TELEDYNE
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August 9, 2013

Subject: ITAR Amendment – Category XI (Military Electronics); RIN(1400-AD25); Comments on Proposed Rule Changes

Directorate of Defense Trade Controls
U.S. Department of State

Dear Sir,

Teledyne Benthos would like to submit the following comments on the proposed rule changes to ITAR Amendment - Category XI (Military Electronics) for your consideration.

Proposed rule from the Federal Register Vol. 78 No. 143:

§ 121.1 General. The United States Munitions List.
* * * * *
Category XI—Military Electronics
(a) Electronic equipment and systems not included in Category XII of the U.S. Munitions List, as follows:
(1) Underwater hardware, equipment, or systems, as follows:
(i) Active or passive acoustic array sensing systems or acoustic array equipment capable of real-time processing that survey or detect, and also track, localize (i.e., determine range and bearing), classify, or identify surface vessels, submarines, other undersea vehicles, torpedoes, or mines, having any of the following:

Suggested wording for this section:

(i) Active or passive array sensing systems or acoustic array equipment capable of real-time processing that tracks, localizes (i.e., determines range and bearing), or classifies surface vessels as to their military nature or purpose. The term "array" specifically excludes multi-element, phase-based, USBL systems in which the largest spacing among elements is less than one wavelength relative to all frequencies within the operating band

Reason for proposed change in wording:

This regulation, as written, may sweep in all multi-element sensing systems, especially the variety known as Ultra Short Baseline (USBL) systems. This regulation will also preclude the commercial development of collision avoidance systems for unmanned surface and subsurface platforms.

The terms "survey" and "detect" and "identify" and "classify" are undefined and ambiguous terms.

Proposed rule from the Federal Register Vol. 78 No. 143 (cont.):

(iv) Acoustic modems, networks, and communications equipment with realtime adaptive compensation or employing Low Probability of Intercept (LPI); Note to paragraph (a)(1)(iv): Adaptive compensation is the capability of an underwater modem to assess the water conditions to select the best algorithm to receive and transmit data.

Suggested wording for this section:

(iv.1) Acoustic modems, networks, and communications equipment with real-time adaptive modulation. Note to paragraph (a)(1)(iv.1): Adaptive modulation is the capability of an underwater modem to assess the water conditions to select the best algorithm to receive and transmit data.

Reason for proposed change in wording:

Adaptive modulation is a major source of academic R&D in universities around the world, and the USA is far from being a distinct leader in this field. We suggest the restriction is too late, and we recommend that it be dropped entirely. Failing that, we recommend that the regulation have a specific expiration or review date of no more than three years.

The following research institutions are known to be working in this field:

1. Woods Hole Oceanographic Institution (WHOI)
2. State University of New York (Buffalo)
3. University of Padova, Italy
4. University of Rome, Italy
5. Porto University, Portugal
6. National University of Singapore
7. Tokyo University of Marine Science and Technology, Japan
8. Teledyne Benthos, USA
9. Scripps/UCSD
10. University of Victoria
11. University of Kiel, Germany
12. University of Trondheim, Norway
13. University of Washington/APL
14. Naval Post Graduate School, USA

(iv.2) Acoustic modems, networks, and communications equipment employing Low Probability of Intercept (LPI)….

Suggested wording for this section:

(iv.2) Acoustic modems, networks, and communications equipment employing Low Probability of Intercept (LPI) technologies specifically identified as such by the Military.

Reasons for proposed changes in wording:

The rule as written is broad enough to encompass all forms of very low data rate acoustic communications. For example, conventional spread spectrum acoustic communications used for highly robust and interference-tolerant, asynchronous communications will have many aspects of LPD/LPI telemetry. The military has a legitimate need for specially-crafted underwater communications that will not be detectable, but these techniques should be controlled individually and specifically.

We respectfully request your consideration of these suggested changes.

Best Regard,

Dale Green
Chief Scientist
Teledyne Benthos

August 9, 2013

To: DDTCResponseTeam@state,gov
publiccomments@bis.doc.gov

From: waroot23@gmail.com

Subject: Revision of Category XI RIN 1400-AD25; and
Related 600 Series RIN 0694-AF64

Thank you for accepting some of my recommendations concerning the November 28, 2012 proposed rules. This memo contains recommendations to revise the July 25, 2013 proposed rules.

