



# FEDERAL REGISTER

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Vol. 80

Thursday,

No. 98

May 21, 2015

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Part III

## Department of Commerce

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Bureau of Industry and Security

15 CFR Parts 738, 740, 742, *et al.*

Wassenaar Arrangement 2014 Plenary Agreements Implementation and  
Country Policy Amendment; Final Rule

**DEPARTMENT OF COMMERCE****Bureau of Industry and Security****15 CFR Parts 738, 740, 742, 743, 772 and 774****[Docket No. 150304217–5217–01]****RIN 0694–AG44****Wassenaar Arrangement 2014 Plenary Agreements Implementation and Country Policy Amendments****AGENCY:** Bureau of Industry and Security, Commerce.**ACTION:** Final rule.

**SUMMARY:** The Bureau of Industry and Security (BIS) maintains, as part of its Export Administration Regulations (EAR), the Commerce Control List (CCL), which identifies certain of the items subject to Department of Commerce jurisdiction. This final rule revises the CCL to implement changes made to the Wassenaar Arrangement's List of Dual-Use Goods and Technologies (Wassenaar List) maintained and agreed to by governments participating in the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies (Wassenaar Arrangement, or WA) at the December 2014 WA Plenary Meeting (the Plenary). The twentieth Plenary meeting of the Wassenaar Arrangement was held in Vienna on 2 to 3 December 2014. The Wassenaar Arrangement advocates implementation of effective export controls on strategic items with the objective of improving regional and international security and stability.

Wassenaar Participating States agreed to new export controls in a number of areas, including spacecraft equipment (Category 9) and technology for fly-by-wire/flight-by-light systems (Category 7), while texts for the control of machine tools (Category 2) and optical equipment for military utility and fiber laser components (Category 6) were substantially revised. In addition, significant reviews of several categories resulted in the deletion of obsolete controls relating to vessels (Category 8) and in refined controls on Unmanned Aerial Vehicles—UAVs (Category 9), specifically taking note of the substantial progress of technology in that area. Wassenaar Participating States modified controls in a number of other areas, such as equipment for production of electronic devices (Category 3), certain telecommunications equipment where encryption and other “information security” functionality is limited to operations, administration, or

maintenance (OAM) tasks (Category 5P2), and general purpose computers or servers where standard “information security” functionality is provided by embedded mass market microprocessors (CPUs) or operating systems (also Category 5P2).

This rule amends the CCL by implementing the changes agreed to by the WA at the Plenary by revising 42 Export Control Classification Numbers (ECCNs), adding one ECCN and removing one ECCN, as well as amending the General Technology Note, WA reporting requirements, adding seven (7) definitions and revising six (6) definitions in the EAR.

This rule also revises 3 ECCNs to add License Exception CIV eligibility for Anisotropic plasma dry etching equipment and related software and technology for the development and production of this equipment, as a result of BIS' foreign availability assessment.

Country Group A column 1, the Coordinating Committee (CoCom) member countries, is replaced with the successor national security export regime the Wassenaar Arrangement Participating States. In addition, the second national security column and the second regional stability column of the Commerce Country Chart are amended to harmonize with each other, as well as make changes based on the risk of diversion to unauthorized end user, end uses or destinations.

**DATES:** This rule is effective: May 21, 2015.

**FOR FURTHER INFORMATION CONTACT:** For general questions contact Sharron Cook, Office of Exporter Services, Bureau of Industry and Security, U.S. Department of Commerce at 202–482–2440 or by email: [Sharron.Cook@bis.doc.gov](mailto:Sharron.Cook@bis.doc.gov).

For technical questions contact:

Categories 0, 1 & 2: Michael Rithmire at 202–482–6105

Category 3: Brian Baker at 202–482–5534

Categories 4 & 5: ITCD staff 202–482–0707

Category 5 (Satellites): Mark Jaso at 202–482–0987 or Reynaldo Garcia at 202–482–3462

Category 6 (optics): Chris Costanzo at 202–482–0718

Category 6 (lasers): Mark Jaso at 202–482–0987

Category 6 (sensors and cameras): John Varesi 202–482–1114

Category 8: Darrell Spires 202–482–1954

Categories 7 & 9: Daniel Squire 202–482–3710 or Reynaldo Garcia 202–482–3462

**SUPPLEMENTARY INFORMATION:**

**Background**

The Wassenaar Arrangement (WA) on Export Controls for Conventional Arms and Dual-Use Goods and Technologies is a group of 41 like-minded states committed to promoting responsibility and transparency in the global arms trade, and preventing destabilizing accumulations of arms. As a Participating State, the United States has committed to controlling for export all items on the WA control lists. The lists were first established in 1996 and have been revised annually thereafter. Proposals for changes to the WA control lists that achieve consensus are approved by Participating States at annual December Plenary meetings. Participating States are charged with implementing the agreed list changes as soon as possible after approval. Implementation of WA list changes ensures U.S. companies have a level playing field with their competitors in other WA Participating States.

Unless otherwise indicated, the changes to the EAR described below are made in order to implement changes to the WA control lists approved at the December 2014 Plenary meeting.

**Revisions to the Commerce Control List**

Revises (42): 0A606, 1A613, 1C002, 1C007, 1C008, 1C010, 1E002, 2B001, 3A001, 3A002, 3A991, 3B001, 4D001, 4E001, 5D001, 5E001, 5A002, 6A001, 6A003, 6A004, 6A005, 6C005, 6D003, 7A003, 7D004, 7E004, 7E001, 8A001, 8A002, 8A620, 8E002, 9A001, 9A003, 9D003, 9A004, 9A010, 9A012, 9B001, 9B010, 9D003, 9D004, and 9E003.

Adds (1): 9D005.

Removes (1): 4D002.

Revises because of the Foreign Availability Assessment (3): 3B001, 3D001, and 3E001.

**Category 0—Nuclear Materials, Facilities, and Equipment [And Miscellaneous Items]***0A606 Ground Vehicles and Related Commodities*

ECCN 0A606 is amended by revising paragraph .b in Note 2 to paragraph .a in order to remove a comma after the word “parts” to correct the punctuation.

**Category 1—Special Materials and Related Equipment, Chemicals, “Microorganisms,” and “Toxins”***1A613 Armored and Protective “Equipment” and Related Commodities*

ECCN 1A613 is amended by adding “metallic or non-metallic” to the beginning of Items paragraph .a to clarify that 1A613 includes plates made from metal or non-metal materials, such as ceramics, glass, composites, or any

combination of metal or non-metal materials.

**1C002 Metal Alloys, Metal Alloy Powder and Alloyed Materials**

ECCN 1C002 is amended by revising Item paragraphs c.2.f and c.2.g, and adding Item paragraph c.2.h. Paragraph c.2.f is revised by removing the word “or” from the end of this paragraph. Paragraph c.2.g is revised by replacing the “and” with an “or” at the end of this paragraph. This rule adds new paragraph c.2.h to control metal alloy powder or particulate material specified in 1C002.c.1 made in a controlled environment by “plasma atomization,” because this process is capable of producing fine spherical powders having the composition specified in 1C002.c.1 and can produce powder sizes finer than those processes already listed 1C002.c.2. Also, the definition for “plasma atomization” is added to § 772.1 of the EAR.

**1C007 Ceramic Powders, Non-“Composite” Ceramic Materials, Ceramic-“Matrix” “Composite” Materials and Precursor Materials**

ECCN 1C007 is amended by revising the Heading and Item paragraph a. The Heading is revised by replacing “ceramic base materials” with “ceramic powders,” because this term is not commonly used in literature for ceramics, not commonly recognized by ceramics manufacturers, and is prone to misinterpretation. For the same reason, Item paragraph .a is amended by replacing “base materials” with “ceramic powders.”

**1C008 Non-Fluorinated Polymeric Substances as Follows (see List of Items Controlled)**

ECCN 1C008 is amended by removing and reserving Item paragraph .b (Thermoplastic liquid crystal copolymers), because thermoplastics have not been able to compete in structural applications with thermosetting material controlled in 1C008.a.2.

**1C010 “Fibrous or Filamentary Materials”**

ECCN 1C010 is amended by moving the Technical Notes from below paragraph .c and adding them to the beginning of the Items paragraph of the List of Items Controlled section, because it applies to the whole ECCN. This rule also revises Item paragraph d.1.b by replacing the reference to “1C008.b to 1C008.f” with “1C008.d to 1C008.f” in order to harmonize with the revision this rule made to 1C008.

**1E002 Other “Technology”**

ECCN 1E002 is amended by revising the List Based License Exceptions and Items paragraphs .c, .c.1., .c.1.c.1., .c.1.c.2. and .g; removing Items paragraphs .c.1.c.3 through .c.1.c.3.c.; removing and reserving Item paragraph .d; and removing the Technology Note to paragraph .g.

1E002.f is removed from License Exception TSR eligibility because the General Technology Note, Supplement No. 2 to part 774, which indicates that License Exception TSU is not available for repair “technology” controlled by 1E002.e or .f. A License Requirement Note is added to explain this in the ECCN.

Items paragraphs .c, .c.1, .c.1.c.1, and .c.1.c.2 are amended by replacing the term “base materials” with “ceramic powders,” because this term is not commonly used in literature for ceramics, not commonly recognized by ceramics manufacturers and is prone to misinterpretation.

This rule removes Item paragraphs .c.1.c.3 through .c.1.c.3.c (technology for the design or production of ceramic powders or non-composite ceramic materials having platelets, whiskers, and continuous or chopped fibers), because the advancement of technology in this area has made the use of these materials outdated and it is very unlikely that these materials would ever be used in the same ceramic composition formulation.

Item paragraph .d (aromatic polyamide “production” “technology”) is removed and reserved because this technology is adequately covered by ECCN 1E001.

Item paragraph .g is amended by adding double quotes around the term “libraries”, removing the parenthetical phrase “(parametric technical databases)” and removing the Technology Note to paragraph .g that provided a definition for the term “library,” because the term “libraries” is changed from a locally defined term to a globally defined term. See § 774.1(d) regarding the quote system used in the CCL. This rule adds the term “libraries” to § 772.1 of the EAR to harmonize with the WA agreement to make it a global definition because it is used in both the WA Military List (ML17) and in 1E002.

**Category 2—Materials Processing**

**Technical Notes for 2B001 to 2B009, 2B201, 2B290 and 2B991 to 2B999**

Changes are made in the Technical Notes under 2B, to provide guidance for the measurement of “unidirectional positioning repeatability” (UPR).

**2B001 Machine Tools and any Combination Thereof, for Removing (or Cutting) Metals, Ceramics or “Composites”, Which, According to the Manufacturer’s Technical Specifications, Can Be Equipped With Electronic Devices for “Numerical Control”**

ECCN 2B001 is amended by revising Item paragraphs a.1, b.1.a, b.2.a through b.3, c.1.a, c.2 through c.2.c, Notes 2B001.c paragraph b., and e.2.b. Item paragraphs a.1, b.1.a, b.2.a through b.3, c.1.a, c.2 through c.2.c, Notes 2B001.c paragraph b amendments change the control parameter for turning, milling, jig boring and grinding machine tools from positioning accuracy (A) to “unidirectional positioning repeatability” (UPR). This includes adding a definition for “unidirectional positioning repeatability” in § 772.1 of the EAR. Machine tools for milling and turning having five or more axes are grouped in 3 divisions depending on the travel length of axis (length < 1m, 1m ≤ length < 4m and length ≥ 4m) to which specific control thresholds are associated (1.1 μm, 1.4 μm and 6 μm). Other machines (Turning, milling, grinding and jig boring) would be controlled based upon a specific UPR value and, as appropriate, their number of linear/rotary axes. The main reason for the change is that UPR represents the best possible accuracy for machine tools. Additionally, there is no systematic error in the measurement of UPR therefore there is no need for compensation. In particular, this may solve a loophole that currently exists with the measurement of positioning accuracy which is dependent on compensation. In the course of discussions at WA, delegations also addressed the question of used machines for which UPR values may not be specified or available. Generally there is a factor of 1 to 3 (According to ISO) between A and UPR. This ratio could be another tool that can assist in classifying used machine tools.

Item paragraph e.2.b is amended to add double quotes around the term “accuracy” to indicate that the term is defined in § 772.1 of the EAR. See § 774.1(d) regarding the quote system used in the CCL.

**Category 3—Electronics**

**3A001 Electronic Components and “Specially Designed” “Components” Therefor**

ECCN 3A001 is amended by revising Item paragraphs a.5.b.1 and a.5.b.2, a.7, a.7.a and a.7.b, the Technical Notes following a.7.b, b.7, b.10, and b.11.f and

b.11.g. Items paragraph a.5.b., which describes Digital-to-Analog Converters (DAC) having resolution of 10 bit or more, is amended by replacing the “or greater” with “greater than” for the ‘adjusted updated rate.’ Items paragraph a.5.b.2, which describes DACs having resolution of 12 bit or more, is amended by removing the text “equal to or.” Items paragraphs a.7.a and a.7.b, which specify parameters for Field Programmable Logic Devices (FPLDs), are amended by raising the maximum number of single-ended digital input/outputs from “500 or greater” to “greater than 700” and ‘aggregate one-way peak serial transceiver data rate’ from “of 200 Gb/s or greater” to “500 Gb/s or greater.” These revisions are made to reflect the advances made in recent years to Field Programmable Gate Arrays (FPGA) and to reduce controls on used devices. Technical Note 1 that follows Items paragraph a.7.b is removed because the Note above it already specifies FPGAs and Field Programmable Logic Arrays (FPLAs) in the list of devices included in 3A007.a.7.

Items paragraph b.7, converters and harmonic mixers, is amended to add detailed parameters, (e.g., output power, frequency range, operating range), for converters and harmonic mixers that can extend the frequency range of equipment in 3A002.c through .f (signal analyzers, signal generators, network analyzers, and microwave test receivers).

Items paragraph b.10, oscillators or oscillator assemblies, is amended to clarify that 3A001.b.10 applies not only between 10 Hz and 10 kHz, but also at those frequencies, which ensures that oscillators are properly controlled. The revisions to 3A001.b.10 seek to adjust the formula defining the control thresholds so that they closely approximate the actual shape of the phase noise curve in real oscillators/instruments. This will increase the effectiveness of the controls.

3A001.b.11.f and b.11.g are revised by raising the upper frequency limit of 75 GHz to 90 GHz to align the specified maximum frequency to a standard waveguide frequency breakpoint that is relevant to current commercial applications.

#### *3A002 General Purpose Electronic Equipment*

ECCN 3A002 is amended by revising Items paragraphs a.5.a through a.5.c; adding paragraph 3. to the Technical Notes following Items paragraph a.5.c; revising Items paragraphs .c through c.3, c.4.a, .d through d.1.a, d.2, d.3.b through

d.4.b, d.5, Note 1 after d.5, Technical Note 1 after d.5, and e.1 through e.2.

3A002.a.5.c and Technical Note paragraph 3 are added to the recording equipment and oscilloscopes control to clarify the scope of controls and, in particular, to address an issue of overlap between waveform digitizers and transient recorders specified by 3A002.a.5 and digital instrumentation data recorder systems specified by 3A002.a.6.

3A002.c (Signal analyzers) is amended by removing the term ‘radio frequency,’ which is no longer consistent with the scope of controls specified by this entry. The term ‘radio frequency’ indicates frequencies up to 6 GHz, but the subparagraphs 3A002.c.1 through c.3, in which frequencies are specified, all refer to frequencies of 31.8 GHz and higher.

In 3A002.c.1, although the frequency breakpoint for this band has been 37.5 GHz, it is now recognized that the breakpoint is 37 GHz, as per ETSI EN 300 197.

In 3A002.c.2, c.3, d.2 (Signal analyzers and generators), e.1 and e.2 (network analyzers) the high-frequency maximum limit is raised to 90 GHz. This figure corresponds to the maximum frequency of E-band waveguide (60–90 GHz), which is relevant to current commercial applications.

3A002.c.4.a is revised by increasing the control threshold (real-time bandwidth) from 85 to 170 MHz. Civilian data communication networks have increased in bandwidth to facilitate and promote these legitimate commercial uses. The updated threshold for real-time bandwidth addresses the 802.11ac WiFi standard.

3A002.d (signal generators) is revised to align the controls with current commercial technology requirements, specifically driven by commercial RF (Radio Frequency)/MW (Microwave) communication systems, while maintaining control on equipment of national security interests. The bandwidth (frequency change) is increased uniformly to 2.2 GHz and the frequency switching time is decreased uniformly to 100  $\mu$ s (except in the range 31.8–37 GHz, for which the bandwidth and frequency switching time thresholds remain, unchanged). These changes are motivated by developments in modern commercial communication applications that are utilizing the modulation formats of the IEEE 802.11ad standard.

#### *3A991 Electronic Devices, and “Components” not Controlled by 3A001*

ECCN 3A991 is amended by revising the introductory text to Items paragraph .d (field programmable logic devices) by raising the maximum limit of input/outputs from 500 to 700 in order to accommodate technological advances in this area and to correspond to the change made to 3A001.a.7, i.e., greater than 700. In addition, the text of this paragraph is simplified by replacing the phrase “input/outputs of 200 or greater and less than 700” to “input/outputs between 200 and 700,” which means the range includes 200 and 700.

#### *3B001 Equipment for the Manufacturing of Semiconductor Devices or Materials and “Specially Designed” “Components” and “Accessories” Therefor*

ECCN 3B001 is amended by revising the License Exception CIV eligibility paragraph and revising Items paragraphs f.1.a through f.2. The License Exception CIV eligibility paragraph is revised by adding 3B001.c (anisotropic plasma dry etching equipment) in light of a foreign availability assessment completed by BIS that concluded that equivalent items are available in China and therefore, no longer warrant CIV eligibility. Two lithography equipment parameters in 3B001.f are revised to recognize the movement of the state of the art of lithography equipment and feature size of advanced integrated circuits of significance to the military. A modernization of “Minimum Resolvable Feature size” (MRF) from 95 nm to 45 nm in Items paragraph f.1.b also required a change to the source wavelength in Items paragraph f.1.a used in direct step wafer lithography equipment. Therefore, Items paragraph f.1.a is revised by lowering the light source wavelength from “shorter than 245 nm” to “shorter than 193 nm.” In addition, the feature control parameter for imprint lithography in Items paragraph f.2 is revised from 95 nm to 45 nm to be consistent with the changes to direct step wafer equipment in Items paragraph f.1.

#### *3D001 and 3E001*

The License Exception CIV eligibility paragraphs are revised by adding software and technology for 3B001.c (anisotropic plasma dry etching equipment), because of the foreign availability assessment completed by BIS that concluded that equivalent items are available in China and therefore, no longer warrant control.

