover, BIS will certainly need to engage government and industry experts to a significant degree to have confidence that it understands the issue it is considering controlling. This takes time, and BIS and the other agencies will absolutely need to hire significant numbers of new engineers and scientists expert in the ANPRM technology topics, which “include” such diverse and massively complex topics such as: (i) “biotechnology,” (ii) “artificial intelligence,” (iii) “Position, Navigation, and Timing (PNT) technology;” (iv) “microprocessor technology,” (v) “advanced computing technology,” (vi) “data analytics technology,” (vii) “quantum information and sensing technology,” (viii) “logistics technology,” (ix) “additive manufacturing,” (x) “robotics,” (xi) “brain-computer interfaces,” (xii) “hypersonics,” (xiii) “advanced materials,” and (xiv) “advanced surveillance technologies.”

The new rules that the Administration anticipates proposing and imposing as a result of this effort will certainly lead to an increase in the number of license applications and other requests -- primarily classification and advisory opinion requests -- submitted to BIS and its agency colleagues. Without a corresponding increase in resources to process the new applications and other requests, license applications may be unduly delayed, leading to unnecessary burdens and loss of competitiveness for U.S. industry. Similarly, without a corresponding increase in enforcement resources, the new controls are less meaningful and the playing field for compliant companies is not level.

As mentioned above, any systematic effort to mine already-existing government and industry sources of information on emerging technologies is certainly going to require a massive amount of additional resources. As well-described in the ANPRM and during the legislative hearings leading up to ECRA, the issue to be addressed by the emerging technologies identification effort is significant and serious. A correspondingly significant and serious amount of additional resources is required to properly address the issue. Otherwise, quick and seemingly easy new technology controls based on the responses of limited resources could do more harm than good for U.S. industry.

SIA Comment 15.B. – Many Policy Concerns Can be Better Addressed Through Tailored BIS Actions Specific to Transactions and Companies Rather than Through Industry-Wide Technology Controls

The EAR has many tools to address a novel national security issue that do not involve identifying new technology controls on the CCL. In particular, ECRA section 4817(b)(1) gives BIS the authority to impose interim controls “such as by informing a person that a license is required for export.” If used judiciously, this plenary “is informed” authority can be an effective tool at addressing a particular national security issue involving specific transactions *without having to impose controls on the broader area of technology involved.*

SIA Comment 15.C. – Consider End-Use and End-User Controls

ECRA recognizes that list-based controls are not the only way to achieve the national security and foreign policy objectives of export controls. In particular, ECRA section 4813(a)(2) explicitly requires the creation of lists of end users and end uses that are determined to be a threat to national security and foreign policy interests of the United States. Specifically, ECRA sections 4813(a)(2) and 4814(b)(2)(C) together preserve the authority of BIS to add entities to the Entity List that are engaged in or pose a significant risk of becoming involved in activities contrary to the national security or foreign policy interests of the United States.

As previous technology control identification efforts have demonstrated, detailed technical descriptions of specific new technologies for inclusion on control lists can sometimes end up doing more harm than good. If, for example, the exact same technology is used to commit a bad act and to defend against the bad act, then a list-based control will not accomplish its objective. Another example is surveillance technology, which usually relies on the same technology (including semiconductors) used in massively widespread, benign commercial applications.

The solution for when list-based controls would be ineffective, or would do more harm than good, is to focus on the end uses and the end users of concern. When someone in government or elsewhere identifies concerns with such technology, the issue is generally more about *how* it is being used and *who* is using it than something inherently threatening in the technology. The EAR already has a well-developed structure to implement creative and tailored end use and end user controls. We encourage BIS to consider such ECRA-authorized approaches to addressing national security concerns when CCL-based controls over emerging technologies would result in doing more harm than good, or would be ineffective.