Specially designed in USML proposal

These comments on "specially designed" should not be interpreted as abandoning recommendations re the November 28 State rule to remove from Category XI many other ambiguous words and phrases.

The July 25 proposal retains "specially designed" in 20 of the 22 USML sub-items in which it appeared in the November 28 proposal and adds four more. The July 25 proposal omits the November 28 proposed sub-item XI(a)(12) entirely. The July 25 omission of "specially designed" from XI(c)(1) was not accompanied by my recommendation, repeated now, to add to the control of application specific integrated circuits that the functionality is "a characteristic in the text of a U.S. Munitions List description of a controlled defense article." Without that addition, the specific application could concern a trivial functionality having no connection to the reason for the control of the defense article. Deletion of "specially designed" from, and addition of "a characteristic in the text ..." to, XI(a)(5)(i) re C^4, XI(c)(2) (and the Note to (c)(2)) re PCBs, and XI(c)(3) (and the Note to (c)(3)) re multi-chip modules is recommended for the same reason.

The July 25 proposal recognized my point that the definition of "specially designed" is not applicable to descriptions of what is not controlled. It changed "not specially designed for navigation" in XI(b)(1) to "specially designed for applications other than navigation." But there is no way to determine what applications are, or are not, specially designed for the negative phrase "other than navigation." My recommendation simply to delete "specially designed" from "not specially designed for navigation" is repeated.

Of the other 16 USML continued uses of "specially designed," the following 13 appear to be accompanied by technical language to permit simple deletion of "specially designed": XI(a)(1)(v), (a)(3)(xxix), (a)(4)(iii), (a)(5)(iv), (a)(5)(v), (a)(11), (a)(12), (b)(2), (c)(11)(iii), (c)(12), (c)(13), (c)(15), and (c)(16). This would avoid inadvertent decontrols by findings that the exported product does not meet the definition of "specially designed" even though it meets the technical specifications on the USML.

"Specially designed" should also be simply deleted from the introductory language of XI(b).

This would be preferably accompanied by adding “as follows” to that language and deleting the Note which describes (b)(1), (2), and (3) as “examples” of the scope of this paragraph. Then the technical details in (b)(1), (2), and (3) would suffice. Even if these remained only as examples, “specially designed” in the XI(b) introduction would serve no useful purpose. This is because the remainder of the introduction is so broad that it contains no “controlled performance levels, characteristics, or functions” against which either the exporter or the Government could determine whether they are achieved or exceeded, per the applicable 120.41(a)(1) portion of the definition of “specially designed.”
Two of the remaining three continued uses of “specially designed” are second order parts and components (of DRFM in XI(c)(7) and of antennae XI(c)(9)), which are themselves components per the heading of XI(c). These completely undefined second order components would reasonably be transferred to 3A611.x.

The remaining one is XI(c)(17), for which more technical information is needed to explain what is meant by CODECs and by information assurance and to distinguish this information security item from XIII.b and from ECCN 5A002.

The above is an effort to further one of the main objectives of the Export Control Reform, namely, increase the precision of the USML by replacing inherently ambiguous phrases, such as specially designed, with technical descriptions. However, the April 16 final rule goes in the opposite direction. Under that rule, EAA 17(c) will be implemented by relying on the definition of “specially designed.”All defense articles which are, or might become, FAA certified would have to be modified by specially designed to comply with 17(c). IT IS STRONGLY RECOMMENDED THAT THE APRIL 16 RULE BE REVISED BEFORE IT BECOMES EFFECTIVE ON OCTOBER 15 BY ADDING THE SUBSTANCE OF 17(c) TO THE LIST IN 120.3(c) OF WHAT IS NOT SUBJECT TO DDTC JURISDICTION.

The June 25 proposed rule notes that FAA-regulated radio altimeters and traffic collision avoidance systems are not controlled by XI(a)(3) or XI(c)(10), respectively. This is another approach to implementation of 17(c). But there are many other electronic-related items on the USML which are now, or might become in the future, FAA-certified for civil aircraft.

<u>Missile Technology Control Regime in USML Category XI July 25, 2013 proposal</u>

The April 25 proposal deletes 6 of the 14 USML MT designations proposed on November 28. These were presumably deleted because of finding no applicable MTCR items. The following two of the remaining 8 should be deleted for the same reason: XI(c)(11)(vi) radomes structural integrity and XI(c)(18) classified. All of XI(c)(18), and similar items in other USML Categories, should be deleted. An exporter unaware of security classifications could not comply with such controls. An aware exporter would also know that restrictions based on such classifications are more restrictive than export controls.