**Category 4—Computers****4D001 “Software”**

ECCN 4D001 is amended by revising the License Exception TSR eligibility paragraph in the List Based License Exceptions section; revising the License Exception STA ineligibility paragraph in the Special Conditions for STA section; and revising Items paragraph b.1 in the List of Items Controlled section. Because the Adjusted Peak Performance in Items paragraph .b is raised from 0.60 Weighted TeraFLOPS (WT) to 1.0 WT, the License Exception TSR eligibility paragraph and the License Exception STA ineligibility paragraphs are adjusted from 1.0 WT to 2.0 WT to account for technological advancements in software for the development and production of computers.

**4D002 “Software” “Specially Designed” or Modified To Support “Technology” Controlled by 4E (Except 4E980, 4E992, and 4E993)**

4D002 is removed from the Commerce Control List, because it is no longer in use and not of national security concern.

**4E001 “Technology”**

ECCN 4E001 is amended by revising the License Exception TSR eligibility paragraph in the List Based License Exceptions section; revising the License Exception STA ineligibility paragraph in the Special Conditions for STA section; and revising Items paragraph b.1 in the List of Items Controlled section. Because the Adjusted Peak Performance in Items paragraph .b is raised from 0.60 Weighted TeraFLOPS (WT) to 1.0 WT, the License Exception TSR eligibility paragraph and the License Exception STA ineligibility paragraphs are adjusted from 1.0 WT to 2.0 WT to account for technological advancements in software for the development and production of computers.

**Technical Note on “Adjusted Peak Performance” (“APP”)**

Note 6 of the Technical Note on “APP” is amended by removing the requirement to calculate the APP value for multiple memory/processor combinations operating simultaneously utilizing “specially designed” hardware, such as external interconnection equipment controlled under 4A003.g. Two Technical Notes are added after Note 6 for clarification on APP requirements for multi-processor systems. The revision to Note 6 simplifies the Note, eliminates an instance of “specially designed,” and

tightens the focus of the control on the more capable shared-memory computer systems. The Technical Note is added to define when processors actually share memory.

**Category 5 Part 1—“Telecommunications”****5D001 “Software”**

ECCN 5D001 is amended by removing and reserving Items paragraph .b, “Software” “specially designed” or modified to support “technology” controlled by 5E001, because this control is outdated and no longer in use.

**5E001 “Technology”**

ECCN 5E001 is amended by revising Items paragraph c.1, infrastructure transmission and switching “technology”, to raise the “total digital transfer rate” from 120 Gbit/s to 560 Gbit/s in order to accommodate advances in technology and in public standards.

**Category 5 Part 2—“Information Security”**

Category 5 Part 2 is amended to revise Note 1 to Category 5 Part 2, 5A002.a and 5A002.b to clarify that these entries apply to any system, equipment or component that meet the control parameters specified in a particular 5A002 or 5B002 entry. Prior to this revision there was a risk that exporters would interpret the current language to exclude some items that have “information security” functionality but are not specifically listed. The definition of “cryptanalytic items” in § 772.1 of the EAR is similarly revised, for the same reasons.

ECCN 5A002 is amended by revising the Related Controls paragraph in the List of Items Controlled section to add recently added paragraphs, *i.e.*, (k), (l), and (m) to Related Controls Note 2.

This rule also revises paragraph (j) in the Note at the beginning of the Items section, 5A002.b, 5D002.d and 5E002.b and the definition of “cryptographic activation” in order to address a loophole regarding the ‘cryptographic activation’ controls. The concept of “cryptographic activation” was introduced in 2010. The purpose of (j) is to release from control cryptographic equipment where the cryptographic capability cannot be enabled without some kind of additional mechanism such as a license key that is securely kept and bound to the equipment being activated. However, it was found that the original wording of the definition did not explicitly exclude certain circumstances by which export controls on cryptography could be circumvented by a manufacturer.

A new paragraph (l) is added to the Note at the beginning of Items paragraph to exclude from 5A002 routers, switches or relays, where the “information security” functionality is limited to the tasks of “Operations, Administration or Maintenance—OAM,” implementing only published or commercial cryptographic standards. In addition, a definition for “Operations, Administration or Maintenance” (“OAM”) is added to § 772.1 of the EAR, as well as a new Note under 5D002.c.

New paragraph (m) is added to the Note at the beginning of the Items paragraph to exclude from 5A002 general purpose computing equipment or servers having standard ‘information security’ functionality from their embedded mass market microprocessors (CPUs) and operating systems, in addition to OAM functionality.

The Note to 5A002.a.2 (Equipment performing cryptanalytic functions) is amended by replacing the word ‘cryptanalysis’ with ‘cryptanalytic functions’ and adding a new Technical Note to clarify the meaning of ‘cryptanalytic functions’. This eliminates ambiguity by explicitly defining the term ‘cryptanalytic functions’ for purposes of the control, while keeping the term ‘cryptanalysis’ as a local definition to the overall definition of “information security.”

The definition of “cryptanalytic items” in § 772.1 of the EAR is similarly revised to make clear references to ‘cryptanalytic functions’ and ‘cryptanalysis.’

Items paragraph a.9 and the Technical Note following Items paragraph a.9 are corrected by replacing the single quotes with double quotes around the term “quantum cryptography” and removing Technical Note 1, which is the definition for “quantum cryptography,” because that term is now defined in § 772.1 of the EAR. See § 774.1(d) regarding the quote system used in the CCL.

**Category 6—Sensors and Lasers****6A001 Acoustic Systems, Equipment and “Components”**

ECCN 6A001 is amended by revising Items paragraph a.1.a.2.a.2; the Technical Note after Items paragraph a.1.a.2.a.2; and Items paragraph a.1.a.3. Items paragraph a.1.a.2.a.2 (Underwater survey equipment designed for seabed topographic mapping) is amended to add the unit “m/s” to the sounding rate parameter. The Technical Note that defines ‘sounding rate’ is amended by adding the guidance, “for systems that produce soundings in two directions (3D sonars), the maximum of the

'sounding rate' in either direction should be used."

Items paragraph a.1.a.3 (Side Scan Sonar (SSS) or Synthetic Aperture Sonar (SAS), designed for seabed imaging) is amended by adding a control for "specially designed transmitting and receiving acoustic arrays therefor," because the quality and size of the transmitting and receiving hydrophone arrays is a key component to the performance of the overall system.

This rule also revises the introductory text of Items paragraph a.1.c to add two commas and 1 set of parentheses for clarity; adds the phrase "not specified by 6A001" to Note 1 that appears after Items paragraph a.1.c; removes Items paragraph a.1.c.1 and adds in its place Items paragraphs a.1.c.1, a.1.c.1.a and a.1.c.1.b; removes the Technical Note after Items paragraph a.1.c.1 and adds a Technical Note after Items paragraph a.1.c.1.b; and removes and reserves Items paragraph a.1.c.2. The revised text of 6A001.a.1.c (Acoustic Projectors) is intended to address an issue with the former text that did not specify the conditions under which the specified criteria were to be determined.

#### *6A003 Cameras, Systems or Equipment, and "Components" Therefor*

ECCN 6A003 is amended by removing the special license requirement for Hong Kong in the License Requirement Table, because 6A003.b.4.b already requires a license under NS:2, RS:1 and RS:2 for these items.

ECCN 6A003 is amended by revising the Reporting Requirement Note, under the License Requirement Table, by replacing the list of countries with a reference to the newly revised Country Group A:1 of Supplement No. 1 to part 740. This is to align with the revision of the Regional Stability requirements for these items in § 742.6 and the overall national security country group amendments.

ECCN 6A003 is amended by revising Items paragraphs a.3 through a.3.b, paragraph b.4.c.1 in Note 3 to 6A003.b.4.b that appears after Items paragraph b.4.c; and revising paragraph .b in Note 4 to 6A003.b.4.c that appears after Items paragraph b.4.c. Items paragraph a.3 through a.3.b (mechanical or electronic streak cameras) are amended by restructuring the control text in a cascading format to apply the writing speed parameter to mechanical camera and a temporal resolution to electronic tube cameras. As a result, plug-ins for streak cameras are decontrolled, which are relatively simple devices and do not represent a concern.

Note 3 and 4 to 6A003.b.4.b and 6A003.b.4.c respectively are amended to adjust the parameters in order to decontrol imaging cameras as a component of a night vision system for civil passenger land vehicles.

#### *6A004 Optical Equipment and "Components,"*

ECCN 6A004 is amended by revising the GBS and CIV paragraphs under the List Based License Exceptions section, adding a Technical Note after introductory Items paragraph 6A004.a; revising Items paragraph a.1, including adding subparagraphs a.1.a through a.1.b.2; and removing and reserving Items paragraph d.4. 6A004.a.1 is revised to address an issue with the text that essentially captured all deformable mirrors (DMs) on the market, irrespective of their military significance. The revised text includes new parameters that more closely identifies DMs with clear military utility and significance.

In addition, this rule revises Items paragraph a.4, including adding subparagraphs a.4.a through a.4.b.2.b and N.B after a.4.b.2.b. The revised text of 6A004.a.4 (Mirrors for beam steering mirror stages) and 6A004.d.2 (Beam steering mirrors stages and resonator alignment equipment) are updated to align the parameters with technological advancements in this area.

This rule also revises Items paragraph d.2, including adding subparagraphs d.2.a through d.2.b in order to separate and modernize the beam steering mirror controls in 6A004.a.4 and mirror control equipment listed 6A004.d.2.

Optical control equipment for segmented mirror alignment in 6A004.d.4 is removed because space qualified segmented mirror systems are already captured by 6A004.c.3, which makes the 6A004.d.4 control entirely redundant. Any non-space qualified optical control equipment for segmented mirror alignment is widely available and does not warrant control. License Exception GBS and CIV paragraphs are amended to remove reference to 6A004.d.4.

#### *6A005 "Lasers," "Components" and Optical Equipment*

ECCN 6A005 is amended by removing the Note to 6A005.c that appears after the Items paragraph .c; revising Items paragraph e.2; adding a Note to Items paragraph e.2; and adding Items paragraph e.3.

The Note to 6A005.c is removed because some of the referenced laser technologies no longer exist. However, this does not mean that all the lasers listed in this Note are decontrolled, and

exporters should look to specific ECCNs related to specific lasers to confirm control status.

Items paragraph e.2 (optical mirrors or transmissive or partially transmissive optical or electro-optical-"components,") is amended to move "fused tapered fiber combiners and Multi-Layer Dielectric gratings (MLDs)" to Items paragraph e.3.c. Items paragraph e.3 (fiber laser components) is added to specify parameters for fiber laser components of concern.

#### *6C005 Laser Material*

The Heading of 6C005 is amended to be more general, because specific items paragraphs are added to this entry. What was previously specified by the Heading is now specified in Items paragraph 6C005.a. Rare-earth-metal doped double-clad fibers are added to 6C005.b to specify components of concern.

#### *6D003 Other "Software"*

6D003.d is added to control "software" specially designed to maintain the alignment and phasing of segmented mirror systems consisting of mirror segments having a diameter or major axis length equal to or larger than 1 m. While this rule removes optical control equipment specially designed to maintain the alignment and phasing of segmented mirror systems from 6A004.d.4, because it is widely available, the software for such purposes is not widely available and still warrants controls.

### **Category 7—Navigation and Avionics**

#### *7A003 'Inertial Measurement Equipment or Systems'*

This rule replaces the reference to 'civil aviation authorities in a Wassenaar Arrangement Participating State' with 'civil aviation authorities of one or more Wassenaar Arrangement Participating States' in various entries of the control lists (7A003 Note 2, 9A001.a, 9E003.h). This change acknowledges the fact that, for example in Europe the authority for certifying civil aircraft and components for airworthiness is the European Aviation Safety Agency (EASA). It would ensure that the Notes continue to apply to aircraft and components certified in European countries that may no longer have a Civil Aviation Authority.

#### *7D004 & 7E004 Fly-by-Wire and Fly-by-Light "Source Code" and "Technology"*

ECCN 7D004 and 7E004 are amended by revising the Related Controls paragraph in the List of Items Controlled section to remove reference to ECCNs 0D521 and 0E521, because these items

have been added to 7D004.c and 7E004.b.7 and b.8. Accordingly, 0D521 No. 2 and 0E521 No. 6 are removed from the Table of Supplement No. 5 to part 774 of the EAR.

These changes are intended to address an issue with the current text which only controls 'active flight control systems' for protection-predictive diagnosis (7E004.b.3 and 7E004.b.4) and the related software in 7D004. The revised text will cover technology and software "know-how" related to high performance fly-by-wire/fly-by-light systems that could enhance the performance capabilities of systems of concern. Source code for fly-by-wire/fly-by-light systems is addressed in a new entry 7D004.c.

There are two main revisions to 7E004: Addition of a 7E004.b.7, which is intended to control the "development" "technology" for specific fly-by-wire functions/capabilities, which enable or enhance critical military capabilities; and addition of 7E004.b.8, which controls the technology to design a fault tolerant fly-by-wire system that has a Probability of Loss of Control (PLOC) rate of less (better) than  $1 \times 10^{-9}$ . Also the Note that appeared after paragraph b.6 is moved to after paragraph b.8.b, as well as adding double quotes around the word "technology" within the Note.

#### *7E001 Technology for Items Controlled in Category 7*

7E001 Heading is corrected to reinsert the exceptions to 7A994 and 7B994 that were inadvertently removed by the last WA implementation rule.

#### **Category 8—Marine**

##### *8A001 Submersible Vehicles and Surface Vessels*

ECCN 8A001 is amended by removing Items paragraphs .f (surface-effect vehicles (fully skirted variety)), .g (surface-effect vehicles (rigid sidewalls)), .h (hydrofoil vessels with active systems for automatically controlling foil systems), and .i (small waterplane area vessels), because these control entries are obsolete. Commodities no longer controlled in 8A001 may now be controlled in ECCN 8A992 (Vessels, marine systems or equipment, not controlled by 8A001 or 8A002, and "specially designed" "parts" and "components" therefor, and marine boilers and "parts," "components," "accessories," and "attachments"). "Technology" according to the General Technology Note for the "development" or "production" of the equipment removed

from 8A001 remains controlled in newly added 8E002.c.

##### *8A002 Marine Systems, Equipment, "Parts" and "Components"*

ECCN 8A002 is amended by removing Items paragraphs .k (skirts, seals and fingers), .l (Lift fans), .m (fully submerged subcavitating or supercavitating hydrofoils, "specially designed" for vessels controlled by 8A001.h), .n (active systems "specially designed" or modified to control automatically the sea-induced motion of vehicles or vessels, controlled by 8A001.f, 8A001.g, 8A001.h or 8A001.i), and o.1 (Water-screw propeller or power transmission systems, "specially designed" for surface effect vehicles (fully skirted or rigid sidewall variety), hydrofoils or 'small waterplane area vessels' controlled by 8A001.f, 8A001.g, .8A001.h or 8A001.i), because these are support systems for the items being deleted in 8A001. Commodities no longer controlled in 8A002 may now be controlled in ECCN 8A992 (Vessels, marine systems or equipment, not controlled by 8A001 or 8A002, and "specially designed" "parts" and "components" therefor, and marine boilers and "parts," "components," "accessories," and "attachments").

##### *8A620 Submersible Vessels, Oceanographic and Associated Commodities*

ECCN 8A620 is amended by revising Items paragraph .f (Closed and semi-closed circuit (rebreathing) apparatus "specially designed" for military use and not enumerated elsewhere in the CCL or in the USML) by removing the control for "specially designed" "components" for use in the conversion of open-circuit apparatus to military use, because none have been identified.

##### *8E002 Other "Technology"*

ECCN 8E002 is amended by removing License Exception TSR eligibility, because 8E002.a is specifically ineligible for License Exception TSU pursuant to the Note in the General Technology Note (GTN) of Supplement No. 2 to part 774. This rule also adds a License Exception Note to the List Based License Exceptions section to reference the Note to the GTN, which makes this ECCN ineligible for License Exception TSU, so that people do not overlook the Note to the GTN that has been in existence for more than a decade. In addition, this rule adds Items paragraph .c to maintain controls on "technology" according to the General Technology Note for the "development" or "production" of equipment deleted from 8A001.f through .i. Even though

this equipment is obsolete to those that have advanced technology, the technology still warrants controls because of the usefulness of the equipment.

#### **Category 9—Aerospace and Propulsion**

##### *9A001 Aero Gas Turbine Engines*

ECCN 9A001 is amended by revising Notes 1 and 2 in Items paragraph .a for reasons explained under 7A003 above.

##### **9A003 and 9D003 (Components and Software for Gas Turbine Engines)**

ECCNs 9A003 and 9D003 are amended by revising the Headings by replacing the "and" with "or" and to also control the "specially designed" assemblies or components of the Auxiliary Power Unit (APU) (which incorporate "technologies" controlled by 9E003.a and 9E003.h) and FADEC software of the APU until it becomes decontrolled by Note 2 under 9A001 (APU's). The changes also make clear that when an APU becomes decontrolled by Note 2 under 9A001, then the specially designed assemblies or components, as well as the FADEC software, can be exported without any further licensing requirements. Item paragraph .b is revised to align the country scope with the Wassenaar Participating States of Supplement No. 1 to part 743 of the EAR.

##### **9A004 Space Launch Vehicles and "Spacecraft," "Spacecraft Buses", "Spacecraft Payloads", "Spacecraft On-Board Systems or Equipment, and Terrestrial Equipment**

ECCN 9A004 is amended by revising the Heading; revising the License Requirements section; redesignating Items paragraph .a as .w; adding paragraphs .a through .f.2; and revising the range of paragraphs that are Reserved from "b. through w." to "g. through v."

Items paragraph .a (the International Space Station) is moved to Items paragraph .w, in order to add newly designated Items paragraphs .a (space launch vehicles), .b ("spacecraft"), .c ("spacecraft buses"), .d ("spacecraft payloads"), .e (on-board systems or equipment, specially designed for "spacecraft"), and .f (terrestrial equipment, specially designed for "spacecraft"). Even though these Items paragraphs .a–f are controlled under a different ECCN 9A515, as indicated by the new License Requirement Note, they are listed here so they harmonize with the placement of them in the Wassenaar Arrangement Dual-use List in order to create a pointer to ECCN 9A515 for those that look for them here first. BIS

will keep using 9A515 for these items because it works best with the unique export controls of the U.S., in that the "15" in the number corresponds to the category on the USML where related military items are specified.

Prior to publication of this rule, only some specific components were controlled on their own merits in the relevant categories (e.g., sensors), and when exported separately. The new controls capture the major sub-assemblies or equipment of a satellite that represent a high level of technology and are sensitive in terms of the potential military application they confer. This is the case of "spacecraft buses" (9A004.c), "spacecraft payloads" incorporating specific items controlled elsewhere in the CCL (9A004.d), on-board systems or equipment performing specific functions such as Attitude and Orbit Control (9A004.e) and terrestrial equipment—telemetry and telecommand equipment or simulators—(9A004.f).