SIA Comment 15.D. – Conduct the Emerging Technologies Identification and Control Process with as Much Transparency, Outreach, and Certainty as Possible

There is considerable concern in the investor and foreign business partner community that the United States will begin imposing broad controls on the large categories of emerging technologies identified in the ANPRM. Most do not appreciate that the ANPRM is a request for public input and information about broad categories of technologies in order for BIS to use in considering how to develop narrowly tailored controls essential to national security. They also generally do not appreciate that there are specific statutory standards governing the effort and what may and may not be added to the control lists. Because perception can, however, become reality with respect to economic decisions involving U.S. companies, we encourage the Administration to continue to roll out proposed new controls in a transparent, ECRA-consistent manner in order to reduce uncertainty among those who do not follow the nuances of the EAR and this process.

SIA Comment 15.E. – Not All Controls Need to be Imposed on Exports to All Destinations

Not all controls need to be imposed on exports and reexports worldwide. BIS has discretion when imposing unilateral controls on exports and reexports to specific countries or country groups. Thus, the impact of potential new controls can and should be tailored to specific issues posed by specific countries. See ECRA § 4817(b)(2).

SIA Comment 15.F. – With Respect to any New Emerging Technology Controls, Adopt (i) An Intercompany Exemption for Affiliates and (ii) Intracompany Deemed Export Exemption for Bona Fide Full Time Regular Foreign National Employees

ECRA was established at the same time as the Foreign Investment Risk Review Modernization Act (FIRRMA). Indeed, ECRA section 4817 was deliberately created to work with FIRRMA to address congressional and Administration concerns about transfers of critical technology, including emerging and foundational technology, regardless of the nature of the underlying investment or transaction. As evidenced by FIRRMA's section 4565(a)(4)(B)(iii), however, these policy concerns do not pertain to transactions among affiliates. That is, FIRRMA explicitly excluded investments by foreign affiliates of U.S. companies from the scope of the new authorities it gave to the Committee on Foreign Investment in the United States (CFIUS).

Consistent with this carve-out in FIRRMA, we ask BIS to use the broad authority ECRA section 4817(b)(4)(B) gives it to create a similar intercompany exception for any new controls that would be imposed pursuant to this emerging technologies identification effort. We believe such an exception is reasonable because the risk of diversion from within a corporate family is generally low. Also, the risk of economic harm to a U.S. affiliate posed by a unilateral control on transactions with its foreign affiliates is quite

high. We would expect that any such exception would exclude transactions involving affiliates in Country Group E countries or affiliates that are proscribed entities and would otherwise not affecting licenses required by ECRA section 4817(b)(2). Nonetheless, the broader policy point of excepting controlled transactions among affiliates in good standing from any new emerging technology licensing obligations, consistent with the approach Congress took in FIRRMA, remains the same.

In addition, we ask BIS to use its ECRA section 4817(b)(4)(B) authority to create, in connection with any new controls over emerging technologies, a license exception from the EAR's deemed export controls for foreign person bona fide full-time regular employees. Similar to the previous request, the FIRRMA debate that led to this emerging technologies effort did not identify concerns about release of technology to foreign person employees of U.S. companies. The concern was about what other countries might do with such technology. We make this suggestion because a significant potential harm to many of our members from any new unilateral export controls will be, as a matter of law or perception, the loss of access to the best engineers and technologists from around the world. Such experts are critical to their success as U.S. companies, as discussed above. If the U.S. develops the reality or perception that the domestic intra-company sharing of technology in these areas becomes unilaterally burdensome or prohibited, then the best and brightest talent from the United States and abroad will simply take their skills to our foreign competitors.

SIA Comment 15.G. – Take the Comments in Response to the Emerging Technologies ANPRM into Account When Preparing the ANPRM on Foundational Technologies

The ANPRM states that Commerce plans to address possible controls on “foundational” technologies in a separate request for information and comments. 83 Fed. Reg. at 58202. Because the statutory standards in ECRA section 4817 for the technologies that should and should not become controlled as “emerging” pursuant to that section are identical to the standards governing new controls over “foundational” technologies, our comments in response to such a notice are likely to be quite similar to these comments. In light of ECRA’s general emphasis on not imposing unilateral controls over technology for which there is comparable foreign availability, SIA suggests that BIS explain in its next ANPRM how basic and common (*i.e.*, foundational) technology could theoretically meet the standards in ECRA section 4817 and elsewhere. In particular, we ask BIS to answer in its next ANPRM how a unilateral control over such technology would be effective at preventing its proliferation to countries of concern if it is, by definition, generally available and common. We are not opposed to the effort, of course; we merely do not yet know how to answer that question. It is important to our members because most semiconductor technology could potentially meet the definition of “foundational.”