The remaining 6 (plus (b)(2, to which MT should be added) are in need of clarification, as follows:

1. Proposed XI(a)(3)(xxix) differs from MTCR 11.A.1 and overlaps VIII(h)(10) (4/16/13

final rule). Recommend that:

6A108.a be revised, as follows, to conform with 11.A.1 and defer to USML:

Radar and laser radar systems, not controlled by USML XI(a)(3)(xxix), including altimeters, not controlled by USML VIII(h)(10), designed or modified for use in rockets or UAVs capable of delivering a "payload" of at least 500 kg to a "range" of at least 300 km

Technical Note: Laser radar systems embody specialized transmission, scanning, receiving and signal processing techniques for utilization of lasers for echo ranging, direction finding and discrimination of targets by location, radial speed and body reflection characteristics.

6A108 Related Controls (2) be deleted.

XI(a)(3)(xxix) be revised to read:

Radar and laser radar systems having characteristics described in texts of U.S. Munitions List Category IV or Category VIII (a)(5), (a)(6), or (a)(13), not controlled by VIII(h)(10) (MT if also described in 6A108.a)

In VIII(h)(10), revise MT portion to read:

(MT if also described in 6A108.a.)

In 6A008, revise MT applies to read

MT applies to 6A008 also described in 6A108

2. Proposed XI(a)(12) differs from MTCR 11.A.2. Recommend that:

7A115 be revised, as follows, to conform with 11.A.2 and defer to USML:

Passive sensors, not controlled by USML XI(a)(12), for determining bearings to specific electromagnetic sources (direction finding equipment) or terrain characteristics, designed or modified for use in rockets or UAVs capable of delivering a "payload" of at least 500 kg to a "range" of at least 300 km

Statement that 7A115 is subject to DDTC export licensing authority be deleted.

In 5A001.e:

after "Radio direction finding equipment" insert ", not controlled by USML XI(a)(12),"; statement in Related Controls that 5A001.e is subject to DDTC export licensing authority be deleted.

XI(a)(12) be revised to read:

Direction finding equipment for determining bearings to specific electromagnetic sources or terrain characteristics designed or modified for use in Category IV(a)(1) or Category VIII(a)(5), (a)(6), or (a)(13) (MT if also described in 7A115) (see also 5A001.e)

3. Proposed XI(b)(2) differs from MTCR 17.A.1. Recommend that:

1A101 be revised to read:

Devices, not controlled by USML XI(b(2), for reduced observables such as radar reflectivity, ultraviolet/infrared signatures and acoustic signatures (i.e. stealth technology), for applications usable for rockets or UAVs with "range" at least 300 km or subsystems described in 9A119.a or .b, 9A116, 9A105.a or .b, 9A107.a or .b, 7A117, 9A106, or weapon or warhead safing, arming, fuzing, and firing mechanisms

1A101 Related Controls be revised to read simply: "See also 1C101."

XI(b)(2) add at end: "(MT if also described in 1A101.)

4. Proposed XI(c)(11)(vii) is identical with MTCR 18.A.3, VIII(h)(22)(vii) (4/16/13 final rule); and 6A103. Recommend that VIII(h)(22)(vii) and 6A103 be deleted.

5. Proposed XI(c)(15) differs from MTCR 11.A.4 and from 3A001.a.2.a. It is recommended that:

XI(c)(15) be revised to read:

Electronic assemblies and components designed or modified for use in rockets, SLVs, missiles, drones, or UAVs capable of a "range" equal to or greater than 300 km and 'specially designed' for military use and operation at temperatures in excess of 125°C (MT).

Note: 'Specially designed' in XI(c)(15) has the MT definition given in 15 CFR 772.1.

Add to 3A001.a.2.a ", not controlled by USML XI(c)(15)"

6. Proposed XI(c)(16) differs from MTCR 16.A.1. It is recommended that:

4A102 be revised to read:

'Specially designed' hybrid (combined analogue/digital) computers, not controlled by USML XI(c)(16), for modelling, simulation or design integration of rockets or UAVs delivering a "payload" of at least 500 kg to a "range" of at least 300 km or the subsystems described in 9A119.a, 9A116, 9A105.a, 9A107.a, 7A117, 9A106, or weapon or warhead safing, arming, fuzing, and firing mechanisms, if supplied with "software" 'specially designed' for modelling, simulation, or design integration of such rockets, UAVs, or subsystems or 9A119.b

Note: 'Specially designed' in 4A102 has the MT definition given in 15 CFR 772.1.