Finally, the terms "spacecraft bus" and "spacecraft payload" are added to § 772.1 to avoid any ambiguity in the terms used, reflecting the technical state of the art and the commercial practices, and to facilitate common interpretation of both concepts.

**9A010 "Specially Designed" "Parts," "Components," Systems and Structures, for Launch Vehicles, Launch Vehicle Propulsion Systems or "Spacecraft"**

ECCN 9A010 is amended by adding a List of Items Controlled section and Items paragraph heading; and adding Items paragraphs .a through .d in order to harmonize with the Wassenaar Dual-Use List placement and to direct people who may look for them here first to the ITAR. These items are "subject to the ITAR" (See 22 CFR parts 120 through 130).

**9A012 Non-Military "Unmanned Aerial Vehicles," ("UAVs"), Unmanned "Airships", Related Equipment and "Components"**

ECCN 9A012 is amended by revising the Heading, the MT paragraph in the License Requirements section, and Items paragraphs .a through b.2, and b.4. The word 'system' is deleted from the Heading because the revised text no longer includes systems. The capitalization of words that are abbreviated for the first time is corrected in the MT license requirement paragraph. The revised text of 9A012.a limits the control of UAVs to those designed to have controlled flight out of the direct 'natural vision' of the 'operator' and having either: 1) A maximum 'endurance' greater than or

equal to 30 minutes but less than 1 hour and designed to take-off and have stable controlled flight in wind gusts of 25 knots or greater, or 2) A maximum 'endurance' of 1 hour or greater. Three new Technical Notes explain what is meant by 'operator,' 'endurance,' 'natural vision.' Items paragraphs b.1 and b.2 are deleted because remote control components are very hard to distinguish from model aircraft remote control units for smaller platforms, or they are not considered as critical enabling equipment for larger platforms. Items paragraph b.4 is amended to make the SI system (International System of Quantities ISO) the main reference for parameters as agreed to by WA.

**9B001 Equipment, Tooling or Fixtures, "Specially Designed" for Manufacturing Gas Turbine Engine Blades, Vanes or "Tip Shrouds"**

ECCN 9B001 is amended by revising the Heading; the Special Conditions for STA section; Items paragraph .b; and adding Items paragraph .c. The Heading is amended by replacing the "and" with "or," adding the word "engine" before "blades," replacing "tip shroud" with "tip shrouds," and removing the word "castings" to clarify the scope of the entry. Paragraph .b includes a control on cores or shells made from refractory metals. The Special Conditions for STA that apply to Country Group A:6 are revised to expand the scope to all of 9B001 to reflect the limited availability of 9B001.a equipment outside of WA Participating countries and the emerging technology of 9B001.c. This change is also reflected in Supplement No. 6 to part 774 "Sensitive List." Items paragraph .b is revised to update the current entry and provide a more comprehensive description of the critical production tools for the manufacture of gas turbine blades, vanes or tip shrouds. Paragraph 9B001.c is added to control additive manufacturing equipment for turbine components.

**9B010 Equipment "Specially Designed" for the Production of Items Specified by 9A012**

ECCN 9B010 is amended by revising the Heading to harmonize with the changes made to ECCN 9A012.

**9D003 "Software" Incorporating "Technology" Specified by ECCN 9E003.h and Used in "FADEC Systems" for Systems Controlled by ECCN 9A001 to 9A003, 9A101 (Except for Items in 9A101.b that are "Subject to the ITAR", See 22 CFR Part 121), 9A106.d or .e, or 9B (Except for ECCNs 9B604, 9B610, 9B619, 9B990, and 9B991)**

The Heading of 9D003 is amended by removing the word "propulsion" to clarify the scope of the entry and by removing 9A004 from the range of systems related to "FADEC Systems." ECCN 9A004 now controls spacecraft items, which have no gas turbine engines. FADEC Systems are defined for gas turbine engines.

**9D004 Other "Software"**

ECCN 9D004 is amended by revising Items paragraphs .c and .e to specify software that is specially designed to control the crystal growth process in casting or additive manufacturing equipment specified in 9B001.a or 9B001.c, respectively.

**9D005 "Software" Specially Designed or Modified for the Operation of Items Specified by 9A004.e or 9A004.f. (This "Software" Is Controlled by ECCN 9D515)**

A new entry 9D005 is added to the CCL to control related software to the new spacecraft controls added to 9A004. However, these Items are already controlled under ECCN 9D515 on the CCL, as indicated by the text in the parentheses. This entry is added to the CCL to harmonize with the placement of them in the Wassenaar Arrangement Dual-use List and so that people who look for them here first will be directed to ECCN 9D515 where they are controlled in the CCL. BIS will keep using 9D515 for this software because it works best with the unique export controls of the U.S., in that the "15" in the number corresponds to the category on the USML that specifies related military items.

**9E003 Other "Technology"**

ECCN 9E003 is amended by revising the SI License Requirement paragraph in the License Requirements section, the items paragraphs a.3 through a.4, redesignating paragraph .j as .k, and adding new Items paragraph .j. The SI license requirement paragraph is amended by replacing the reference to paragraph .j with .k, because .j was redesignated as .k. Item paragraph a.3 is amended to address an overlap between entries 1E001, 9E003.a.3.a and 9E003.a.3.c. Item paragraph a.4 is updated to align with 9E003.a.2 and 9E003.a.5. The Note to 9E003.h that

appears after Items paragraph h.3 is revised to align the country scope with the Wassenaar Participating States of Supplement No. 1 to part 743 of the EAR. Items paragraph .j is added to control wing-folding systems on large, high-speed civil jet aircraft that represent an emerging technology in the civilian sector, as current wing folding systems are generally limited to military aircraft designed to operate from aircraft carriers and to smaller general aviation aircraft.

**Supplement No. 5 to Part 774 “Items Classified Under ECCNS 0A521, 0B521, 0C521, 0D521 and 0E521”**

Supplement No. 5 to part 774 is amended by removing and reserving 0D521 No. 2 “Source code” for the “development” of fly-by-wire control systems”; and removing 0E521 No. 6 “Technology” for fly-by-wire control systems,” because this software and technology are now controlled in 7D004 and 7E004.

**Supplement No. 6 to Part 774 “Sensitive List”**

Supplement No. 6 to part 774 “Sensitive List” is amended by revising paragraph (2), removing and reserving paragraph (5)(iv), and revising “9B001.b” to read “9B001” in paragraph (9)(ii). Paragraph (2) “2D001, 2E001, and 2E002” are revised to harmonize with changes made to Category 2 of the CCL, e.g. changing “stated positioning accuracy” to “unidirectional positioning repeatability.” Paragraph (5)(iv) “5D001.b—“Software” specially designed or modified to support “technology” controlled by this Supplement’s description of 5E001.a” is removed and reserved because this control is outdated and no longer used. Paragraph (9)(ii) is amended to expand the scope to all of 9B001 to reflect the limited availability of 9B001.a equipment outside of WA Participating countries and the emerging technology of 9B001.c.

**Part 740—License Exceptions and Country Groups**

In order to align Country Group A:1 (formerly Coordinating Committee (CoCom) member countries) with its successor the Wassenaar Arrangement, BIS is adding Argentina, Austria, Bulgaria, Croatia, Czech Republic, Estonia, Finland, Hungary, Iceland, Ireland, South Korea, Latvia, Lithuania, Mexico, New Zealand, Poland, Romania, Slovakia, Slovenia, South Africa, Sweden, and Switzerland to Country Group A:1 in Supplement No. 1 to part 740. The new name of column A:1 is Wassenaar Participating States.

Footnote 1, which was used to identify the cooperating countries, *i.e.*, those countries that cooperated with the policies of CoCom, is removed because all of the cooperating countries are now in A:1, except for Hong Kong. New Footnote 1 is added to the title of Column A:1 to say, “Country Group A:1 is a list of the Wassenaar Arrangement Participating States, except for Malta, Russia and Ukraine.” Footnote 2 is added to the title of Country Group A:4 Nuclear Suppliers Group to say, “Country Group A:4 is a list of the Nuclear Suppliers Group countries, except for the People’s Republic of China (PRC).”

License Exception GOV in § 740.11 is amended by revising the country scope of the term “cooperating governments” in paragraph (c)(1). Argentina, Austria, Finland, Ireland, Korea (Republic of), New Zealand, Sweden, and Switzerland are removed from the definition of “cooperating governments,” because these countries are now included in the newly revised Country Group A:1, which is already included in the definition of cooperating government. The revision of Country Group A:1 expands the country scope of the term “cooperating government” in § 740.11(c)(1) by adding Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Iceland, Latvia, Lithuania, Mexico, Poland, Romania, Slovakia, Slovenia, and South Africa. These countries are now eligible destinations under § 740.11(c) of License Exception GOV, which authorizes exports, reexports and transfers (in-country) of items listed in paragraph § 740.11(c)(2) consigned to or for official use of any agency of a cooperating government within the national territory of cooperating governments, except items excluded by paragraph § 740.11(c)(3). “Official use” includes exports, reexports and transfers (in-country) to and for the official use of a military end user or military end use or an agency of NATO. This authorization also extends to exports, reexports and transfers (in-country) to and for the official use of a diplomatic or consular mission located in any country in Country Group B, which includes all of the newly added countries. Paragraph (f) of § 744.17 (Restrictions on certain exports, reexports and transfers (in-country) of microprocessors and associated “software” and “technology” for “military end uses” and to “military end users.”), excludes agencies of a cooperating government from the license requirements set forth in § 744.17. While the License Exception GOV authorization for cooperating

governments is referenced in § 743.1(b)(1) for WA reporting requirements, the expansion of the country scope for cooperating governments does not change the scope of the reporting requirements, because the reports are only required for exports outside of the WA Participating Countries and all the additional countries are WA Participating Countries.

**§ 740.16—License Exception APR**

Expanding the country scope of Country Group A:1 also affects License Exception APR in § 740.16(a) and (b). Prior to publication of this rule, paragraph (a) authorized reexports from countries in Country Group A:1 and cooperating countries. As this rule removes the term “cooperating countries,” the authorization is now for destinations in Country Group A:1 and Hong Kong. The same change is made to paragraph (b), which authorizes reexports to and among destinations in Country Group A:1 and Hong Kong. In addition, the list of countries in paragraph (b)(3) that pertain to cameras is replaced by a reference to Country Group A:1. This revision removes Albania, Cyprus and Malta from License Exception APR eligibility for cameras in paragraph (b)(3), because of the high risk of diversion to unauthorized end users, end uses and destinations.

**Supplement No. 1 to Part 738—Commerce Country Chart**

The Commerce Country Chart is amended by revising the second columns for national security (NS:2), and regional stability (RS:2) in order to harmonize these columns with the newly revised Country Group A:1, making the license requirement consistent with the risk of diversion to unauthorized end users, end uses and destinations. Specifically, this rule would remove the X, *i.e.*, license requirement, in the NS:2 Column for Argentina, as well as removing the X in the RS:2 Column for South Korea, because the risk of diversion to unauthorized destinations, parties or uses is low for these countries. Both Argentina and South Korea are WA Participating States, but are not NATO member countries. This rule also harmonizes the license requirements between the NS:2 and RS:2 columns by adding an X for Albania in the RS:2 column, because the RS controls generally mirror the NS license requirements in order to promote regional stability. Albania is not a WA Participating State, but it is a NATO member country; however this rule adds an X for RS:2, because the risk of

diversion to unauthorized destinations, parties or uses is high. The only difference between NS:2 and RS:2 after these revisions is that there is not an X under RS:2 for India. On January 23, 2015 (80 FR 3463), BIS published a rule that removed the X under RS:2 for India in order to further implement the November 8, 2010 bilateral understanding.

#### § 742.4—National Security

Section 742.4(a) is amended by replacing the reference to Country Group A:5 with a reference to Country Group A:1. The difference between Country Group A:5 and the newly formulated Country Group A:1 is that Mexico and South Africa are included in A:1, but are not in A:5. Mexico and South Africa are Wassenaar Participating States and do not pose a risk of diversion to unauthorized end users or end uses. This rule also removes the special country scope for ECCN 6A003.b.4.b cameras, because this rule is aligning the country scope for these cameras with NS:2, which adds a license requirement for Albania, Cyprus and Malta because of the high risk of diversion of these cameras to unauthorized end users, end uses and destinations.

#### § 742.6—Regional Stability

Section 742.6 is amended by revising paragraphs (a)(2)(iii), (a)(2)(v), (a)(3) and (a)(4)(ii) in order to replace the lists of countries with a reference to the newly revised Country Group A:1 of Supplement No. 1 to part 740. This revision aligns this section with the revised Country Group A:1 and Columns NS:2 and RS:2 in the Commerce Country Chart in Supplement No. 1 to part 738. Paragraph (a)(4)(i) is amended by replacing a reference to “Australia, India, Japan, New Zealand and countries in the North Atlantic Treaty Organization (NATO)” with a reference to “Country Group A:1 (see Supplement No. 1 to part 740 of the EAR) and India.” These countries are excepted from an RS:2 license requirement. Newly revised RS Column 2 does not have an X for India, which makes it different from NS:2 and Country Group A:1. On January 23, 2015, BIS published a rule (80 FR 3463) that removed the X under RS:2 for India in order to further implement the November 8, 2010 bilateral understanding.

#### § 743.1—Wassenaar Arrangement

Section 743.1 is amended by correcting a reference to License Exception GOV in paragraph (b)(1) and revising paragraphs (g) and (h) to add an

Email address for submission of the Wassenaar reports and to update the contact information for Wassenaar reports.

#### § 743.3—Thermal Imaging Camera Reporting

Paragraph (b) in § 743.3 is amended by replacing the list of countries with a reference to the newly revised Country Group A:1 of Supplement No. 1 to part 740. This revision aligns these reporting requirements with the revised Regional Stability requirements for these items in § 742.6 and the overall national security country group amendments.

#### Part 772—Definitions

Section 772.1 is amended by adding in alphabetical order the terms: fly-by-light system, fly-by-wire system, library, operations, administration or maintenance (OAM), plasma atomization, quantum cryptography, spacecraft bus, and spacecraft payload; and revising the terms: civil aircraft, cryptanalytic items, cryptographic activation, end-effectors, information security, local area network, and technology.

See § 774.1(d) regarding the quote system used in the CCL. If a term on the CCL uses double quotes it means there is a defined term in part 772. However, the absence of double quotes does not mean that a term used on the CCL is not defined in part 772.

The reason for revising the definition of the term “civil aircraft” is stated under the explanation for amendments of ECCN 7A003 above.

The definition of “cryptographic activation” was restructured, and in places reworded, to more clearly and precisely reflect the 2010 Wassenaar agreements, without changing the scope. The words “of an item” were added after “Any technique that activates or enables cryptographic capability,” and additional wording makes clear that the ‘mechanism for “cryptographic activation”’ must be “uniquely bound” to “a single instance of the item” or to “one customer, for multiple instances of the item.” These clarifications convey that “cryptographic activation”’ does not include changing or upgrading the controlled cryptographic functionality of a previously exported item, or using a single license key or digitally-signed certificate to activate multiple types of items. For editorial reasons, the explanation that license keys or digitally-signed certificates can be ‘mechanisms for “cryptographic activation”’ was moved into the Technical Notes.

The definition for the term “end-effectors” is amended by replacing the

double quotes with single quotes around the term “active tooling units,” because the definition for “active tooling unit” is in the Note to the definition of “end-effectors” and is not a separate term defined in Section 772.1 of the EAR.

The terms “fly-by-wire” and “fly-by-light” are added to Section 772.1 in order to help the exporting community understand the scope of the new controls in ECCNs 7D004 and 7E004.

The reference for the term “information security” is amended by replacing the reference to (Cat 5) with (Cat 4, 5P1, 5P2, 8, GSN) because this term is used in all these locations. In addition, double quotes are replaced by single quotes around the term ‘cryptanalysis’ because this term is defined in the Technical Note to the definition of “information security.”

The definition of “local area network” is amended by replacing double quotes with single quotes around the term ‘data devices,’ because the term is defined in a Note to the term “local area network.”

The terms “operations, administration or maintenance” (“OAM”) and “quantum cryptography” are added to § 772.1 and the term “cryptanalytic items” is revised for reasons stated under “Category 5 Part 2—Information Security” above.

The term “plasma atomization” is added to § 772.1 for reasons stated under ECCN 1C002 above.

The terms “spacecraft bus” and “spacecraft payload” are added to § 772.1 for reasons stated under ECCN 9A004.

The reference list for the term “technology” is amended by adding “throughout the EAR,” because this term is used throughout the EAR. In addition, double quotes are replaced by single quotes around the terms ‘technical data’ and ‘technical assistance,’ because these terms are defined in the Technical Notes to this definition and not as separate terms within § 772.1.

The term “unidirectional positioning repeatability” is added to § 772.1 for reasons stated in under ECCN 2B001 above.

#### Export Administration Act

Although the Export Administration Act expired on August 20, 2001, the President, through Executive Order 13222 of August 17, 2001, 3 CFR, 2001 Comp., p. 783 (2002), as amended by Executive Order 13637 of March 8, 2013, 78 FR 16129 (March 13, 2013) and as extended by the Notice of August 7, 2014, 79 FR 46957 (August 11, 2014), has continued the Export Administration Regulations in effect under the International Emergency

Economic Powers Act. BIS continues to carry out the provisions of the Export Administration Act, as appropriate and to the extent permitted by law, pursuant to Executive Order 13222 as amended by Executive Order 13637.

#### Saving Clause

Shipments of items removed from license exception eligibility or eligibility for export, reexport, or transfer (in-country) without a license as a result of this regulatory action that were on dock for loading, on lighter, laden aboard a carrier, or en route aboard a carrier to a port, on May 21, 2015, pursuant to actual orders to a destination, may proceed to that destination under the previous license exception eligibility or without a license so long as they have been exported, reexported, or transferred (in-country) before July 20, 2015. Any such items not actually exported, reexported, or transferred (in-country) before midnight, on July 20, 2015, require a license in accordance with this regulation.

#### Rulemaking Requirements

1. Executive Orders 13563 and 12866 direct agencies to assess all costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order 13563 emphasizes the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. This rule has been designated a “significant regulatory action,” under Executive Order 12866.