SIA Comment 15.H. – Substantial Resources Should Be Committed to Regularly Reviewing, Revising, and Updating the CCL Consistent with the Standards and Requirements in ECRA

We realize this comment process is not about the CCL in general. Nonetheless, when doing the research to decide which new technologies should be added to the CCL as “emerging,” BIS will inevitably be studying semiconductor technologies, and technologies that depend upon them, in ways it might not have without having to conduct this effort. It will, thus, likely develop new insights into the technology, the industry, and the foreign capabilities. We, therefore, respectfully request, at a minimum, that the CCL benefit from such work generally and, as appropriate, BIS propose the removal or revision of ECCNs affected by such research that have not otherwise have been reviewed for years or decades.

We also respectfully ask BIS to begin a broader systematic effort to review the CCL, particularly its Category 3, in light of ECRA’s coming in to effect. By definition, none of the items controlled in the CCL were created under the standard in ECRA section 4811(1), which is that export control should be used “only after full consideration of the impact on the economy of the United States and only to the extent necessary.” Absent research not made public, BIS does not have in its files any studies of any sort that analyze the “impact on the economy of the United States” of any of the EAR’s controls or whether existing controls exist “only to the extent necessary.” Moreover, ECRA section 4811(3) requires that the impact of the EAR’s implementation on U.S. industry’s “leadership and competitiveness **must be evaluated on an ongoing basis. . . .**” (emphasis supplied). Similarly, ECRA section 4811(7) mandates that an “**efficient process should be created to regularly update the controls, such as by adding or removing such items.**” (emphasis supplied).

For BIS to be able to comply with these new statutory mandates, it and its sister agencies in the export control system -- primarily DTSA, ISN, DDTTC, and NNSA -- must be appropriated and thereafter devote *substantial* additional technical, regulatory, legal, policy, and related staff resources to the CCL update effort. Sticking to the usual process of proposing a few changes to the multilateral regimes each year, although appreciated, does not satisfy the new statutory requirements. The previous Administration often said that it would do a “top-to-bottom” review of the CCL. But aside from the annual tweaks to the CCL through the regular regime-review process, it did not -- largely because its technical resources were focused on reviewing and revising the lists of military items rather than commercial and dual-use items. Now that the military list review effort is essentially complete, we ask the current Administration to do what the previous Administration did not -- and what ECRA now mandates.

In addition, we suggest BIS consider creating in the EAR a process for affected exporters to petition for removal or modification of a control that is not consistent with ECRA’s standards. This process could also allow for the submission of ECRA-relevant information that was not available to the government at the time it imposed the control,

such as a change in foreign sourcing, technological advancements, or overwhelming commercial applications in situations where there not has not been a specific national security basis for the control articulated. If controlled technology that has lost its sensitivity as a result of, for example, widespread commercial availability, then SIA member companies fall behind their foreign competitors that are not subject to such controls either as a legal or a practical matter. For a strategic industry like semiconductors that evolves rapidly, the consequences of U.S. export controls falling behind include loss of U.S. leadership, negative impact on U.S. manufacturing, and, therefore, the weakening of the U.S. defense industrial base. BIS's CCL maintenance efforts, therefore, should be a high priority even if there were not a specific statutory mandate.

SIA Comment 15.I. – Expedite the Process of Creating the ETTAC

SIA respectfully asks BIS to expedite the creation of the Emerging Technologies Technical Advisory Committee (ETTAC) to ensure experts are in place and able to provide feedback on proposed rules. If it takes too long to establish the ETTAC, its utility will be limited and it will be unable to fulfill its responsibilities as referenced in ECRA section 4817(a)(2)(A)(iv).