Statement that 4A102 is subject to DDTC export licensing authority be deleted.

MT portion of XI(c)(16) be revised to read:

(MT if also described in 4A102.)

7. Proposed MT portion of XI(d) differs from MTCR 11.D.1, 16.D.1, 11.E.1, 11.E.2, 16.E.1, and 18.E.1. It is recommended that:

MT portion of XI(d) be revised to read:

(MT if “software” specially designed or modified for the “use” of the MT portions of USML XI(a)(3)(xxix), XI(a)(12), or XI(c)(15); “software” supplied with the MT portion of XI(c)(16) ‘specially designed’ for modelling, simulation, or design integration of rockets or UAVs capable of delivering “payloads” of at least 500 kg to “range” of at least 300 km or of subsystems described in 9A119.a or .b, 9A116, 9A105.a or .b, 9A107.a or .b, 7A117, 9A106, or weapon or warhead safing, arming, fuzing, and firing mechanisms; or technology according to the MTCR General Technology Note for the “development”, “production”, or “use” of the MT portions of USML XI(a)(3)(xxix), XI(a)(12), XI(c)(11)(vii), XI(c)(15), or XI(c)(16) (also see 7E102)

Note: ‘Specially designed’ in MT portion of XI(d) has the MT definition given in 15 CFR 772.1.

In 6D001, delete MT applies

(MTCR does not control software for development or production of any part of 6A008 or 6B008. 6D102 covers MTCR 11.D.1 use of 6A108 and portion of 6A008 also described in 6A108 and 1D103 covers MTCR 17.D.1 software for 6B108 and portion of 6B008 also described in 6B108.)

In 6D102, after “Software” insert “, not controlled by USML XI(d),”

7D001 delete MT applies

(MTCR does not control development or production software for CCL Category 7 items.)

In 7D101,

after “7A115" insert “(not controlled by USML XI(d))”; and
delete “7A115" from Related Controls (1)

In 7D103,

after “Software” insert “, not controlled by USML XI(d),”; and
delete parenthetical text re DDTC export licensing authority

7E001 revise MT applies to read:

MT applies to “technology” for items controlled for MT reasons by 7A001 to 7A006, 7A101 to 7A107, 7A115 to 7A117, 7B001 to 7B003, 7B101 to 7B103, 7D002, 7D003, 7D101 to 7D103

In 9D103,

after “Software” insert “, not controlled by USML XI(d),”;
change “missiles” to “rockets or UAVs capable of delivering “payloads” of at least 500 kg to “range” of at least 300 km”;
change “subsystems controlled by 9A005, 9A007, 9A105.a, 9A106, 9A108, 9A116 or 9A119" to “subsystems described in 9A119.a or .b, 9A116, 9A105.a or .b, 9A107.a or .b, 9A106, or weapon or warhead safing, arming, fuzing, and firing mechanisms”; and
delete parenthetical text re DDTC export licensing authority

In 1E101, 1E102, 2E101,3E101, 5E101, 6E101, 7E101, 9E101, 9E102, before “General Technology Note” insert “MTCR”

In 6E101, 7E101, 9E101, 9E102, after “Technology” insert “, not controlled by USML XI(d),”

In 7E101, 9E101, 9E102, delete statement re DDTC export licensing authority from Related Controls

In 9E101, change “development”, “production”, or “use” to “development” or “production”
(9E102 controls “use”.)

<u>Non-MT USML/CCL Overlaps: USML Narrower than CCL</u>

When, as in the following 9 instances, the proposed USML coverage is narrower than the existing CCL coverage, it is recommended that either the proposed USML coverage be deleted or the CCL item or sub-item be revised as follows:
(Deletion should be seriously considered. The ECR envisages transfers from the USML to the CCL, not even partial transfers of CCL items to the USML.)