2. Notwithstanding any other provision of law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*) (PRA), unless that collection of information displays a currently valid Office of Management and Budget (OMB) Control Number. This rule involves two collections of information subject to the PRA. One of the collections has been approved by OMB under control number 0694–0088, “Multi-Purpose Application,” and carries a burden hour estimate of 58 minutes for a manual or electronic submission. The other of the collections has been approved by OMB under control number 0694–0106, “Reporting and Recordkeeping Requirements under the Wassenaar Arrangement,” and

carries a burden hour estimate of 21 minutes for a manual or electronic submission. Send comments regarding these burden estimates or any other aspect of these collections of information, including suggestions for reducing the burden, to OMB Desk Officer, New Executive Office Building, Washington, DC 20503; and to Jasmeet Seehra, OMB Desk Officer, by email at [Jasmeet.K.Seehra@omb.eop.gov](mailto:Jasmeet.K.Seehra@omb.eop.gov) or by fax to (202) 395–7285; and to the Office of Administration, Bureau of Industry and Security, Department of Commerce, 1401 Constitution Ave. NW., Room 6622, Washington, DC 20230.

3. This rule does not contain policies with Federalism implications as that term is defined under Executive Order 13132.

4. The provisions of the Administrative Procedure Act (5 U.S.C. 553) requiring notice of proposed rulemaking, the opportunity for public participation, and a 30-day delay in effective date, are inapplicable because this regulation involves a military and foreign affairs function of the United States (5 U.S.C. 553(a)(1)). Immediate implementation of these amendments fulfills the United States’ international obligation to the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies. The Wassenaar Arrangement contributes to international security and regional stability by promoting greater responsibility in transfers of conventional arms and dual use goods and technologies, thus preventing destabilizing accumulations of such items. The Wassenaar Arrangement consists of 41 member countries that act on a consensus basis and the changes set forth in this rule implement agreements reached at the December 2014 plenary session of the WA. Because the United States is a significant exporter of the items covered by this rule, implementation of this rule is necessary for the WA to achieve its purpose. Any delay in implementation will create a disruption in the movement of affected items globally because of disharmony between export control measures implemented by WA members, resulting in tension between member countries. Export controls work best when all countries implement the same export controls in a timely manner. If this rulemaking were delayed to allow for notice and comment and a 30-day delay in effectiveness, it would prevent the United States from fulfilling its commitment to the WA in a timely manner and would injure the credibility of the United States in this and other multilateral regimes.

Further, no other law requires that a notice of proposed rulemaking and an opportunity for public comment be given for this final rule. Because a notice of proposed rulemaking and an opportunity for public comment are not required to be given for this rule under the Administrative Procedure Act or by any other law, the analytical requirements of the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) are not applicable. Therefore, this regulation is issued in final form. Although there is no formal comment period, public comments on this regulation are welcome on a continuing basis. Comments should be submitted to Sharron Cook, Office of Exporter Services, Bureau of Industry and Security, Department of Commerce, 14th and Pennsylvania Ave. NW., Room 2099, Washington, DC 20230.

#### List of Subjects

15 CFR Parts 738 and 772

Exports.

15 CFR Part 740

Administrative practice and procedure, Exports, Reporting and recordkeeping requirements.

15 CFR Part 742

Exports, Terrorism.

15 CFR Part 743

Administrative practice and procedure, Reporting and recordkeeping requirements.

15 CFR Part 774

Exports, Reporting and recordkeeping requirements.

Accordingly, parts 738, 740, 742, 743, 772 and 774 of the Export Administration Regulations (15 CFR parts 730 through 774) are amended as follows:

#### PART 738 [AMENDED]

■ 1. The authority citation for part 738 continues to read as follows:

**Authority:** 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; 10 U.S.C. 7420; 10 U.S.C. 7430(e); 22 U.S.C. 287c; 22 U.S.C. 3201 *et seq.*; 22 U.S.C. 6004; 30 U.S.C. 185(s), 185(u); 42 U.S.C. 2139a; 42 U.S.C. 6212; 43 U.S.C. 1354; 15 U.S.C. 1824a; 50 U.S.C. app. 5; 22 U.S.C. 7201 *et seq.*; 22 U.S.C. 7210; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of August 7, 2014, 79 FR 46959 (August 11, 2014).

#### Supplement No. 1 to Part 738— [AMENDED]

■ 2. Supplement No. 1 is amended by:  
 ■ a. Revising the NS:2 column by removing the X for Argentina;

- b. Revising the RS:2 column by adding an X for Albania; and
- c. Revising the RS:2 column by removing the X for South Korea.

**PART 740 [AMENDED]**

- 3. The authority citation for part 740 continues to read as follows:

**Authority:** 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; 22 U.S.C. 7201 *et seq.*; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of August 7, 2014, 79 FR 46959 (August 11, 2014).

- 4. Section 740.11 is amended by revising paragraph (c)(1) to read as follows:

**§ 740.11 Governments, international organizations, international inspections under the Chemical Weapons Convention, and the International Space Station (GOV).**

\* \* \* \* \*

(c) \* \* \*  
 (1) *Scope.* The provisions of this paragraph (c) authorize exports, reexports, and transfers (in-country) of the items listed in paragraph (c)(2) of this section to agencies of cooperating governments or agencies of the North Atlantic Treaty Organization (NATO). ‘Agency of a cooperating government’ includes all civilian and military departments, branches, missions, and

other governmental agencies of a cooperating national government. ‘Cooperating governments’ are the national governments of countries listed in Country Group A:1 (see Supplement No. 1 to this part) and the national governments of Hong Kong, Singapore and Taiwan.

\* \* \* \* \*

- 5. Section 740.16 is amended by revising the introductory text to paragraph (a), and paragraphs (b)(1) and (3), to read as follows:

**§ 740.16 Additional permissive reexports (APR).**

\* \* \* \* \*

(a) *Reexports from Country Group A:1 and Hong Kong.* Reexports may be made from countries in Country Group A:1 or from Hong Kong, provided that:

\* \* \* \* \*

(b) *Reexports to and among specified countries.* (1) Commodities that are not controlled for nuclear nonproliferation or missile technology reasons, described in 3A001.b.2 or b.3 (except those that are being reexported for use in civil telecommunications applications), nor listed in paragraph (b)(2) or (3) of this section may be reexported to and among destinations in Country Group A:1 and Hong Kong, provided that eligible commodities are for use or consumption

within a destination in Country Group A:1 (see Supplement No. 1 to this part) or Hong Kong, or for reexport from such country in accordance with other provisions of the EAR.

\* \* \* \* \*

(3) Cameras described in ECCN 6A003.b.3 (having the characteristics listed in 6A002.a.2.a or a.2.b), 6A003.b.4.b, or 6A003.b.4.c may be exported or reexported to and among destinations in Country Group A:1 (see Supplement No. 1 to this part) if:

(i) Such cameras are fully packaged for use as consumer ready civil products; or,

(ii) Such cameras with not more than 111,000 elements are to be embedded in civil products.

\* \* \* \* \*

- 6. Supplement No. 1 to part 740 is amended by:

- a. Revising the first two columns of Country Group A;
- b. Revising footnote 1 of Country Group A; and
- c. Adding footnote 2 to the heading for column A:4 of Country Group A.

The revisions and addition read as follows:

**Supplement No. 1 to Part 740—Country Groups**

**COUNTRY GROUP A**

Country	[A:1] Wassenaar Participating States <sup>1</sup>	* * * * *	[A:4] Nuclear Suppliers Group <sup>2</sup>	* * * * *
Albania .....	.....	* * * * *		* * * * *
Argentina .....	X			
Australia .....	X			
Austria .....	X			
Belarus .....	.....			
Belgium .....	X			
Brazil .....	.....			
Bulgaria .....	X			
Canada .....	X			
Croatia .....	X			
Cyprus .....	.....			
Czech Republic .....	X			
Denmark .....	X			
Estonia .....	X			
Finland .....	X			
France .....	X			
Germany .....	X			
Greece .....	X			
Hong Kong .....	.....			
Hungary .....	X			
Iceland .....	X			
India .....	.....			
Ireland .....	X			
Israel .....	.....			
Italy .....	X			
Japan .....	X			
Kazakhstan .....	.....			
Korea, South .....	X			
Latvia .....	X			
Lithuania .....	X			
Luxembourg .....	X			

COUNTRY GROUP A—Continued

Country	[A:1] Wassenaar Participating States <sup>1</sup>	* * * * *	[A:4] Nuclear Suppliers Group <sup>2</sup>	* * * * *
Malta .....	.....			
Mexico .....	X			
Netherlands .....	X			
New Zealand .....	X			
Norway .....	X			
Poland .....	X			
Portugal .....	X			
Romania .....	X			
Russia .....	.....			
Serbia .....	.....			
Singapore .....	.....			
Slovakia .....	X			
Slovenia .....	X			
South Africa .....	X			
Spain .....	X			
Sweden .....	X			
Switzerland .....	X			
Taiwan .....	.....			
Turkey .....	X			
Ukraine .....	.....			
United Kingdom .....	X			
United States .....	X			

<sup>1</sup> Country Group A:1 is a list of the Wassenaar Arrangement Participating States, except for Malta, Russia and Ukraine.

<sup>2</sup> Country Group A:4 is a list of the Nuclear Suppliers Group countries, except for the People's Republic of China (PRC).

\* \* \* \* \*

**PART 742—[AMENDED]**

■ 7. The authority citation for part 742 continues to read as follows:

**Authority:** 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; 22 U.S.C. 3201 *et seq.*; 42 U.S.C. 2139a; 22 U.S.C. 7201 *et seq.*; 22 U.S.C. 7210; Sec. 1503, Pub. L. 108–11, 117 Stat. 559; E.O. 12058, 43 FR 20947, 3 CFR, 1978 Comp., p. 179; E.O. 12851, 58 FR 33181, 3 CFR, 1993 Comp., p. 608; E.O. 12938, 59 FR 59099, 3 CFR, 1994 Comp., p. 950; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Presidential Determination 2003–23 of May 7, 2003, 68 FR 26459, May 16, 2003; Notice of August 7, 2014, 79 FR 46959 (August 11, 2014); Notice of November 7, 2014, 79 FR 67035 (November 12, 2014).

■ 8. Section 742.4 is amended by revising paragraph (a) to read as follows:

**§ 742.4 National security.**

(a) *License requirements.* It is the policy of the United States to restrict the export and reexport of items that would make a significant contribution to the military potential of any other country or combination of countries that would prove detrimental to the national security of the United States. Accordingly, a license is required for exports and reexports to all destinations, except Canada, for all items in ECCNs on the CCL that include NS Column 1 in the Country Chart column of the “License Requirements” section. A license is required to all

destinations except those in Country Group A:1 (see Supplement No. 1 to part 740 of the EAR), for all items in ECCNs on the CCL that include NS column 2 in the Commerce Country Chart column of the “License Requirements” section except those cameras in ECCN 6A003.b.4.b that have a focal plane array with 111,000 or fewer elements and a frame rate of 60 Hz or less. A license is required to all destinations except those in Country Group A:1 (see Supplement No. 1 to part 740) for those cameras in ECCN 6A003.b.4.b that have a focal plane array with 111,000 or fewer elements and a frame rate of 60 Hz or less and for cameras being exported or reexported pursuant to an authorization described in § 742.6(a)(2)(iii) or (v) of the EAR. The purpose of the controls is to ensure that these items do not make a contribution to the military potential of countries in Country Group D:1 (see Supplement No. 1 to part 740 of the EAR) that would prove detrimental to the national security of the United States. License Exception GBS is available for the export and reexport of certain national security controlled items to Country Group B (see § 740.4 and Supplement No. 1 to part 740 of the EAR).

■ 9. Section 742.6 is amended by revising paragraphs (a)(2)(iii), (a)(2)(v), (a)(3), (a)(4)(i) and (a)(4)(ii), as follows:

**§ 742.6 Regional stability.**

(a) \* \* \*

(2) \* \* \*

(iii) BIS may issue licenses for cameras subject to the license requirement of paragraph (a)(2)(ii) of this section that are fully-packaged for use as consumer-ready civil products that, in addition to the specific transactions authorized by such license, authorize exports and reexports of such cameras without a license to any civil end-user to whom such exports or reexport are not otherwise prohibited by U.S. law in a destination in Country Group A:1 (see Supplement No. 1 to part 740 of the EAR). The license requirements of this paragraph (a)(2) shall not apply to exports or reexports so authorized. In this paragraph, the term “civil end-user” means any entity that is not a national armed service (army, navy, marine, air force, or coast guard), national guard, national police, government intelligence organization or government reconnaissance organization, or any person or entity whose actions or functions are intended to support “military end-uses” as defined in § 744.17(d) of the EAR.

\* \* \* \* \*

(v) BIS may also issue licenses for the cameras described in paragraph (a)(2)(iv) of this section that, in addition to the specific transactions authorized by such license, authorize exports and reexports to authorized companies described in the license for the purpose

of embedding such cameras into a completed product that will be distributed only in countries in Country Group A:1 (see Supplement No. 1 to part 740 of the EAR). The license requirements of this paragraph (a)(2) shall not apply to exports or reexports so authorized. In this paragraph, the term "authorized companies" means companies that have been previously licensed for export, are not the subject of relevant negative intelligence or open source information, have not been the subject of a Department of Commerce or Department of State enforcement action within the past two years, have demonstrable production capacity, and do not pose an unacceptable risk of diversion.

(3) *Special RS Column 1 license requirement applicable to military commodities.* A license is required for reexports to all destinations except Canada for items classified under ECCN 0A919 except when such items are being reexported as part of a military deployment by a unit of the government of a country in Country Group A:1 (see Supplement No. 1 to part 740 of the EAR) or the United States.

(4) \* \* \*

(i) *License requirements applicable to most RS Column 2 items.* As indicated in the CCL and in RS Column 2 of the Commerce Country Chart (see Supplement No. 1 to part 738 of the EAR), a license is required to any destination except those in Country Group A:1 (see Supplement No. 1 to part 740 of the EAR) and India for all items in ECCNs on the CCL that include RS Column 2 in the Country Chart column of the "License Requirements" section. A license continues to be required for items controlled under ECCNs 6A003.b.4.b and 9A515.e for RS Column 2 reasons when destined to India.

(ii) *Special RS Column 2 license requirements applicable only to certain cameras.* As indicated by the CCL, and RS column 2 and footnote number 4 to the Commerce Country Chart, a license is required to any destination except a country in Country Group A:1 (see Supplement No. 1 to part 740 of the EAR) for fully-packaged thermal imaging cameras for use as consumer-ready civil products controlled by 6A003.b.4.b when incorporating "focal plane arrays" that have not more than 111,000 elements and a frame rate of 60Hz or less and that are not being exported or reexported to be embedded in a civil product.

\* \* \* \* \*

**PART 743 [AMENDED]**

■ 10. The authority citation for part 743 continues to read as follows:

**Authority:** 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; E.O. 13637 of March 8, 2013, 78 FR 16129 (March 13, 2013); 78 FR 16129; Notice of August 7, 2014, 79 FR 46959 (August 11, 2014).

■ 11. Section 743.1 is amended by:

■ a. Removing the phrase "(§§ 740.11(b)(2)(iii) and 740.11(b)(2)(iv) of the EAR)" and adding in its place "(§§ 740.11(c) of the EAR)" in paragraph (b)(1); and

■ b. Revising paragraphs (g) and (h).

The revisions read as follows:

**§ 743.1 Wassenaar Arrangement.**

\* \* \* \* \*

(g) *Where to submit Wassenaar reports*—(1) *Email.* Reports may be Emailed to *WAreports@bis.doc.gov*.

(2) *Mail.* If mailed, two (2) copies of reports are required to be delivered via courier to: Bureau of Industry and Security, U.S. Department of Commerce, Attn: "Wassenaar Reports", Room 2099B, 14th Street and Pennsylvania Ave. NW., Washington, DC 20230. BIS will not accept reports sent C.O.D.

(3) *Facsimile.* Reports may also be sent by facsimile to: (202) 482–3345 or 202–482–1373, Attn: "Wassenaar Reports".

(h) *Contacts.* General information concerning the Wassenaar Arrangement and reporting obligations thereof is available from the Office of National Security and Technology Transfer Controls, Tel. (202) 482–4479, Fax: (202) 482–3345 or (202) 482–1373, or Email: *WAreports@bis.doc.gov*.

■ 12. Section 743.3 is amended by revising paragraph (b) to read as follows:

**§ 743.3 Thermal imaging camera reporting.**

\* \* \* \* \*

(b) *Transactions to be reported.* Exports that are not authorized by an individually validated license of thermal imaging cameras controlled by ECCN 6A003.b.4.b to a destination in Country Group A:1 (see Supplement No. 1 to part 740 of the EAR) must be reported to BIS.

\* \* \* \* \*

**PART 772 [AMENDED]**

■ 13. The authority citation for part 772 continues to read as follows:

**Authority:** 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of August 7, 2014, 79 FR 46959 (August 11, 2014).

■ 14. Section 772.1 is amended by:

■ a. Adding definitions in alphabetical order for: "Fly-by-light system", "Fly-by-wire system", "Library", "Operations, Administration or Maintenance (OAM)", "Plasma atomization", "Quantum cryptography", "Spacecraft bus", "Spacecraft payload", and "Unidirectional positioning repeatability";

■ b. Removing the definition for "Cooperating country"; and

■ c. Revising the definitions for: "Civil aircraft", "Cryptanalytic items", "Cryptographic activation", "End-effectors", "Information security", "Local area network", and "Technology".

The additions and revisions read as follows:

**§ 772.1 Definitions of terms as used in the Export Administration Regulations (EAR).**

\* \* \* \* \*

*Civil aircraft.* (Cat 1, 3, 4, 7 and 9) Those "aircraft" listed by designation in published airworthiness certification lists by civil aviation authorities of one or more Wassenaar Arrangement Participating States to fly commercial civil internal and external routes or for legitimate civil, private or business use. (see also "aircraft")

\* \* \* \* \*

*Cryptanalytic items.* (Cat 5P2) Systems, equipment or components designed or modified to perform 'cryptanalytic functions', software having the characteristics of cryptanalytic hardware or performing 'cryptanalytic functions', or technology for the development, production or use of cryptanalytic commodities or software.

**Notes:** 1. 'Cryptanalytic functions' are functions designed to defeat cryptographic mechanisms in order to derive confidential variables or sensitive data, including clear text, passwords or cryptographic keys. These functions may include 'cryptanalysis,' which is the analysis of a cryptographic system or its inputs and outputs to derive confidential variables or sensitive data, including clear text. (ISO 7498–2–1988 (E), paragraph 3.3.18).

2. Functions specially designed and limited to protect against malicious computer damage or unauthorized system intrusion (e.g., viruses, worms and trojan horses) are not construed to be 'cryptanalytic functions.'