SIA Comment 15.J – Address in a Proposed Rule how Companies Should Deal with any Newly Controlled “Emerging” or “Foundational” Technologies that are at the Time of the New Final Rule Outside the United States or in the Possession of Foreign Persons in the United States

If the emerging and foundational technologies control efforts develop as we hope, they will not result in new controls being imposed over any comparable technologies that are available outside the United States. If, however, controls are imposed over technology available outside the United States -- deliberately or inadvertently -- then BIS needs to address in its proposed rule what U.S. and foreign persons abroad should do with such technologies upon the effective date of a new control. Are they required to remove it from the possession of all foreign persons? Destroy it? Return it to the United States until authorized by a license? And are such instructions even practical? Whatever the answer, changing a company compliance program and business operations to suddenly control previously uncontrolled technologies overseas will be extraordinarily burdensome and difficult to accomplish quickly.

Even if such newly identified technologies are unique to the United States, it is almost certain that, given the nature of the technologies at issue, they will be in the possession of foreign persons in the United States, many of whom will have been the developers and inventors of the technologies. How are U.S. companies to address such internal deemed export controls on previously uncontrolled technologies, particularly if the source of such technologies are the very foreign persons now prohibited from possessing the technologies? As discussed above, one partial solution to this conundrum would be for BIS to create a deemed export exemption for foreign persons

who are bona fide regular employees of U.S. person entities.

VII. Conclusion – SIA Comment 16

What is past is prologue in export control policy debates as well as in history and literature. History has shown that the U.S. Government's imposition of export controls over commercial technologies that are not unique to the United States and that are not tailored to address specific national security threats end up harming the very national security concerns the controls were designed to address.

For example, as a result of an apparent violation of then existing export controls over commercial satellite technology in the late 1990's, Congress required that *all* commercial satellite commodities, software, and technology, regardless of sensitivity, be controlled aggressively worldwide to the same degree as the most sensitive weapons and other military items subject to the ITAR. The imposition of such controls over all such commercial items created economic incentives for non-U.S. companies in allied countries to create or expand production of competing products with vastly fewer or no regulatory barriers to sell to non-embargoed destinations. As described by the departments of Defense and State in their 2011 space export control policy report (the "1248 Report") and related public advocacy for congressional authority to tailor non-sensitive commercial space export controls, the statutorily mandated non-tailored controls helped speed the significant loss of the U.S. commercial satellite space industry's worldwide market share. This loss harmed national security because it harmed the health of the U.S. defense and commercial industrial bases. The ANPRM, of course, did not ask about satellite technology; we raise this example to request that BIS avoid taking action to semiconductor and related technologies what Congress required to be done to commercial space and satellite technologies – that is, impose non-tailored unilateral controls over commercial technology for which there is foreign availability.

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Thank you again for conducting this process to identify emerging technologies that are essential to national security, that are not controlled but should be pursuant to the standards in ECRA. If you have any additional questions or would like to discuss these comments further, please contact David Isaacs at disaacs@semiconductors.org.

APPENDIX A

AI, ML and Neural Networks

AI/DL Chip/Hardware (mostly inference play)

1. Huawei/HiSilicon (China) - Ascend processors for AI/DL (both training and inference): <http://www.hisilicon.com/en/Products/ProductList/Kirin> , <http://www.hisilicon.com/en/Media-Center/News/Key-Information-About-the-Huawei-Kirin970> , <https://www.huawei.com/us/> , <http://www.hisilicon.com/>
2. Horizon Robotics (China)- Robotics (inference chip): https://www.eetimes.com/document.asp?doc_id=1333196 , <http://en.horizon.ai/>
3. iFlytek (China) - speech processing (inference chip) <http://www.iflytek.com/en/> , <https://www.huawei.com/us/about-huawei/publications/winwin-magazine/31/iflytek-ai>
4. Hikvision (China)- security surveillance (inference chip): <https://www.hikvision.com/>
5. Cambricon (China): <http://www.cambricon.com/> , <https://www.anandtech.com/show/12815/cambricon-makers-of-huaweis-kirin-npu-ip-build-a-big-ai-chip-and-pcie-card>
6. Imagination Technologies (UK): <https://www.imgtec.com/>
7. Graphcore (UK): <https://www.graphcore.ai/> ,
8. Renasys (Japan): <https://www.renesas.com/us/en/> ,
9. Toshiba (Japan): <http://www.toshiba.com/tai/>