1. In 5A001.b.1 after “frequency outside the range from 20 kHz to 60 kHz” add “, not controlled by USML XI(a)(1)(v),”
In XI(a)(1)(v), add “(see also 5A001.b.1)”

2. In 6A008.g and 3A611.e, add at end “, not controlled by USML XI(a)(3)(i) or XI(a)(3)(xvii),”
In XI(a)(3)(i) and XI(a)(3)(xvii) add “(see also 6A008.g and 3A611.e)”
(As a U.S. Navy-trained radar officer from 1943 to 1946, I learned that the fundamental purpose of both military and civil radar is as described in XI(a)(3)(i) and 3A611.e. Existing XI(a)(3) is ambiguously limited to radar specifically designed, modified, or configured for military application. Proposed XI(a)(3) is an attempt to replace that ambiguity with more precise technical descriptions. However, the seemingly technical descriptions in proposed XI(a)(3)(i) and 3A611.e cover virtually all airborne and maritime radar. The Note to 3A611.e would unintentionally decontrol much of what 3A611.e would control. A primary purpose of ship-borne radar is traffic control. “Specially designed” in that Note does not effectively narrow the scope of its decontrol. The words “achieve or exceed” in (a)(1) of the definition of “specially designed” logically narrow only controls, not decontrols. The lack of any such Note to XI(a)(3)(i) would not only transfer much of 6A008 and 6A108 to the USML but also transfer from EAR99 to the USML much of what is excluded from 6A008 in technical decontrol Notes.)

3. In 6A008.d after “(SAR)” insert “, not controlled by USML XI(a)(3)(ii),”
In XI(a)(3)(ii) add “(see also 6A008.d)”

4. In 6A008.e add “, not controlled by USML XI(a)(3)(xii),”
In XI(a)(3)(xii) add “(see also 6A008.e)”

5. In 5A002.a.4 add “, not controlled by XI(a)(5)(iv),”
In XI(a)(5)(iv) add “(see also 5A002.a.4)”

6. In 2A984 add “, not controlled by USML XI(a)(10),”
In XI(a)(10) add “(see also 2A984)”

7. In 3A001.e.2 after “capacitors” insert “, not controlled by USML XI(c)(5),”
In XI(c)(5) add “(see also 3A001.e.2)”

8. In 6A001.a.1,b add “, not controlled be USML XI(c)(12)
In XI(c)(12) after “projectors” insert “(see also 6A001.a.1.b)”

9. In 6A001.a.1.c, a.2.a.3.b, and a.2.a.3.c add “not controlled by USML XI(c)(13)
In XI(c)(13) add at end “(see also 6A001.a.1.c, a.2.a.3.b, and a.2.a.3.c)”

<u>Non-MT USML/CCL Overlaps: USML Broader than, or Identical with, CCL</u>

It is recommended that the following two Category XI proposals be deleted, because they would be transfers of complete CCL coverage to the USML. They would thus be unequivocally inconsistent with the principal purpose of the Export Control Reform. If the USML proposals were not deleted, the corresponding CCL coverage would have to be deleted.

1. XI(a)(1)(i)(B) less than 20 kHz broader than 6A001.a.1.b.1 below 10 kHz

2. XI(a)(3)(iii) ISAR same as 6A008.d ISAR

<u>Recommended Changes in CCL Military Electronics July 25, 2013 proposal</u>

In 3A101:
In heading change “other than those controlled by 3A001" to “not controlled by 3A001.a.1.a, a.2.c, or a.5.a, 4A001.a.1 or a.2.a, or 4A003.e”
Revise Related Controls to read “N/A”
In 3A101.a change “missiles” to “rockets or UAVs capable of delivering a “payload” of at least 500 kg to a “range” of at least 300 km”
In 3A101.a.1 change “Specially designed” to Designed
In 3A101.a.2 change “specially designed” to “designed or modified”
In 3A101.a.2.a change microcircuits to “microcircuits” and change radiation hardened to “radiation hardened”
In 3A101.a.2.a.2 after “from” insert “below”
In 3A101.b:

after “accelerators” insert “, not controlled by 7A001 or 7A101,”;
change “systems containing those accelerators” to “equipment containing those accelerators not controlled by 7A003 or 7A103”; and
change “missiles” or the subsystems of “missiles” to
rockets or UAVs capable of a “range” of 300 km; UAVs described in 9A120; or subsystems described in 9A119.a or .b, 9A116, 9A105.a or .b, 9A107.a or .b, 7A117, 9A106, or weapon or warhead safing, arming, fuzing, and firing mechanisms

In 3A001 revise MT applies to read: MT applies to 3A001 also described in 3A101.a

In 4A003 add MT applies to 4A003.e also described in 3A101.a

In 7A101 change “other than those controlled by 7A001" to “not controlled by 7A001 or 3A101.b”

(If it is possible for the same accelerometer to have both 7A101 and 3A101.b characteristics, a different formulation would be required to cover that situation.)