*Cryptographic activation.* (Cat 5P2) Any technique that activates or enables cryptographic capability of an item, by means of a secure mechanism implemented by the manufacturer of the item, where this mechanism is uniquely bound to any of the following:

(a) A single instance of the item; or

(b) One customer, for multiple instances of the item.

*Technical Notes to definition of "Cryptographic activation":* 1. "Cryptographic activation" techniques and mechanisms may be implemented as hardware, "software" or "technology".

2. Mechanisms for "cryptographic activation" can, for example, be serial number-based license keys or authentication instruments such as digitally signed certificates.

\* \* \* \* \*

*End-effectors.* (Cat 2) Grippers, 'active tooling units' and any other tooling that is attached to the baseplate on the end of a "robot" manipulator arm.

*Technical Note to definition of "End-effectors":* 'Active tooling unit': a device for applying motive power, process energy or sensing to the workpiece.

\* \* \* \* \*

*Fly-by-light system.* (Cat 7) A primary digital flight control system employing feedback to control the aircraft during flight, where the commands to the effectors/actuators are optical signals.

*Fly-by-wire system.* (Cat 7) A primary digital flight control system employing feedback to control the aircraft during flight, where the commands to the effectors/actuators are electrical signals.

\* \* \* \* \*

*Information security.* (Cat 4, 5P1, 5P2, 8, GSN)—All the means and functions ensuring the accessibility, confidentiality or integrity of information or communications, excluding the means and functions intended to safeguard against malfunctions. This includes "cryptography", "cryptographic activation", "cryptanalysis", protection against compromising emanations and computer security.

*Technical Note to definition of "Information security":* 'Cryptanalysis': the analysis of a cryptographic system or its inputs and outputs to derive confidential variables or sensitive data, including clear text. (ISO 7498-2-1988 (E), paragraph 3.3.18)

\* \* \* \* \*

*Library.* (Cat 1) (parametric technical database) A collection of technical information, reference to which may enhance the performance of the relevant systems, equipment or components.

\* \* \* \* \*

*Local area network.* (Cat 4 and 5 Part 1)—A data communication system that:

(a) Allows an arbitrary number of independent 'data devices' to communicate directly with each other; and

(b) Is confined to a geographical area of moderate size (e.g., office building, plant, campus, warehouse).

*Technical Note to definition of "Local area network":* 'Data device' means equipment capable of transmitting or receiving sequences of digital information.

\* \* \* \* \*

*Operations, Administration or Maintenance ("OAM").* (Cat 5P2) Means performing one or more of the following tasks:

(a) Establishing or managing any of the following:

- (1) Accounts or privileges of users or administrators;
- (2) Settings of an item; or
- (3) Authentication data in support of the tasks described in paragraphs (a)(1) or (2) of this definition;

(b) Monitoring or managing the operating condition or performance of an item; or

(c) Managing logs or audit data in support of any of the tasks described in paragraphs (a) or (b) of this definition.

*Note to definition of "Operations, Administration or Maintenance":* "OAM" does not include any of the following tasks or their associated key management functions:

a. Provisioning or upgrading any cryptographic functionality that is not directly related to establishing or managing authentication data in support of the tasks described in paragraphs (a)(1) or (2) of this definition; or

b. Performing any cryptographic functionality on the forwarding or data plane of an item.

\* \* \* \* \*

*Plasma atomization.* (Cat 1) A process to reduce a molten stream or solid metal to droplets of 500 µm diameter or less, using plasma torches in an inert gas environment.

\* \* \* \* \*

*Quantum cryptography.* (Cat 5P2) A family of techniques for the establishment of a shared key for "cryptography" by measuring the quantum-mechanical properties of a physical system (including those physical properties explicitly governed by quantum optics, quantum field theory, or quantum electrodynamics).

\* \* \* \* \*

*Spacecraft bus.* (Cat 9) Equipment that provides the support infrastructure of the "spacecraft" and location for the "spacecraft payload".

*Spacecraft payload.* (Cat 9) Equipment, attached to the "spacecraft bus", designed to perform a mission in

space (e.g., communications, observation, science).

\* \* \* \* \*

*Technology.* (General Technology Note, throughout EAR) Specific information necessary for the "development", "production", or "use" of a product. The information takes the form of 'technical data' or 'technical assistance'.

*N.B.: Controlled "technology" is defined in the General Technology Note and in the Commerce Control List (Supplement No. 1 to part 774 of the EAR).*

*Note 1 to definition of "Technology":* "Technology" also is specific information necessary for any of the following: Operation, installation (including on-site installation), maintenance (checking), repair, overhaul, refurbishing, or other terms specified in ECCNs on the CCL that control "technology."

*Note 2 to definition of "Technology":* "Technology" not elsewhere specified on the CCL is designated as EAR99, unless the "technology" is subject to the exclusive jurisdiction of another U.S. Government agency (see § 734.3(b)(1) of the EAR) or is otherwise not subject to the EAR (see § 734.4(b)(2) and (3) and §§ 734.7 through 734.11 of the EAR).

*Technical Notes to definition of "Technology":* 1. 'Technical data' May take forms such as blueprints, plans, diagrams, models, formulae, tables, engineering designs and specifications, manuals and instructions written or recorded on other media or devices such as disk, tape, read only memories.

2. 'Technical assistance' may take forms such as instruction, skills, training, working knowledge, consulting services. 'Technical assistance' may involve transfer of 'technical data'. 'Technical assistance' may involve transfer of 'technical data'.

\* \* \* \* \*

*Unidirectional positioning repeatability.* (Cat 2) The smaller of values R↑ and R↓ (forward and backward), as defined by 3.21 of ISO 230-2:2014 or national equivalents, of an individual machine tool axis.

\* \* \* \* \*

**PART 774 [AMENDED]**

■ 15. The authority citation for part 774 continues to read as follows:

**Authority:** 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; 10 U.S.C. 7420; 10 U.S.C. 7430(e); 22 U.S.C. 287c, 22 U.S.C. 3201 *et seq.*; 22 U.S.C. 6004; 30 U.S.C. 185(s), 185(u); 42 U.S.C. 2139a; 42 U.S.C. 6212; 43 U.S.C. 1354; 15 U.S.C. 1824a; 50 U.S.C. app. 5; 22 U.S.C. 7201 *et seq.*; 22 U.S.C. 7210; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p.

228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of August 7, 2014, 79 FR 46959 (August 11, 2014).

Supplement No. 1 to Part 774—[Amended]

16. In Supplement No. 1 to part 774, ECCN 0A606 is amended by revising paragraph b in Note 2 to paragraph .a to read as follows:

Supplement No. 1 to Part 774—The Commerce Control List

\* \* \* \* \*

0A606 Ground Vehicles and Related Commodities, as Follows (see List of Items Controlled).

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: a. \* \* \*

Note 2 to paragraph .a: \* \* \*

b. Armored protection of vital "parts" (e.g., fuel tanks or vehicle cabs);

\* \* \* \* \*

17. In Supplement No. 1 to part 774, ECCN 1A613 is amended by revising Items paragraph a to read as follows:

1A613 Armored and Protective "Equipment" and Related Commodities, as Follows (see List of Items Controlled).

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: a. Metallic or non-metallic armored plate "specially designed" for military use and not controlled by the USML.

Note to paragraph a: For controls on body armor plates, see ECCN 1A613.d.2 and USML Category X(a)(1).

\* \* \* \* \*

18. In Supplement No. 1 to part 774, ECCN 1C002 is amended by revising Item paragraphs c.2.f and c.2.g and adding Item paragraph c.2.h to read as follows:

1C002 Metal Alloys, Metal Alloy Powder and Alloyed Materials, as Follows (see List of Items Controlled).

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items:

\* \* \* \* \*

c. \* \* \*

c.2. \* \* \*

c.2.f. "Melt extraction" and "comminution";

c.2.g. "Mechanical alloying"; or

c.2.h. "Plasma atomization"; and

\* \* \* \* \*

19. In Supplement No. 1 to part 774, ECCN 1C007 is amended by revising the heading and Item paragraph a to read as follows:

1C007 Ceramic Powders, Non-"Composite" Ceramic Materials, Ceramic-"Matrix" "Composite" Materials and Precursor Materials, as Follows (see List of Items Controlled).

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: a. Ceramic powders of single or complex borides of titanium, having total metallic impurities, excluding intentional additions, of less than 5,000 ppm, an average particle size equal to or less than 5 µm and no more than 10% of the particles larger than 10 µm;

\* \* \* \* \*

20. In Supplement No. 1 to part 774, ECCN 1C008 is amended by removing and reserving Items paragraph b.

21. In Supplement No. 1 to part 774, ECCN 1C010 is amended by:

a. Adding Technical Notes at the beginning of the Items paragraph of the List of Items Controlled section;

b. Removing the Technical Notes below Items paragraph c; and

c. Revising Items paragraph d.1.b.

The additions and revision read as follows:

1C010 "Fibrous or Filamentary Materials" as Follows (see List of Items Controlled).

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items:

Technical Notes: 1. For the purpose of calculating "specific tensile strength", "specific modulus" or specific weight of "fibrous or filamentary materials" in 1C010.a, 1C010.b, 1C010.c or 1C010.e.1.b, the tensile strength and modulus should be determined by using Method A described in ISO 10618 (2004) or national equivalents.

2. Assessing the "specific tensile strength", "specific modulus" or specific weight of non-unidirectional "fibrous or filamentary materials" (e.g., fabrics, random mats or braids) in 1C010 is to be based on the mechanical properties of the constituent unidirectional monofilaments (e.g., monofilaments, yarns, rovings or tows) prior to processing into the non-unidirectional "fibrous or filamentary materials".

\* \* \* \* \*

d. \* \* \*

d.1. \* \* \*

d.1.b. Materials controlled by 1C008.d to 1C008.f; or

\* \* \* \* \*

22. In Supplement No. 1 to part 774, ECCN 1E002 is amended by:

a. Revising License Exception TSR in the List Based License Exceptions section;

b. Adding a Note at the end of the List Based License Exceptions section;

c. Revising Items paragraphs c introductory text, c.1., c.1.c.1., and c.1.c.2.;

d. Removing Items paragraphs c.1.c.3.;

e. Removing and reserving Items paragraph d; f. Revising Items paragraph g; and g. Removing the Technology Note to paragraph g.

The revisions and addition read as follows:

1E002 Other "Technology" as Follows (see List of Items Controlled).

\* \* \* \* \*

List Based License Exceptions (See Part 740 for a description of all license exceptions)

\* \* \* \* \*

TSR: Yes, except for 1E002.e and .f.

License Exceptions Note: License

Exception TSU is not applicable for the repair "technology" controlled by 1E002.e or .f, see Supplement No. 2 to this part.

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: \* \* \*

c. "Technology" for the design or "production" of the following ceramic powders or non-"composite" ceramic materials:

c.1. Ceramic powders having all of the following:

\* \* \* \* \*

c.1.c. \* \* \*

c.1.c.1. Zirconia (CAS 1314-23-4) with an average particle size equal to or less than 1 µm and no more than 10% of the particles larger than 5 µm; or

c.1.c.2. Other ceramic powders with an average particle size equal to or less than 5 µm and no more than 10% of the particles larger than 10 µm;

\* \* \* \* \*

g. "Libraries" "specially designed" or modified to enable equipment to perform the functions of equipment controlled under 1A004.c or 1A004.d.

23. In Supplement No. 1 to part 774, the Technical Notes for 2B001 to 2B009, 2B201, 2B290 and 2B991 to 2B999 at the beginning of Category 2, Product Group B are revised to read as follows:

Category 2—Materials Processing

\* \* \* \* \*

B. "Test", "Inspection" and "Production Equipment"

Technical Notes for 2B001 to 2B009, 2B201, 2B290 and 2B991 to 2B999:

1. Secondary parallel contouring axes, (e.g., the w-axis on horizontal boring mills or a secondary rotary axis the center line of which is parallel to the primary rotary axis) are not counted in the total number of contouring axes. Rotary axes need not rotate over 360°. A rotary axis can be driven by a linear device (e.g., a screw or a rack-and-pinion).

2. The number of axes which can be coordinated simultaneously for "contouring control" is the number of axes along or around which, during processing of the workpiece, simultaneous and interrelated motions are performed between the

workpiece and a tool. This does not include any additional axes along or around which other relative motions within the machine are performed, such as:

2.a. Wheel-dressing systems in grinding machines;

2.b. Parallel rotary axes designed for mounting of separate workpieces;

2.c. Co-linear rotary axes designed for manipulating the same workpiece by holding it in a chuck from different ends.

3. Axis nomenclature shall be in accordance with International Standard ISO 841:2001, Industrial automation systems and integration—Numerical control of machines—Coordinate system and motion nomenclature.

4. A “tilting spindle” is counted as a rotary axis.

5. ‘Stated “unidirectional positioning repeatability”’ may be used for each specific machine model as an alternative to individual machine tests, and is determined as follows:

5.a. Select five machines of a model to be evaluated;

5.b. Measure the linear axis repeatability ( $R\uparrow, R\downarrow$ ) according to ISO 230-2:2014 and evaluate “unidirectional positioning repeatability” for each axis of each of the five machines;

5.c. Determine the arithmetic mean value of the “unidirectional positioning repeatability”-values for each axis of all five machines together. These arithmetic mean values “unidirectional positioning repeatability” (UPR) become the stated value of each axis for the model... (UPR<sub>x</sub>, UPR<sub>y</sub>, . . . );

5.d. Since the Category 2 list refers to each linear axis there will be as many ‘stated “unidirectional positioning repeatability”’ values as there are linear axes;

5.e. If any axis of a machine model not controlled by 2B001.a. to 2B001.c. has a ‘stated “unidirectional positioning repeatability”’ equal to or less than the specified “unidirectional positioning repeatability” of each machine tool model plus 0.7 μm, the builder should be required to reaffirm the accuracy level once every eighteen months.

6. For the purpose of 2B, measurement uncertainty for the “unidirectional positioning repeatability” of machine tools, as defined in the International Standard ISO 230-2:2014, shall not be considered.

7. For the purpose of 2B, the measurement of axes shall be made according to test procedures in 5.3.2. of ISO 230-2:2014. Tests for axes longer than 2 meters shall be made over 2 m segments. Axes longer than 4 m require multiple tests (e.g., two tests for axes longer than 4 m and up to 8 m, three tests for axes longer than 8 m and up to 12 m), each over 2 m segments and distributed in equal intervals over the axis length. Test segments are equally spaced along the full axis length, with any excess length equally divided at the beginning, in between, and at the end of the test segments. The smallest “unidirectional positioning repeatability”-value of all test segments is to be reported.

■ 24. In Supplement No. 1 to part 774, ECCN 2B001 is amended by:

■ a. Revising Items paragraphs a.1, b.1.a, b.2.a through b.3, c.1.a, c.2, the Notes to 2B001.c, and e.2.b; and

■ b. Adding Items paragraphs c.2.a through c.2.c.

The revisions and additions read as follows:

2B001 Machine Tools and Any Combination Thereof, for Removing (or Cutting) Metals, Ceramics or “Composites”, Which, According to the Manufacturer’s Technical Specifications, Can Be Equipped With Electronic Devices for “Numerical Control”; as Follows (see List of Items Controlled)

\* \* \* \* \*  
List of Items Controlled

\* \* \* \* \*  
Items:

\* \* \* \* \*

a. \* \* \*  
a.1. “Unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis; and

\* \* \* \* \*  
b. \* \* \*

b.1. \* \* \*  
b.1.a. “Unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis; and

\* \* \* \* \*  
b.2. \* \* \*

b.2.a. “Unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis with a travel length less than 1 m;

b.2.b. “Unidirectional positioning repeatability” equal to or less (better) than 1.4 μm along one or more linear axis with a travel length equal to or greater than 1 m and less than 4 m;

b.2.c. “Unidirectional positioning repeatability” equal to or less (better) than 6.0 μm along one or more linear axis with a travel length equal to or greater than 4 m; or  
b.2.d. Being a ‘parallel mechanism machine tool’;

*Technical Note: A ‘parallel mechanism machine tool’ is a machine tool having multiple rods which are linked with a platform and actuators; each of the actuators operates the respective rod simultaneously and independently.*

b.3. A “unidirectional positioning repeatability” for jig boring machines,, equal to or less (better) than 1.1 μm along one or more linear axis; or

\* \* \* \* \*

c. \* \* \*  
c.1. \* \* \*

c.1.a. “Unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis; and  
c.1.b. Three or more axes which can be coordinated simultaneously for “contouring control”; or

c.2. Five or more axes which can be coordinated simultaneously for “contouring control” having any of the following:

c.2.a. “Unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis with a travel length less than 1m;

c.2.b. “Unidirectional positioning repeatability” equal to or less (better) than 1.4 μm along one or more linear axis with a travel length equal to or greater than 1 m and less than 4 m; or

c.2.c. “Unidirectional positioning repeatability” equal to or less (better) than 6.0 μm along one or more linear axis with a travel length equal to or greater than 4 m.

Notes: 2B001.c does not control grinding machines as follows:

a. Cylindrical external, internal, and external-internal grinding machines, having all of the following:

a.1. Limited to cylindrical grinding; and  
a.2. Limited to a maximum workpiece capacity of 150 mm outside diameter or length.

b. Machines designed specifically as jig grinders that do not have a z-axis or a w-axis, with a “unidirectional positioning repeatability” less (better) than 1.1 μm.

c. Surface grinders.

\* \* \* \* \*

e. \* \* \*

e.2. \* \* \*

e.2.b. A positioning “accuracy” of less (better) than 0.003°;

\* \* \* \* \*

■ 25. In Supplement No. 1 to part 774, ECCN 3A001 is amended by revising Items paragraphs a.5.b.1, the introductory text of a.5.b.2, a.7.a, a.7.b, the Technical Notes following a.7.b, b.7, b.10, b.11.f and b.11.g to read as follows:

3A001 Electronic Components and “Specially Designed” “Components” Thereof, as Follows (see List of Items Controlled)

\* \* \* \* \*  
List of Items Controlled

\* \* \* \* \*  
Items: a. \* \* \*

a.5. \* \* \*

a.5.b. \* \* \*

a.5.b.1. A resolution of 10 bit or more with an ‘adjusted update rate’ of greater than 3,500 MSPS; or

a.5.b.2. A resolution of 12-bit or more with an ‘adjusted update rate’ of greater than 1,250 MSPS and having any of the following:

\* \* \* \* \*

a.7. \* \* \*

a.7.a. A maximum number of single-ended digital input/outputs of greater than 700; or

a.7.b. An ‘aggregate one-way peak serial transceiver data rate’ of 500 Gb/s or greater;

\* \* \* \* \*

*Technical Notes: 1. Maximum number of digital input/outputs in 3A001.a.7.a is also referred to as maximum user input/outputs or maximum available input/outputs, whether the integrated circuit is packaged or bare die.*

2. ‘Aggregate one-way peak serial transceiver data rate’ is the product of the peak serial one-way transceiver data rate times the number of transceivers on the FPGA.