Startups with AI/DL Chip/Hardware (mostly inference play)

1. DeePhi Tech (China): <http://www.deepi.com/>
2. Novumind (China): <https://www.novumind.com/>
3. Kneron (US): <http://www.kneron.com/>
4. Think Force (China): <http://www.think-force.com/>
5. ChipIntelli (China): <http://www.chipintelli.com/>
6. Westwell Lab (China): <http://www.westwell-lab.com/en/home/>
7. Elvees ELISE SoC (Russia): <http://www.elvees.com/index.php?id=30>
8. Baikal Electronics (Russia): <https://www.baikalelectronics.com/products>
9. See <https://www.forbes.com/sites/gilpress/2018/09/24/the-thriving-ai-landscape-in-israel-and-what-it-means-for-global-ai-competition/#383c07230c51>

SoC Microprocessors

1. Zhaoxin (China): (Shanghai Zhaoxin Semiconductor Co., Ltd., also goes by VIA Alliance Semiconductor Co., Ltd.): KaiXian microprocessor: <http://en.zhaoxin.com/>

2. NUDT (China): (National University of Defense Technology) - Matrix-2000 processor with 128 RISC cores for HPC acceleration:
http://www.nudt.edu.cn/index_eng.htm,
3. Huawei/HiSilicon (China) - data center processor SoCs:
<https://www.huawei.com/us/> , <http://www.hisilicon.com/>
4. ZTE/Sanechips (China) - SoCs for embedded and network use cases:
<https://www.prnewswire.com/news-releases/smic-and-sanechips-zte-microelectronics-announce-the-first-commercial-nb-iot-chip-designed-and-manufactured-in-mainland-china-300527368.html> , <https://www.zteusa.com/> ,
<https://www.zte.com.cn/global/> , <https://www.prnewswire.com/news-releases/smic-and-sanechips-zte-microelectronics-announce-the-first-commercial-nb-iot-chip-designed-and-manufactured-in-mainland-china-300527368.html>
5. Datang (China) - Wireless networks chips - <http://en.datanggroup.cn/>
6. C-Sky Microsystems Co. Ltd. (China-acquired by Alibaba) - RISC-V: <http://en.c-sky.com/>
7. Zhaoxin (China): (partially owned by VIA) building small x86 processors (up to 8 cores), <http://en.zhaoxin.com/>
8. Centec (China): Ethernet switching SOCs:
<http://www.centecnetworks.com/en/Main.asp>
9. Nephos (China): Ethernet switching SOCs: <http://www.nephosinc.com/nps/>
10. Realtek (Taiwan): Ethernet and Wireless SOCs: <https://www.realtek.com/en/>
11. Wuhan Fisilink Microelectronics Technology Co. (China) – part of Fiberhome: Ethernet switching SOCs: see Fiberhome at
<http://www.cccme.org.cn/shop/cccme8889/index.aspx>

Quantum Computing/Sensing Technology/Expert Systems

1. D-Wave Systems, Inc. (Canada): <https://www.dwavesys.com/our-company/meet-d-wave>

Speech and Audio Processing/Audio and Video Manipulation

1. Baidu is a leader in this area (China): <http://research.baidu.com/>

Memory

1. Samsung (South Korea): <https://www.samsung.com/us/aboutsamsung/home/>
2. SK hynix (South Korea): <https://www.skhynix.com/eng/index.jsp>

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