In 7A103 change “other than those controlled by 7A003" to “not controlled by 7A003 or 3A101.b”

(If it is possible for the same equipment containing accelerometers to meet both 7A103 and 3A101.b characteristics, a different formulation would be required to cover that situation.)

In 9A012 MT applies add “or also described in 9A120"

In 3A611 heading, after “Military electronics” insert “not enumerated in either a USML category or another ECCN”
In 3A611.a delete “that are not enumerated in either a USML category or another “600 series” ECCN”

(This applies to all of 3A611, not just 3A611.a.)

In 3A611, 3B611, 3D611, 3E611 Reason for Control:
Revise NS applies to read:
NS applies to entire entry except 3x611.y or other portions of 3x611 not controlled by Wassenaar Munitions List or Wassenaar Dual-Use List

(Pursuant to EAA Section 5(c)(6), NS controls may not apply to unilaterally controlled items unless a proposal is pending to add them to multilateral controls.)

Add “MT applies to portion of 3x611 controlled by MTCR - MT Column 1"

(Eventually, the portions of 3x611 (and other 600 and 500 series ECCNs) which are unilaterally or MTCR-controlled should be identified. However, this is now a moving target. Such precision will have to wait until transfers from all USML Categories to “600" or “500" series ECCNs have become final and other ECCNs have been revised as part of this process. Then it would be possible to prepare spread sheets to show how each remaining USML item and each ECCN corresponds with each MTCR, WML, WDUL, IAEA, AG, and CWC multilateral item and *vice versa*, with remainders being unilateral.)

In 3A611 Related Controls delete parts (1), (2), (4), and (5)

(ITAR, rather than EAR, should define what is controlled by ITAR.

Part (1) is redundant, especially if the above recommendation to put "not enumerated in ... a USML category" in the heading of 3A611 is accepted.

Part (2), if retained, should be revised to change "defense articles" to "a characteristic in the text of a U.S. Munitions List description of a defense article." Without that change, the specific application could concern a trivial functionality having no connection to the reason for the control of the defense article.

Parts (4) and (5), if retained, should similarly be revised to change "is specially designed for defense articles" to "furthers a characteristic in the text of a U.S. Munitions List description of a defense article."

In 3A611 and related ECCNs:

Either delete 3A611.a (and 3A611.x Note 1, 4A611, 5A611, 6A611, 7A611) or

change "specially designed" for military use to either

having a predominant military use; or

having a critical military or intelligence advantage

("Specially designed," as defined in the April 16 Federal Register, makes no sense if used for "end-items" with no description other than "for military use." Paragraph (a)(1) is the portion of that definition applicable to "end-items." This portion requires a determination as to whether or not "controlled performance levels, characteristics, or functions" are achieved or exceeded. "Military use" is not a performance level or a characteristic. The function of "military use" is achieved by any military use. Therefore, under this definition, there is no difference between "specially designed for military use" and just "military use."

Deletion of 3A611.a would be consistent with an early ECR objective to avoid controls based simply on military use.

"Military use" with no further modification is far broader than existing 120.3(a). That excludes from future defense article designations or determinations predominant civil applications. It also excludes performance (form, fit, and function) equivalent to civil applications. "Military use" is also far broader than the new 120.3, becoming effective October 15. That deletes existing 120.3(a) and substitutes "critical military or intelligence advantage" in new 120.3(b). This latter formulation would be in effect when transfers from Category XI to "600 series" ECCNs would become effective. The words "in the future," which modify both formulations, lead to uncertainty as to the permissible extent of existing designations or determinations. However, existing 120.3(a) became part of ITAR so long ago that it predates many designations or determinations since then. Moreover, ITAR has never explicitly controlled anything simply because of military use. Indeed, both existing and revised 120.3 are explicit in stating that the intended military or civilian purpose after export, by itself, is not a factor in determining whether the article or service is subject to ITAR controls.