\* \* \* \* \*

b. \* \* \*

b.7. Converters and harmonic mixers, that are any of the following:

b.7.a. Designed to extend the frequency range of "signal analyzers" beyond 90 GHz;

b.7.b. Designed to extend the operating range of signal generators as follows:
b.7.b.1. Beyond 90 GHz;
b.7.b.2. To an output power greater than 100 mW (20 dBm) anywhere within the frequency range exceeding 43.5 GHz but not exceeding 90 GHz;

b.7.c. Designed to extend the operating range of network analyzers as follows:

b.7.c.1. Beyond 110 GHz;
b.7.c.2. To an output power greater than 31.62 mW (15 dBm) anywhere within the frequency range exceeding 43.5 GHz but not exceeding 90 GHz;

b.7.c.3. To an output power greater than 1 mW (0 dBm) anywhere within the frequency range exceeding 90 GHz but not exceeding 110 GHz; or

b.7.d. Designed to extend the frequency range of microwave test receivers beyond 110 GHz;

\* \* \* \* \*

b.10. Oscillators or oscillator assemblies, specified to operate with a single sideband (SSB) phase noise, in dBc/Hz, less (better) than—(126 + 20log10F - 20log10f) anywhere within the range of 10 Hz ≤ F ≤ 10 kHz;

Technical Note: In 3A001.b.10, F is the offset from the operating frequency in Hz and f is the operating frequency in MHz.

b.11. \* \* \*

b.11.f. Less than 1 ms for any frequency change exceeding 2.2 GHz within the synthesized frequency range exceeding 56 GHz but not exceeding 90 GHz; or

b.11.g. Less than 1 ms within the synthesized frequency range exceeding 90 GHz;

N.B.: For general purpose "signal analyzers", signal generators, network analyzers and microwave test receivers, see 3A002.c, 3A002.d, 3A002.e and 3A002.f, respectively.

\* \* \* \* \*

■ 26. In Supplement No. 1 to part 774, ECCN 3A002 is amended by:

■ a. Revising Items paragraphs a.5.a and a.5.b and adding Items paragraph a.5.c before the Technical Notes;

■ b. Adding paragraph 3. to the Technical Notes following Items paragraph a.5.c; and

■ c. Revising Items paragraphs c introductory text through c.3, c.4.a, d introductory text through d.1.a, d.2, d.3.b through d.4.b, d.5, Note 1 after d.5, Technical Note 1 after d.5, e.1, and e.2.

The revisions and addition read as follows:

3A002 General Purpose Electronic Equipment, as Follows (see List of Items Controlled)

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: a. \* \* \*

a.5. \* \* \*

a.5.a. Digitizing rates equal to or more than 200 million samples per second and a resolution of 10 bits or more;

a.5.b. A 'continuous throughput' of 2 Gbit/s or more; and

a.5.c. Triggered acquisition of transients or aperiodic signals;

Technical Notes: \* \* \*

3. For the purposes of 3A002.a.5.c, acquisition can be triggered internally or externally.

\* \* \* \* \*

c. "Signal analyzers" as follows:

c.1. "Signal analyzers" having a 3 dB resolution bandwidth (RBW) exceeding 10 MHz anywhere within the frequency range exceeding 31.8 GHz but not exceeding 37 GHz;

c.2. "Signal analyzers" having Displayed Average Noise Level (DANL) less (better) than—150 dBm/Hz anywhere within the frequency range exceeding 43.5 GHz but not exceeding 90 GHz;

c.3. "Signal analyzers" having a frequency exceeding 90 GHz;

c.4. \* \* \*

c.4.a. "Real-time bandwidth" exceeding 170 MHz; and

\* \* \* \* \*

d. Signal generators having any of the following:

d.1. Specified to generate pulse-modulated signals having all of the following, anywhere within the frequency range exceeding 31.8 GHz but not exceeding 37 GHz:

d.1.a. 'Pulse duration' of less than 25 ns; and

\* \* \* \* \*

d.2. An output power exceeding 100 mW (20 dBm) anywhere within the frequency range exceeding 43.5 GHz but not exceeding 90 GHz;

d.3. \* \* \*

d.3.b. Less than 100 μs for any frequency change exceeding 2.2 GHz within the frequency range exceeding 4.8 GHz but not exceeding 31.8 GHz;

d.3.c. [Reserved]

d.3.d. Less than 500 μs for any frequency change exceeding 550 MHz within the frequency range exceeding 31.8 GHz but not exceeding 37 GHz; or

d.3.e. Less than 100 μs for any frequency change exceeding 2.2 GHz within the frequency range exceeding 37 GHz but not exceeding 90 GHz;

d.3.f. [Reserved]

d.4. Single sideband (SSB) phase noise, in dBc/Hz, specified as being any of the following:

d.4.a. Less (better) than—(126 + 20 log10 F - 20log10f) for anywhere within the range of 10 Hz ≤ F ≤ 10 kHz anywhere within the frequency range exceeding 3.2 GHz but not exceeding 90 GHz; or

d.4.b. Less (better) than—(206 - 20log10f) for anywhere within the range of 10 kHz < F ≤ 100 kHz anywhere within the frequency range exceeding 3.2 GHz but not exceeding 90 GHz; or

Technical Note: In 3A002.d.4, F is the offset from the operating frequency in Hz and f is the operating frequency in MHz.

d.5. A maximum frequency exceeding 90 GHz;

Note 1: For the purpose of 3A002.d, signal generators include arbitrary waveform and function generators.

\* \* \* \* \*

Technical Notes: 1. The maximum frequency of an arbitrary waveform or function generator is calculated by dividing the sample rate, in samples/second, by a factor of 2.5.

\* \* \* \* \*

e. \* \* \*

e.1. An output power exceeding 31.62 mW (15 dBm) anywhere within the operating frequency range exceeding 43.5 GHz but not exceeding 90 GHz;

e.2. An output power exceeding 1 mW (0 dBm) anywhere within the operating frequency range exceeding 90 GHz but not exceeding 110 GHz;

\* \* \* \* \*

■ 27. In Supplement No. 1 to part 774, ECCN 3A991 is amended by revising introductory text to Items paragraph d to read as follows:

3A991 Electronic Devices, and "Components" Not Controlled by 3A001

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items:

\* \* \* \* \*

d. Field programmable logic devices having a maximum number of single-ended digital input/outputs between 200 and 700;

\* \* \* \* \*

■ 28. In Supplement No. 1 to part 774, ECCN 3B001 is amended by:

■ a. Revising the CIV paragraph of the List Based License Exceptions section; and

■ b. Revising Items paragraphs f.1.a through f.2.

The revisions read as follows:

3B001 Equipment For the Manufacturing of Semiconductor Devices or Materials, as Follows (see List of Items Controlled) and "Specially Designed" "Components" and "Accessories" therefor

\* \* \* \* \*

List Based License Exceptions (See Part 740 for a description of all license exceptions)

\* \* \* \* \*

CIV: Yes for equipment controlled by 3B001.a.1, a.2 and c.

List of Items Controlled

\* \* \* \* \*

Items: \* \* \*

f. \* \* \*

f.1. \* \* \*

f.1.a. A light source wavelength shorter than 193 nm; or

f.1.b. Capable of producing a pattern with a "Minimum Resolvable Feature size" (MRF) of 45 nm or less;

**Technical Note:** The ‘Minimum Resolvable Feature size’ (MRF) is calculated by the following formula:

$$MRF = \frac{(an\ exposure\ light\ source\ wavelength\ in\ nm) \times (K\ factor)}{numerical\ aperture}$$

where the K factor = 0.35

f.2 Imprint lithography equipment capable of production features of 45 nm or less;  
\* \* \* \* \*

■ 29. In Supplement No. 1 to part 774, ECCN 3D001 is amended by revising the CIV paragraph in the List Based License Exceptions section to read as follows:

*3D001 “Software” “Specially Designed” for the “Development” or “Production” of Equipment Controlled by 3A001.b to 3A002.g or 3B (Except 3B991 and 3B992)*

\* \* \* \* \*

List Based License Exceptions (See Part 740 for a description of all license exceptions)

CIV: Yes for “software” “specially designed” for the “development” or “production” of equipment controlled by 3B001.c.

\* \* \* \* \*

■ 30. In Supplement No. 1 to part 774, ECCN 3E001 is amended by revising the CIV paragraph in the List Based License Exceptions section to read as follows:

*3E001 “Technology” according to the General Technology Note for the “Development” or “Production” of Equipment or Materials controlled by 3A (except 3A292, 3A980, 3A981, 3A991 3A992, or 3A999), 3B (Except 3B991 or 3B992) or 3C (Except 3C992)*

\* \* \* \* \*

List Based License Exceptions (See Part 740 for a description of all license exceptions)

CIV: Yes for “Technology” According to the General Technology Note for the “Development” or “Production of Equipment in 3B001.c.

\* \* \* \* \*

■ 31. In Supplement No. 1 to part 774, ECCN 4D001 is amended by:

- a. Revising the TSR paragraph in the List Based License Exceptions section;
- b. Revising the STA paragraph in the Special Conditions for STA section; and
- c. Revising Items paragraph b.1 in the List of Items Controlled section.

The revisions read as follows:

*4D001 “Software” as follows (see List of Items Controlled)*

\* \* \* \* \*

List Based License Exceptions (See Part 740 for a description of all license exceptions)

\* \* \* \* \*

TSR: Yes, except for “software” for the “development” or “production” of commodities with an “Adjusted Peak Performance” (“APP”) exceeding 2.0 WT.

\* \* \* \* \*

Special Conditions for STA

STA: License Exception STA may not be used to ship or transmit “software” “specially designed” for the “development” or “production” of equipment specified by ECCN 4A001.a.2 or for the “development” or “production” of “digital computers” having an “Adjusted Peak Performance” (“APP”) exceeding 2.0 Weighted TeraFLOPS (WT) to any of the destinations listed in Country Group A:6 (See Supplement No.1 to part 740 of the EAR).

List of Items Controlled

\* \* \* \* \*

Items: \* \* \*

b. \* \* \*

b.1. “Digital computers” having an “Adjusted Peak Performance” (“APP”) exceeding 1.0 Weighted TeraFLOPS (WT);

\* \* \* \* \*

■ 32. In Supplement No. 1 to part 774, ECCN 4D002 is removed.

■ 33. In Supplement No. 1 to part 774, ECCN 4E001 is amended by:

- a. Revising the TSR paragraph in the List Based License Exceptions section;
- b. Revising the STA paragraph in the Special Conditions for STA section; and
- c. Revising Items paragraph b.1 in the List of Items Controlled section.

The revisions read as follows:

*4E001 “Technology” as Follows (see List of Items Controlled)*

\* \* \* \* \*

List Based License Exceptions (See Part 740 for a description of all license exceptions)

\* \* \* \* \*

TSR: Yes, except for “technology” for the “development” or “production” of commodities with an “Adjusted Peak Performance” (“APP”) exceeding 2.0 WT.

\* \* \* \* \*

Special Conditions for STA

STA: License Exception STA may not be used to ship or transmit “technology” according to the General Technology Note for the “development” or “production” of any of the following equipment or “software”: a. Equipment specified by ECCN 4A001.a.2; b. “Digital computers” having an “Adjusted Peak Performance” (“APP”) exceeding 2.0 Weighted TeraFLOPS (WT); or c. “software” specified in the License Exception STA paragraph found in the License Exception section of ECCN 4D001 to any of the destinations listed in Country Group A:6 (See Supplement No. 1 to part 740 of the EAR).

List of Items Controlled

\* \* \* \* \*

Items: \* \* \*

b. \* \* \*

b.1. “Digital computers” having an “Adjusted Peak Performance” (“APP”) exceeding 1.0 Weighted TeraFLOPS (WT);

\* \* \* \* \*

■ 34. In Supplement No. 1 to part 774, the Technical Note on “Adjusted Peak Performance” after ECCN EAR99 is amended by:

- a. Revising Note 6; and
- b. Adding Technical Notes after Note 6.

The revision and addition read as follows:

*Technical Note on “Adjusted Peak Performance” (“APP”)*

\* \* \* \* \*

Note 6: “APP” values must be calculated for processor combinations containing processors “specially designed” to enhance performance by aggregation, operating simultaneously and sharing memory

*Technical Notes: 1. Aggregate all processors and accelerators operating simultaneously and located on the same die.*

2. Processor combinations share memory when any processor is capable of accessing any memory location in the system through the hardware transmission of cache lines or memory words, without the involvement of any software mechanism, which may be achieved using "electronic assemblies" specified in 4A003.c.

\* \* \* \* \*

■ 35. In Supplement No. 1 to part 774, ECCN 5D001 is amended by removing and reserving Items paragraph b.

■ 36. In Supplement No. 1 to part 774, ECCN 5E001 is amended by revising Items paragraph c.1 to read as follows:

5E001 "Technology" as Follows (see List of Items Controlled)

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: \* \* \*

c. \* \* \*

c.1. Equipment employing digital techniques designed to operate at a "total digital transfer rate" exceeding 560 Gbit/s;

\* \* \* \* \*

■ 37. In Supplement No. 1 to part 774, Category 5, Part 2 is amended by revising Note 1 to read as follows:

Category 5—Telecommunications and "Information Security"

\* \* \* \* \*

Part 2—"Information Security"

Note 1: The control status of "information security" items or functions is determined in Category 5, Part 2 even if they are components, "software" or functions of other systems or equipment.

N.B. to Note 1: Commodities and software "specially designed" for medical end-use that incorporate an item in Category 5, part 2 are not classified in any ECCN in Category 5, part 2.

\* \* \* \* \*

■ 38. In Supplement No. 1 to part 774, ECCN 5A002 is amended by:

■ a. Revising the Related Controls paragraph in the List of Items Controlled section;

■ b. Revising paragraphs (j) and (k) of the Note at the beginning of the Items paragraph;

■ c. Adding paragraphs (l) and (m) to the of the Note at the beginning of the Items paragraph;

■ d. Revising the introductory text of Items paragraph a;

■ e. Revising Items paragraph a.2 and the Note to 5A002.a.2;

■ f. Adding a Technical Note following the Note to 5A002.a.2;

■ g. Revising Items paragraph a.9 and the Technical Notes following paragraph a.9; and

■ h. Revising Items paragraph b.

The revisions and additions read as follows:

5A002 "Information Security" Systems, Equipment and "Components" Therefor, as Follows (see List of Items Controlled)

\* \* \* \* \*

List of Items Controlled

Related Controls: (1) ECCN 5A002.a controls "components" providing the means or functions necessary for "information security." All such "components" are presumptively "specially designed" and controlled by 5A002.a. (2) 5A002 does not control the commodities listed in paragraphs (a), (d), (e), (f), (g), (i), (j), (k), (l) and (m) in the Note in the items paragraph of this entry. These commodities are instead classified under ECCN 5A992, and related software and technology are classified under ECCNs 5D992 and 5E992 respectively. (3) After encryption registration to or classification by BIS, mass market encryption commodities that meet eligibility requirements are released from "EI" and "NS" controls. These commodities are classified under ECCN 5A992.c. See § 742.15(b) of the EAR.

\* \* \* \* \*

Items:

Note: \* \* \*

(j) Equipment, having no functionality specified by 5A002.a.2, 5A002.a.4, 5A002.a.7, 5A002.a.8 or 5A002.b, meeting all of the following:

1. All cryptographic capability specified by 5A002.a meets any of the following:

a. It cannot be used; or  
b. It can only be made useable by means of "cryptographic activation"; and

2. When necessary as determined by the appropriate authority in the exporter's country, details of the equipment are accessible and will be provided to the authority upon request, in order to ascertain compliance with conditions described above;

N.B.1: See 5A002.a for equipment that has undergone "cryptographic activation."

N.B.2: See also 5A002.b, 5D002.d and 5E002.b.  
(k) Mobile telecommunications Radio Access Network (RAN) equipment designed for civil use, which also meet the provisions 2. to 5. of part a. of the Cryptography Note (Note 3 in Category 5, Part 2), having an RF output power limited to 0.1W (20 dBm) or less, and supporting 16 or fewer concurrent users;

(l) Routers, switches or relays, where the "information security" functionality is limited to the tasks of "Operations, Administration or Maintenance" ("OAM") implementing only published or commercial cryptographic standards; or

(m) General purpose computing equipment or servers, where the "information security" functionality meets all of the following:

1. Uses only published or commercial cryptographic standards; and  
2. Is any of the following:  
a. Integral to a CPU that meets the provisions of Note 3 to Category 5-Part 2;  
b. Integral to an operating system that is not specified by 5D002; or  
c. Limited to "OAM" of the equipment.

a. Systems, equipment and components, for "information security", as follows:

\* \* \* \* \*

a.2. Designed or modified to perform 'cryptanalytic functions';

Note: 5A002.a.2 includes systems or equipment, designed or modified to perform 'cryptanalytic functions' by means of reverse engineering.

Technical Note: 'Cryptanalytic functions' are functions designed to defeat cryptographic mechanisms in order to derive confidential variables or sensitive data, including clear text, passwords or cryptographic keys.

\* \* \* \* \*

a.9. Designed or modified to use or perform "quantum cryptography."

Technical Note: "Quantum cryptography" is also known as Quantum Key Distribution (QKD).

b. Systems, equipment and components, designed or modified to enable, by means of "cryptographic activation", an item to achieve or exceed the controlled performance levels for functionality specified by 5A002.a that would not otherwise be enabled.

■ 39. In Supplement No. 1 to part 774, ECCN 5D002 is amended by

■ a. Adding a Note to 5D002.c after Items paragraph c.2; and

■ b. Revising Items paragraph d.

The revisions read as follows:

5D002 "Software" as Follows (see List of Items Controlled)

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: \* \* \*

c. \* \* \*

c.2. \* \* \*

Note: 5D002.c does not apply to "software" limited to the tasks of "OAM" implementing only published or commercial cryptographic standards.

d. "Software" designed or modified to enable, by means of "cryptographic activation," an item to achieve or exceed the controlled performance levels for functionality specified by 5A002.a that would not otherwise be enabled.

■ 40. In Supplement No. 1 to part 774, ECCN 5E002 is amended by revising Items paragraph b and the Note to 5E002 to read as follows:

5E002 "Technology" as Follows (see List of Items Controlled)

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: \* \* \*

b. "Technology" to enable, by means of "cryptographic activation," an item to achieve or exceed the controlled performance levels for functionality specified by 5A002.a that would not otherwise be enabled.

Note: 5E002 includes "information security" technical data resulting from procedures carried out to evaluate or determine the implementation of functions, features or techniques specified in Category 5-Part 2.

■ 41. In Supplement No. 1 to part 774, ECCN 6A001 is amended by:

- a. Revising Items paragraph a.1.a.2.a.2 and the Technical Note following Items paragraph a.1.a.2.a.2;
- b. Revising the introductory text of Items paragraph a.1.a.3;
- c. Revising Note 1 after Items paragraph a.1.c;
- d. Revising Items paragraph a.1.c.1;
- e. Removing and reserving Items paragraph a.1.c.2 and removing the Technical Note following Items paragraph a.1.c.2; and
- f. Adding a N.B. after paragraph a.1.c.2.

The revisions and additions read as follows:

6A001 *Acoustic Systems, Equipment and "Components", as Follows (see List of Items Controlled)*

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: a. \* \* \*

a.1. \* \* \*

a.1.a. \* \* \*

a.1.a.2 \* \* \*

a.1.a.2.a. \* \* \*

a.1.a.2.a.2. 'Sounding rate' greater than 3,800 m/s; or

*Technical Note: 'Sounding rate' is the product of the maximum speed (m/s) at which the sensor can operate and the maximum number of soundings per swath assuming 100% coverage. For systems that produce soundings in two directions (3D sonars), the maximum of the 'sounding rate' in either direction should be used.*

\* \* \* \* \*

a.1.a.3. Side Scan Sonar (SSS) or Synthetic Aperture Sonar (SAS), designed for seabed imaging and having all of the following, and specially designed transmitting and receiving acoustic arrays therefor:

\* \* \* \* \*

a.1.c. \* \* \*

*Notes: 1. The control status of acoustic projectors, including transducers, "specially designed" for other equipment not specified by 6A001 is determined by the control status of the other equipment.*

\* \* \* \* \*

a.1.c.1. Operating at frequencies below 10 kHz and having any of the following:

a.1.c.1.a. Not designed for continuous operation at 100% duty cycle and having a radiated 'free-field Source Level ( $SL_{RMS}$ )' exceeding  $(10\log(f) + 169.77)$ dB (reference 1  $\mu$ Pa at 1 m) where f is the frequency in Hertz of maximum Transmitting Voltage Response (TVR) below 10 kHz; or

a.1.c.1.b. Designed for continuous operation at 100% duty cycle and having a continuously radiated 'free-field Source Level ( $SL_{RMS}$ )' at 100% duty cycle exceeding  $(10\log(f) + 159.77)$ dB (reference 1  $\mu$ Pa at 1 m) where f is the frequency in Hertz of maximum Transmitting Voltage Response (TVR) below 10 kHz; or

*Technical Note: The 'free-field Source Level ( $SL_{RMS}$ )' is defined along the maximum response axis and in the far field of the acoustic projector. It can be obtained from*

*the Transmitting Voltage Response using the following equation:  $SL_{RMS} = (TVR + 20\log V_{RMS})$  dB (ref 1 $\mu$ Pa at 1 m), where  $SL_{RMS}$  is the source level, TVR is the Transmitting Voltage Response and  $V_{RMS}$  is the Driving Voltage of the Projector.*

\* \* \* \* \*

*N.B.: See 6A001.a.1.c.1 for items previously specified in 6A001a.1.c.2.*

\* \* \* \* \*

■ 42. In Supplement No. 1 to part 774, ECCN 6A003 is amended by:

- a. Remove the entry "RS applies to 6A003.b.4.b" from the table in the License Requirements section;
- b. Revising the Reporting Requirements in the License Requirements section;
- c. Revising Items paragraph a.3;
- d. Revising paragraph b.4.c in Note 3 to 6A003.b.4.b; and
- e. Revising paragraph b in Note 4 to 6A003.b.4.c.

The revisions read as follows:

6A003 *Cameras, Systems or Equipment, and "Components" Therefor, as Follows (see List of Items Controlled)*

\* \* \* \* \*

License Requirements

\* \* \* \* \*

Reporting Requirements See § 743.3 of the EAR for thermal camera reporting for exports that are not authorized by an individually validated license of thermal imaging cameras controlled by ECCN 6A003.b.4.b to destinations in Country Group A:1 (see Supplement No. 1 to part 740 of the EAR), must be reported to BIS.

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: a. \* \* \*

a.3. Mechanical or electronic streak cameras as follows:

a.3.a. Mechanical streak cameras having writing speeds exceeding 10 mm/ $\mu$ s;

a.3.b. Electronic streak cameras having temporal resolution better than 50 ns;

\* \* \* \* \*

b. \*\*\*

b.4. \*\*\*

b.4.c. \*\*\*

Note 3: \*\*\*

b. \*\*\*

4. \*\*\*

*c. The camera is "specially designed" for installation into a civilian passenger land vehicle and having all of the following:*

*1. The placement and configuration of the camera within the vehicle are solely to assist the driver in the safe operation of the vehicle;*

*2. Is operable only when installed in any of the following:*

*a. The civilian passenger land vehicle for which it was intended and the vehicle weighs less than 4,500 kg (gross vehicle weight); or*

*b. A "specially designed", authorized maintenance test facility; and*

*3. Incorporates an active mechanism that forces the camera not to function when it is removed from the vehicle for which it was intended.*

*Note: When necessary details of the items will be provided, upon request, to the Bureau of Industry and Security in order to ascertain compliance with the conditions described in Note 3.b.4 and Note 3.c in this Note to 6A003.b.4.b.*

Note 4: \*\*\*

*b. Where the camera is "specially designed" for installation into a civilian passenger land vehicle or passenger and vehicle ferries and having all of the following:*

*1. The placement and configuration of the camera within the vehicle or ferry are solely to assist the driver or operator in the safe operation of the vehicle or ferry;*

*2. Is only operable when installed in any of the following:*

*a. The civilian passenger land vehicle for which it was intended and the vehicle weighs less than 4,500 kg (gross vehicle weight);*

*b. The passenger and vehicle ferry for which it was intended and having a length overall (LOA) 65 m or greater; or*

*c. A "specially designed", authorized maintenance test facility; and*

*3. Incorporates an active mechanism that forces the camera not to function when it is removed from the vehicle for which it was intended;*

\* \* \* \* \*

■ 43. In Supplement No. 1 to part 774, ECCN 6A004 is amended by:

■ a. Revising the GBS and CIV paragraphs under the List Based License Exceptions section;

■ b. Adding a Technical Note after the introductory text of Items paragraph a;

■ c. Revising Items paragraph a.1;

■ d. Revising Items paragraph a.4;

■ e. Revising Items paragraph d.2;

■ f. Removing and reserving Items paragraph d.4.

The revisions and additions read as follows:

6A004 *Optical Equipment and "Components," as Follows (see List of Items Controlled)*

\* \* \* \* \*

List Based License Exceptions (See Part 740 for a description of all license exceptions)

\* \* \* \* \*

GBS: Yes for 6A004.a.1, a.2, a.4, b, and d.2.

CIV: Yes for 6A004.a.1, a.2, a.4, b, and d.2.

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: a. \*\*\*

*Technical Note: For the purpose of 6A004.a, Laser Induced Damage Threshold (LIDT) is measured according to ISO 21254-1:2011.*

a.1. "Deformable mirrors" having an active optical aperture greater than 10 mm and having any of the following, and specially designed components therefor:

a.1.a. Having all the following:

a.1.a.1. A mechanical resonant frequency of 750 Hz or more; and

a.1.a.2. More than 200 actuators; or

a.1.b. A Laser Induced Damage Threshold (LIDT) being any of the following:

a.1.b.1. Greater than 1 kW/cm<sup>2</sup> using a "CW laser"; or
a.1.b.2. Greater than 2 J/cm<sup>2</sup> using 20 ns "laser" pulses at 20 Hz repetition rate;

a.4. Mirrors specially designed for beam steering mirror stages specified in 6A004.d.2.a with a flatness of λ/10 or better (λ is equal to 633 nm) and having any of the following:

a.4.a. Diameter or major axis length greater than or equal to 100 mm; or

a.4.b. Having all of the following:

a.4.b.1. Diameter or major axis length greater than 50 mm but less than 100 mm; and

a.4.b.2. A Laser Induced Damage Threshold (LIDT) being any of the following:

a.4.b.2.a. Greater than 10 kW/cm<sup>2</sup> using a "CW laser"; or

a.4.b.2.b. Greater than 20 J/cm<sup>2</sup> using 20 ns "laser" pulses at 20 Hz repetition rate;

N.B. For optical mirrors specially designed for lithography equipment, see 3B001.

\* \* \* \* \*

d. \*\*\*

d.2. Steering, tracking, stabilisation and resonator alignment equipment as follows:

d.2.a. Beam steering mirror stages designed to carry mirrors having diameter or major axis length greater than 50 mm and having all of the following, and specially designed electronic control equipment therefor:

d.2.a.1. A maximum angular travel of ±26 mrad or more;

d.2.a.2. A mechanical resonant frequency of 500 Hz or more; and

d.2.a.3. An angular accuracy of 10 μrad (microradians) or less;

d.2.b. Resonator alignment equipment having bandwidths equal to or more than 100 Hz and an accuracy of 10 μrad or less;

\* \* \* \* \*

■ 44. In Supplement No. 1 to part 774, ECCN 6A005 is amended by:

■ a. Removing the Note to 6A005.c after Items paragraph c;

■ b. Revising Items paragraph e.2; and

■ c. Adding Items paragraph e.3.

The revision and additions read as follows:

6A005 "Lasers," "Components" and Optical Equipment, as Follows (see List of Items Controlled), Excluding Items That Are Subject to the Export Licensing Authority of the Nuclear Regulatory Commission (see 10 CFR part 110)

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items:

\* \* \* \* \*

e. \*\*\*

e.2. Optical mirrors or transmissive or partially transmissive optical or electro-optical-"components," other than fused tapered fiber combiners and Multi-Layer Dielectric gratings (MLDs), "specially designed" for use with controlled "lasers";

Note to 6A005.e.2: Fiber combiners and MLDs are specified by 6A005.e.3.

e.3. Fiber laser "components" as follows:

e.3.a. Multimode to multimode fused tapered fiber combiners having all of the following:

e.3.a.1. An insertion loss better (less) than or equal to 0.3 dB maintained at a rated total average or CW output power (excluding output power transmitted through the single mode core if present) exceeding 1,000 W; and

e.3.a.2. Number of input fibers equal to or greater than 3;

e.3.b. Single mode to multimode fused tapered fiber combiners having all of the following:

e.3.b.1. An insertion loss better (less) than 0.5 dB maintained at a rated total average or CW output power exceeding 4,600 W;

e.3.b.2. Number of input fibers equal to or greater than 3; and

e.3.b.3. Having any of the following:

e.3.b.3.a. A Beam Parameter Product (BPP) measured at the output not exceeding 1.5 mm mrad for a number of input fibers less than or equal to 5; or

e.3.b.3.b. A BPP measured at the output not exceeding 2.5 mm mrad for a number of input fibers greater than 5;

e.3.c. MLDs having all of the following:

e.3.c.1. Designed for spectral or coherent beam combination of 5 or more fiber lasers; and

e.3.c.2. CW Laser Induced Damage Threshold (LIDT) greater than or equal to 10 kW/cm<sup>2</sup>;

\* \* \* \* \*

■ 45. In Supplement No. 1 to part 774, ECCN 6C005 is amended by:

■ a. Revising the heading; and

■ b. Revising the Items paragraphs.

■ The revisions read as follows:

6C005 "Laser" Materials as Follows (see List of Items Controlled)

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: a. Synthetic crystalline "laser" host material in unfinished form as follows:

a.1. Titanium doped sapphire;

a.2. [Reserved]

b. Rare-earth-metal doped double-clad fibers having any of the following:

b.1. Nominal laser wavelength of 975 nm to 1,150 nm and having all of the following:

b.1.a. Average core diameter equal to or greater than 25 μm; and

b.1.b. Core 'Numerical Aperture' ('NA') less than 0.065; or

Note to 6C005.b.1: 6C005.b.1 does not apply to double-clad fibers having an inner glass cladding diameter exceeding 150 μm and not exceeding 300 μm.

b.2. Nominal laser wavelength exceeding 1,530 nm and having all of the following:

b.2.a. Average core diameter equal to or greater than 20 μm; and

b.2.b. Core 'NA' less than 0.1.

Technical Notes: 1. For the purposes of 6C005, the core 'Numerical Aperture' ('NA') is measured at the emission wavelengths of the fiber.

2. 6C005.b includes fibers assembled with end caps.

■ 46. In Supplement No. 1 to part 774, ECCN 6D003 is amended by:

■ a. Adding an undesignated center heading before Items paragraph d; and
■ b. Revising Items paragraph d.

The addition and revision read as follows:

6D003 Other "Software" as Follows (see List of Items Controlled)

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items:

\* \* \* \* \*

OPTICS

d. "Software" specially designed to maintain the alignment and phasing of segmented mirror systems consisting of mirror segments having a diameter or major axis length equal to or larger than 1 m;

\* \* \* \* \*

■ 47. In Supplement No. 1 to part 774, ECCN 7A003 is amended by revising Note 2 in the Items paragraph to read as follows:

7A003 'Inertial Measurement Equipment or Systems', Having Any of the Following (see List of Items Controlled)

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items:

\* \* \* \* \*

Note 2: 7A003 does not apply to 'inertial measurement equipment or systems' which are certified for use on "civil aircraft" by civil aviation authorities of one or more Wassenaar Arrangement Participating States, see Supplement No. 1 to part 743 of the EAR.

\* \* \* \* \*

■ 48. In Supplement No. 1 to part 774, ECCN 7D004 is amended by:

■ a. Revising the Related Controls paragraph in the List of Items Controlled section; and

■ b. Revising Items paragraph c.

The revisions read as follows:

7D004 "Source Code" Incorporating "Development" "Technology" Specified by 7E004.a.1 to a.6 or 7E004.b, For Any of the Following: (see List of Items Controlled)

\* \* \* \* \*

List of Items Controlled

Related Controls: See also 7D103 and 7D994

\* \* \* \* \*

Items: \*\*\*

c. "Fly-by-wire systems" or "fly-by-light systems";

\* \* \* \* \*

■ 49. In Supplement No. 1 to part 774, ECCN 7E001 is amended by revising the heading to read as follows:

7E001 "Technology" According to the General Technology Note for the "Development" of Equipment or "Software", Specified by 7A. (except 7A994), 7B. (except 7B994), 7D001, 7D002, 7D003 or 7D005.

\* \* \* \* \*

- 50. In Supplement No. 1 to part 774, ECCN 7E004 is amended by:
  - a. Revising the Related Controls paragraph in the List of Items Controlled;
  - b. Revising Items paragraphs b introductory text and b.1;
  - c. Removing the Note after Items paragraph b.6;
  - d. Adding Items paragraphs b.7 and b.8.

The revisions and additions read as follows:

*7E004 Other "Technology" as Follows (see List of Items Controlled)*

\* \* \* \* \*

List of Items Controlled

*Related Controls:* (1) See also 7E001, 7E002, 7E101, and 7E994. (2) In addition to the Related Controls in 7E001, 7E002, and 7E101 that include MT controls, also see the MT controls in 7E104 for design "technology" for the integration of the flight control, guidance, and propulsion data into a flight management system, designed or modified for rockets or missiles capable of achieving a "range" equal to or greater than 300 km, for optimization of rocket system trajectory; and also see 9E101 for design "technology" for integration of air vehicle fuselage, propulsion system and lifting control surfaces, designed or modified for unmanned aerial vehicles capable of achieving a "range" equal to or greater than 300 km, to optimize aerodynamic performance throughout the flight regime of an unmanned aerial vehicle.

\* \* \* \* \*

*Items: \*\*\**

b. "Development" "technology", as follows, for "active flight control systems" (including "fly-by-wire systems" or "fly-by-light systems"):

b.1. Photonic-based "technology" for sensing aircraft or flight control component state, transferring flight control data, or commanding actuator movement, "required" for "fly-by-light systems" "active flight control systems";

\* \* \* \* \*

b.7. "Technology" "required" for deriving the functional requirements for "fly-by-wire systems" having all of the following:

b.7.a. 'Inner-loop' airframe stability controls requiring loop closure rates of 40 Hz or greater; and

*Technical Note: 'Inner-loop' refers to functions of "active flight control systems" that automate airframe stability controls.*

b.7.b. Having any of the following:

b.7.b.1. Corrects an aerodynamically unstable airframe, measured at any point in the design flight envelope, that would lose recoverable control if not corrected within 0.5 seconds;

b.7.b.2. Couples controls in two or more axes while compensating for 'abnormal changes in aircraft state';

*Technical Note: 'Abnormal changes in aircraft state' include in-flight structural damage, loss of engine thrust, disabled control surface, or destabilizing shifts in cargo load.*

b.7.b.3. Performs the functions specified in 7E004.b.5; or

*Note: 7E004.b.7.b.3 does not apply to autopilots.*

b.7.b.4. Enables aircraft to have stable controlled flight, other than during take-off or landing, at greater than 18 degrees angle of attack, 15 degrees side slip, 15 degrees/second pitch or yaw rate, or 90 degrees/second roll rate;

b.8. "Technology" "required" for deriving the functional requirements of "fly-by-wire systems" to achieve all of the following:

b.8.a. No loss of control of the aircraft in the event of a consecutive sequence of any two individual faults within the "fly-by-wire system"; and

b.8.b. Probability of loss of control of the aircraft being less (better) than  $1 \times 10^{-9}$  failures per flight hour;

*Note: 7E004.b does not apply to "technology" associated with common computer elements and utilities (e.g., input signal acquisition, output signal transmission, computer program and data loading, built-in test, task scheduling mechanisms) not providing a specific flight control system function.*

\* \* \* \* \*

■ 51. In Supplement No. 1 to part 774, ECCN 8A001 is amended by removing the semicolon at the end of paragraph e.2. and adding in its place a period and removing Items paragraph f through the Technical Note following i.2.

■ 52. In Supplement No. 1 to part 774, ECCN 8A002 is amended by removing and reserving Items paragraphs k through n and o.1.

■ 53. In Supplement No. 1 to part 774, ECCN 8A620 is amended by revising Items paragraph f to read as follows:

*8A620 Submersible Vessels, Oceanographic and Associated Commodities (see List of Items Controlled)*

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

*Items: \*\*\**

f. Closed and semi-closed circuit (rebreathing) apparatus "specially designed" or modified for military use and not enumerated elsewhere in the CCL or in the USML.

\* \* \* \* \*

■ 54. In Supplement No. 1 to part 774, ECCN 8E002 is amended by:

- a. Revising the TSR paragraph in the List Based License Exceptions section;
- b. Adding a Note at the end of the List Based License Exceptions section; and
- c. Adding Items paragraph c.