Numerous USML end-item controls now read "specifically designed or modified (or adapted or configured) for military use (or purposes or applications)." The terms "specifically designed or modified" and its variations have never been defined. However, as in the case of "specially designed," those words would be redundant if the intent was to cover every such military use. Therefore, it is reasonable to conclude that existing 120.3(a) now provides an interpretation of those words when applied to end-items and that revised 120.3(b) would do so after October 15. Use of "in the future" in revised

120.3(b) provides a basis for continued use of existing 120.3(a) to interpret "specifically designed or modified" even after existing 120.3(a) is deleted on October 15.)

In 3A611.a Note after "controlled by" change "a" to "another"

In 3A611.a, 3A611.a Note 1, 3A611.x Note 1, 3B611.a, 3B611.x, and 7A611, change "nor controlled in another "600 series" ECCN" to "nor controlled in another ECCN"; and

in 4A611 and 5A611 after "not enumerated in any USML category" insert " or another ECCN"

(Many existing ECCNs, after years of intense negotiations, have technical descriptions designed to be more precise than "military use" or "specially designed." This progress toward these major objectives of the ECR would be undone in these areas unless this recommendation is accepted.)

Delete 3A611.c and 3A611.d

(There is no publicly available evidence that either MMIC power amplifiers or discrete microwave transistors are now subject to DDTC export licensing authority. They are not now listed in USML Category XI(a) or (b). While XI(a) states that its control is not limited to the list which follows, its control is limited to what is "specifically designed, modified, or configured for military application." The July 25 Supplementary Information statement that 3A611.c and .d have significant military use does not claim that these items were "specifically designed, modified, or configured for military application." The 3A001 Related Controls parts (1) and (2) list many portions of 3A001 which are subject to DDTC licensing authority. These portions do not include 3A001.b.2 MMIC power amplifiers or 3A001.b.3 discrete microwave transistors. In other words, in order for MMIC power amplifiers and discrete microwave transistors to be transferred from the USML to the CCL "600 series," they would first have to be transferred from BIS jurisdiction to DDTC jurisdiction. To the extent that proposed 3A611.c and .d are more restrictive than 3A001.b.2, 3A001.b.3, and 3A982 , such transfer would be from EAR99. The July 25 proposal notes that the United States is proposing that Wassenaar revise 3A001.b.2 so as to be as restrictive as proposed 3A611.c. The 3A001.b.2 revision which became effective on June 20, 2013 did not have that effect. Even assuming Wassenaar did eventually agree to tighten both 3A001.b.2 and b.3 to be as restrictive as proposed 3A611.c and .d, the result would not be an increase in DDTC jurisdiction. Instead, it would expand BIS jurisdiction in 3A001 and there would be no need for 3A611.c or 3A611.d. The basic purpose of the Export Control Reform is to transfer items of lesser significance from the USML to the CCL. Its purpose is not to transfer items from the CCL to the USML and then retransfer them back to "600 series" items. The net effect would be more restrictive controls. Unlike proposed 3A611, 3A001.b.2 and b.3 are controlled only to NS Column 2 countries; b.2 is eligible for License Exception GBS; b.3 is eligible for LVS up to $3,000 to all Group B countries; and both are eligible for STA (c)(2) as well as (c)(1) countries.)

Re 3A611.e, see comments on XI(a)(3)(i) above under the heading "Non-MT USML/CCL Overlaps: USML Narrower than CCL".

In 3A611.f, .g, and .h:

Change "600 series" to "a characteristic in the text of a description of a 600 series ECCN"; and delete "specially designed" from .g and .h.

In 3D611 change "specially designed" to "required" in the heading and in items .a, .b, .y

(For consistency with EAR definition of “required.”)

In 3D611.a change “commodities” to “items” and add “or 3D611"

(To comply with WML 21.a.)

In 3D611 add new .c:

3D611.c “Software” not enumerated in the USML or otherwise enumerated in the CCL performing the military functions of equipment enumerated in USML Category XI or 3A611

(To comply with WML 21.c.)

3E611.a

change “(other than that described in 3E611.b or 3E611.y)” to

“not controlled by 3E611.c or 3E611.y”

Delete 3E611.b

(With the above change in 3E611.a, 3E611.b would be covered by 3E611.a.)

Add new 3E611.c:

“Technology” “required” for the design of, the assembly of components into, and the operation, maintenance, and repair of complete production installations for items specified by the U.S. Munitions List or “600 series” ECCNs, even if the components of such production installations are not specified.

(To comply with WML 22.b.1.)