The revision and additions read as follows:

*8E002 Other "Technology" as Follows (see List of Items Controlled)*

\* \* \* \* \*

List Based License Exceptions (See Part 740 for a description of all license exceptions)

\* \* \* \* \*

*TSR: N/A*

License Exceptions Note: License Exception TSU is not applicable for the repair "technology" controlled by 8E002.a or .b, see Supplement No. 2 to this part.

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

*Items: \* \* \**

c. "Technology" according to the General Technology Note for the "development" or "production" of any of the following:

c.1. Surface-effect vehicles (fully skirted variety) having all of the following:

c.1.a. Maximum design speed, fully loaded, exceeding 30 knots in a significant wave height of 1.25 m or more;

c.1.b. Cushion pressure exceeding 3,830 Pa; and

c.1.c. Light-ship-to-full-load displacement ratio of less than 0.70;

c.2. Surface-effect vehicles (rigid sidewalls) with a maximum design speed, fully loaded, exceeding 40 knots in a significant wave height of 3.25 m or more;

c.3. Hydrofoil vessels with active systems for automatically controlling foil systems, with a maximum design speed, fully loaded, of 40 knots or more in a significant wave height of 3.25 m or more; or

c.4. 'Small waterplane area vessels' having any of the following:

c.4.a. Full load displacement exceeding 500 tonnes with a maximum design speed, fully loaded, exceeding 35 knots in a significant wave height of 3.25 m or more; or

c.4.b. Full load displacement exceeding 1,500 tonnes with a maximum design speed, fully loaded, exceeding 25 knots in a significant wave height of 4 m or more.

*Technical Note: A 'small waterplane area vessel' is defined by the following formula: waterplane area at an operational design draft less than 2x (displaced volume at the operational design draft).<sup>2/3</sup>*

■ 54. In Supplement No. 1 to part 774, ECCN 9A001 is amended by revising Notes 1 and 2 to Items paragraph a to read as follows:

*9A001 Aero Gas Turbine Engines Having Any of the Following (see List of Items Controlled)*

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

*Items: a. \*\*\**

*Note 1: 9A001.a does not control aero gas turbine engines which meet all of the following:*

a. Certified by civil aviation authorities of one or more Wassenaar Arrangement Participating States listed in Supplement No. 1 to Part 743; and

b. Intended to power non-military manned aircraft for which any of the following has been issued by civil aviation authorities of one or more Wassenaar Arrangement Participating States listed in Supplement No. 1 to Part 743 for the aircraft with this specific engine type:

b.1. A civil type certificate; or

b.2. An equivalent document recognized by the International Civil Aviation Organization (ICAO).

Note 2: 9A001.a does not apply to aero gas turbine engines for Auxiliary Power Units (APUs) approved by the civil aviation authority of Wassenaar Arrangement Participating States (see Supplement No. 1 to part 743 of the EAR).

\* \* \* \* \*

- 55. In Supplement No. 1 to part 774, ECCN 9A003 is amended by:
■ a. Revising the heading; and
■ b. Revising Items paragraph b.
The revisions read as follows:

9A003 "Specially Designed" Assemblies or "Components," Incorporating Any of the "Technologies" Controlled by 9E003.a, 9E003.h or 9E003.i, For Any of the Following Aero Gas Turbine Engines (see List of Items Controlled)

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: \*\*\*

b. Whose design or production origins are either not from a Wassenaar Participating State (see Supplement No. 1 to part 743 of the EAR) or unknown to the manufacturer.

- 56. In Supplement No. 1 to part 774, ECCN 9A004 is amended by:
■ a. Revising the heading;
■ b. Revising the License Requirements section;
■ c. Redesignating Items paragraph a as paragraph w and adding new paragraph .a;
■ d. Adding paragraphs b. through f.

The revisions and addition read as follows:

9A004 Space Launch Vehicles and "Spacecraft," "Spacecraft Buses", "Spacecraft Payloads", "Spacecraft" On-board Systems or Equipment, and Terrestrial Equipment, as Follows (see List of Items Controlled)

License Requirements
Reason for Control: NS and AT.

Table with 2 columns: Control(s) and Country chart (See Supp. No. 1 to part 738). Rows include NS applies to 9A004.w and .x, AT applies to 9A004.w, .x and .y.

License Requirement Note: 9A004.a through .f are controlled under ECCN 9A515.

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items:

- a. Space launch vehicles;
b. "Spacecraft";
c. "Spacecraft buses";
d. "Spacecraft payloads" incorporating items specified by 3A001.b.1.a.4, 3A002.g, 5A001.a.1, 5A001.b.3, 5A002.a.5, 5A002.a.9, 6A002.a.1, 6A002.a.2, 6A002.b, 6A002.d, 6A003.b, 6A004.c, 6A004.e, 6A008.d, 6A008.e, 6A008.k, 6A008.l or 9A010.c;

e. On-board systems or equipment, specially designed for "spacecraft" and having any of the following functions:
e.1. "Command and telemetry data handling";

Note: For the purpose of 9A004.e.1, "command and telemetry data handling" includes bus data management, storage, and processing.

e.2. "Payload data handling"; or
Note: For the purpose of 9A004.e.2, "payload data handling" includes payload data management, storage, and processing.

e.3. "Attitude and orbit control";
Note: For the purpose of 9A004.e.3, "attitude and orbit control" includes sensing and actuation to determine and control the position and orientation of a "spacecraft".

N.B.: Equipment specially designed for military use is "subject to the ITAR". See 22 CFR parts 120 through 130.

f. Terrestrial equipment, specially designed for "spacecraft" as follows:

- f.1. Telemetry and telecommand equipment;
f.2. Simulators.

\* \* \* \* \*

- 57. In Supplement No. 1 to part 774, ECCN 9A010 is revised to read as follows:

9A010 "Specially Designed" "Parts," "Components," Systems and Structures, for Launch Vehicles, Launch Vehicle Propulsion Systems or "Spacecraft". (These items are "subject to the ITAR." See 22 CFR parts 120 through 130.)

List of Items Controlled

Items:

a. "Parts", "components" and structures, each exceeding 10 kg and "specially designed" for launch vehicles manufactured using any of the following:

a.1. "Composite" materials consisting of "fibrous or filamentary materials" specified by 1C010.e and resins specified by 1C008 or 1C009.b;

a.2. Metal "matrix" "composites" reinforced by any of the following:

- a.2.a. Materials specified by 1C007;
a.2.b. "Fibrous or filamentary materials" specified by 1C010; or
a.2.c. Aluminides specified by 1C002.a; or
a.3. Ceramic "matrix" "composite" materials specified by 1C007;

Note: The weight cut-off is not relevant for nose cones.

b. "Parts", "components" and structures, "specially designed" for launch vehicle propulsion systems specified by 9A005 to 9A009, manufactured using any of the following:

b.1. "Fibrous or filamentary materials" specified by 1C010.e and resins specified by 1C008 or 1C009.b;

b.2. Metal "Matrix" "composites" reinforced by any of the following:

- b.2.a. Materials specified by 1C007;
b.2.b. "Fibrous or filamentary materials" specified by 1C010; or
b.2.c. Aluminides specified by 1C002.a; or
b.3. Ceramic "matrix" "composite" materials specified by 1C007;

c. Structural components and isolation systems, specially designed to control

actively the dynamic response or distortion of "spacecraft" structures;

d. Pulsed liquid rocket engines with thrust-to-weight ratios equal to or more than 1 kN/kg and a response time (the time required to achieve 90% of total rated thrust from start-up) of less than 30 ms.

- 58. In Supplement No. 1 to part 774, ECCN 9A012 is amended by:

- a. Revising the heading;
■ b. Revising the second entry in the table under the License Requirements section; and
■ c. Revising Items paragraphs a through b.2 and b.4.

The revisions read as follows:

9A012 Non-military "Unmanned Aerial Vehicles," ("UAVs"), Unmanned "Airships", Related Equipment and "Components", as Follows (see List of Items Controlled)

License Requirements

\* \* \* \* \*

Table with 2 columns: Control(s) and Country chart (See Supp. No. 1 to part 738). Row includes MT applies to non-military Unmanned Air Vehicle (UAVs) and Remotely Piloted Vehicles (RPVs) that are capable of a maximum range of at least 300 kilometers (km), regardless of payload.

List of Items Controlled

\* \* \* \* \*

Items: a. "UAVs" or unmanned "airships", designed to have controlled flight out of the direct 'natural vision' of the 'operator' and having any of the following:

- a.1. Having all of the following:
a.1.a. A maximum 'endurance' greater than or equal to 30 minutes but less than 1 hour; and

- a.1.b. Designed to take-off and have stable controlled flight in wind gusts equal to or exceeding 46.3 km/h (25 knots); or
a.2. A maximum 'endurance' of 1 hour or greater;

Technical Notes: 1. For the purposes of 9A012.a, 'operator' is a person who initiates or commands the "UAV" or unmanned "airship" flight.

2. For the purposes of 9A012.a, 'endurance' is to be calculated for ISA conditions (ISO 2533:1975) at sea level in zero wind.

3. For the purposes of 9A012.a, 'natural vision' means unaided human sight, with or without corrective lenses.

b. Related equipment and "components", as follows:

- b.1 [Reserved]
b.2. [Reserved]

\* \* \* \* \*

b.4. Air breathing reciprocating or rotary internal combustion type engines, "specially designed" or modified to propel "UAVs" or unmanned "airships", at altitudes above 15,240 meters (50,000 feet).

Note: 9A012 does not control model aircraft or model "airships".

■ 59. In Supplement No. 1 to part 774, ECCN 9B001 is amended by:

- a. Revising the heading;
- b. Revising the Special Conditions for STA section;
- c. Revising Items paragraph b; and
- d. Adding Items paragraph c.

The revisions and addition read as follows:

*9B001 Equipment, Tooling or Fixtures, "Specially Designed" for Manufacturing Gas Turbine Engine Blades, Vanes or "Tip Shrouds", as Follows (See List of Items Controlled)*

\* \* \* \* \*

Special Conditions for STA

STA: License Exception STA may not be used to ship commodities in 9B001 to any of the destinations listed in Country Group A:6 (See Supplement No.1 to part 740 of the EAR).

List of Items Controlled

\* \* \* \* \*

Items: \* \* \*

b. Cores or shells (moulds), specially designed for casting, manufactured from refractory metals or ceramics;

c. Directional-solidification or single-crystal additive-manufacturing equipment.

■ 60. In Supplement No. 1 to part 774, ECCN 9B010 is amended by revising the heading to read as follows:

*9B010 Equipment "Specially Designed" for the Production of Items Specified by 9A012*

\* \* \* \* \*

■ 61. In Supplement No. 1 to part 774, ECCN 9D003 is amended by revising the heading to read as follows:

*9D003 "Software" Incorporating "Technology" Specified by ECCN 9E003.h and Used in "FADEC Systems" for Systems Controlled by ECCN 9A001 to 9A003, 9A101 (Except for Items in 9A101.b That Are "Subject to the ITAR", See 22 CFR Part 121), 9A106.d or .e, or 9B (Except for ECCNs 9B604, 9B610, 9B619, 9B990, and 9B991).*

\* \* \* \* \*

■ 62. In Supplement No. 1 to part 774, ECCN 9D004 is amended by revising Items paragraphs c and e to read as follows:

*9D004 Other "Software" as Follows (See List of Items Controlled).*

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: \* \* \*

c. "Software" "specially designed" to control directional solidification or single crystal material growth in equipment specified by 9B001.a or 9B001.c;

\* \* \* \* \*

e. "Software" "specially designed" or modified for the operation of items specified by 9A012;

\* \* \* \* \*

■ 63. In Supplement No. 1 to part 774, ECCN 9D005 is added to the Commerce Control List after ECCN 9D004 to read as follows:

*9D005 "Software" Specially Designed or Modified for the Operation of Items Specified by 9A004.e or 9A004.f. (This "Software" Is Controlled by ECCN 9D515)*

■ 64. In Supplement No. 1 to part 774, ECCN 9E003 is amended by:

- c. Revising the second entry in the table in the License Requirements section;
- d. Revising Items paragraphs a.3 and a.4;
- e. Revising the Note to 9E003.h after Items paragraph h.3;
- f. Redesignating Items paragraph j as paragraph k; and
- g. Adding new Items paragraph j.

The revisions and addition read as follows:

**9E003 Other "Technology" as Follows (See List of Items Controlled).**

License Requirements

\* \* \* \* \*

Control(s)	Country chart (see supp. No. 1 to part 738)
* * * * *	* * * * *

SI applies to 9E003.a.1 through a.8.,h., i., and .k. See § 742.14 of the EAR for additional information.

\* \* \* \* \*

List of Items Controlled

\* \* \* \* \*

Items: a. \* \* \*

a.3. "Parts" or "components," that are any of the following:

a.3.a. Manufactured from organic "composite" materials designed to operate above 588 K (315 °C);

a.3.b. Manufactured from any of the following:

a.3.b.1. Metal "matrix" "composites" reinforced by any of the following:

a.3.b.1.a. Materials controlled by 1C007;

a.3.b.1.b. "Fibrous or filamentary materials" specified by 1C010; or

a.3.b.1.c. Aluminides specified by 1C002.a; or

a.3.b.2. Ceramic "matrix" "composites" specified by 1C007; or

a.3.c. Stators, vanes, blades, tip seals (shrouds), rotating blings, rotating blisks or 'splitter ducts', that are all of the following:

a.3.c.1. Not specified in 9E003.a.3.a;

a.3.c.2. Designed for compressors or fans; and

a.3.c.3. Manufactured from material controlled by 1C010.e with resins controlled by 1C008;

*Technical Note: A 'splitter duct' performs the initial separation of the air-mass flow between the bypass and core sections of the engine.*

a.4. Uncooled turbine blades, vanes or "tip shrouds" designed to operate at a 'gas path temperature' of 1,373 K (1,100 °C) or more;

\* \* \* \* \*

h. \* \* \*

h.3. \* \* \*

*Note: 9E003.h does not apply to technical data related to engine-aircraft integration required by civil aviation authorities of one or more Wassenaar Arrangement Participating States (See Supplement No. 1 to part 743 of the EAR) to be published for general airline use (e.g., installation manuals, operating instructions, instructions for continued airworthiness) or interface functions (e.g., input/output processing, airframe thrust or shaft power demand).*

j. "Technology" "required" for the "development" of wing-folding systems designed for fixed-wing aircraft powered by gas turbine engines.

*N.B.: For "technology" "required" for the "development" of wing-folding systems designed for fixed-wing aircraft specified in USML Category VIII (a), see USML Category VIII (i).*

\* \* \* \* \*

**Supplement No. 5 to Part 774 [AMENDED]**

■ 65. Supplement No. 5 to part 774 is amended by:

■ a. Removing and reserving item No. 2 under the heading "0D521. Software"; and

■ b. Removing item No. 6 under the heading "0E521. Technology".

■ 66. Supplement No. 6 to part 774 is amended by:

■ a. Revising paragraph (2);

■ b. Removing and reserving paragraph (5)(iv); and

■ c. Revising paragraph (9)(ii).

The revisions read as follows:

**Supplement No. 6 to Part 774— Sensitive List**

\* \* \* \* \*

(2) Category 2

(i) 2D001—"Software", other than that controlled by 2D002, specially designed for the "development" or "production" of equipment as follows:

(A) Machine tools for turning (ECCN 2B001.a) having all of the following:

- (1) "Unidirectional positioning repeatability" equal to or less (better) than 1.1 µm along one or more linear axis; and
- (2) Two or more axes which can be coordinated simultaneously for "contouring control";

(B) Machine tools for milling (ECCN 2B001.b) having any of the following:

- (1) Having all of the following:

(a) “Unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis; and

(b) Three linear axes plus one rotary axis which can be coordinated simultaneously for “contouring control”;

(2) Specified by 2B001.b.2.a, 2B001.b.2.b or 2B001.b.2.c and having a “unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis; or

(3) A “unidirectional positioning repeatability” for jig boring machines equal to or less (better) than 1.1 μm along one or more linear axis;

(C) Electrical discharge machines (EDM) controlled under 2B001.d;

(D) Deep-hole-drilling machines controlled under 2B001.f;

(E) “Numerically controlled” or manual machine tools controlled under 2B003.

(ii) 2E001—“Technology” according to the General Technology Note for the “development” of “software” specified by 2D001 described in this Supplement or for the “development” of equipment as follows:

(A) Machine tools for turning (ECCN 2B001.a) having all of the following:

(1) “Unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis; and

(2) Two or more axes which can be coordinated simultaneously for “contouring control”;

(B) Machine tools for milling (ECCN 2B001.b) having any of the following:

(1) Having all of the following:

(a) “Unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis; and

(b) Three linear axes plus one rotary axis which can be coordinated simultaneously for “contouring control”;

(2) Specified by 2B001.b.2.a, 2B001.b.2.b or 2B001.b.2.c and having a “unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis; or

(3) A “unidirectional positioning repeatability” for jig boring machines equal to or less (better) than 1.1 μm along one or more linear axis;

(C) Electrical discharge machines (EDM) controlled under 2B001.d;

(D) Deep-hole-drilling machines controlled under 2B001.f;

(E) “Numerically controlled” or manual machine tools controlled under 2B003.

(iii) 2E002—“Technology” according to the General Technology Note for the “production” of equipment as follows:

(A) Machine tools for turning (ECCN 2B001.a) having all of the following:

(1) “Unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis; and

(2) Two or more axes which can be coordinated simultaneously for “contouring control”;

(B) Machine tools for milling (ECCN 2B001.b) having any of the following:

(1) Having all of the following:

(a) “Unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis; and

(b) Three linear axes plus one rotary axis which can be coordinated simultaneously for “contouring control”;

(2) Specified by 2B001.b.2.a, 2B001.b.2.b or 2B001.b.2.c and having a “unidirectional positioning repeatability” equal to or less (better) than 1.1 μm along one or more linear axis; or

(3) A “unidirectional positioning repeatability” for jig boring machines equal to or less (better) than 1.1 μm along one or more linear axis;

(C) Electrical discharge machines (EDM) controlled under 2B001.d;

(D) Deep-hole-drilling machines controlled under 2B001.f;

(E) “Numerically controlled” or manual machine tools controlled under 2B003.

\* \* \* \* \*

(9) Category 9

\* \* \* \* \*

(ii) 9B001

\* \* \* \* \*

Dated: May 1, 2015.  
**Kevin J. Wolf,**  
*Assistant Secretary for Export Administration.*

[FR Doc. 2015-10579 Filed 5-20-15; 8:45 am]

**BILLING CODE 3510-33-P**