Future Focus, Inc.™
technical enquiries

PO Box 2547
Woodinville, WA 98072
phone (425) 489-0446
toll free (888) BUG-KILR

Attn: Ms. Candace M. J. Goforth
Office of Defense Trade Controls Policy
U.S. Department of State
PM/DDTC, SA-1, 12th Floor
2401 E Street, NW
Washington, DC 20037
August 20, 2013

Attention: Ms. Candace M. J. Goforth, Dir Office of Defense Trade Controls Policy

Subject: Proposed ITAR Amendment – Category XI and "Equipment"

Dear Ms. Goforth:

The Department of State's proposed revisions to the U.S. Munitions List Category XI b (3) (Federal Register, Vol. 78, No. 143) published on July 25, 2013 requested public comments.

I am pleased to comment on the recently published public notice regarding a change to the ITAR.

We use spectrum analyzers just like the ones described in [Public Notice 8388] Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI.

In this photo the spectrum analyzer I am holding just detected a suspicious signal from a video conferencing device in the headquarters of a well known US company.

We bought the spectrum analyzer 4 or 5 years ago as a used demo unit from Anritsu. It is now obsolete but it we use it regularly for electronic system design and commercial TSCM sweeps.

It has features listed in the notice:
(i) A sweep speed exceeding 250 MHz per second;
(ii) a built-in signal analysis capability;
(iii) a volume of less than 1 cubic foot;
(iv) Record time-domain or frequency-domain digital signals other than single trace spectral snapshots; and;
(v) display time-vs-frequency domain

Weapon?

The spectrum analyzer in the picture above is a plain vanilla measurement device that would be included in the ITAR list. Anyone trying to use this device for intelligence gathering or for defeating intelligence methods would be very, very disappointed.

The basic problem here is that the 5 spectrum analyzer characteristics listed in the public notice are so vague that they really don't define what should be controlled. If properly written this portion of the proposed ITAR revision could be effective.

My background allows me to understand these issues it includes:

- President, Future Focus, a provider of engineering and technical services
- Commander, USNR, retired
- Professional Engineer licensed WA, OR, CA, MN
- PhD, Electrical Engineering, University of Washington
- Life Fellow, International Society for Optical Engineering
- Senior Member, Institute of Electrical and Electronic Engineers
- Certifications related to technology and security: CPP, CISSP, GSEC, GPen, GCIH

If this portion of the proposed ITAR is accepted it will have substantial effects including:

- Listing of clunker spectrum analyzers like we use causing pain but having no benefit
- Creating a big mess by not clearly defining what should be listed (or not listed)
- Decreasing business capability to use common spectrum analyzers in the US where a foreign national might touch them
- Preventing US based TSCM firms from being competitive internationally
- **Decreasing US security by distracting enforcement from really important items**

Gordon Mitchell, PhD
President

G Mitchell

Digitally signed by G Mitchell
DN: o=VeriSign, Inc., ou=VeriSign Trust Network, ou=www.verisign.com/repository/RPA Incorp. by Ref.,LIAB.LTD(c)98, ou=Persona Not Validated, ou=Digital ID Class 1 - Netscape Full Service, cn=G Mitchell, email=gmit@esleuth.com
Date: 2013.08.20 10:37:10 -07'00'

MICROSEARCH
TECHNICAL
SURVEILLANCE
COUNTERMEASURES

August 26, 2013

Ms. Candace M. J. Goforth
Director, Office of Defense Trade Controls Policy
United States Department of State
PM/DDTC, SA-1, 12th Floor
2401 East Street, NW
Washington, DC 20037

Dear Ms. Goforth:

I am writing in response to the proposed revisions (published July 25, 2013) to the U.S. Department of State's U.S. Munitions List Category XI b (3) (Federal Register, Vol. 78, No. 143). The published revisions requested public comment, and as a U.S. Company located in Seal Beach, California, Microsearch offers the following comments specific to the proposed rules for spectrum analyzers.

The relevant proposed text below is for your reference:

> XI b (3) Technical surveillance countermeasure (TSCM) or electronic surveillance equipment and counter electronic surveillance equipment (including spectrum analyzers) for the RF/microwave spectrum that:
>
> (i) Sweep or scan speed exceeding 250 MHz per second;
> (ii) Have built-in signal analysis capability;
> (iii) Have a volume of less than 1 cubic foot;
> (iv) Record time-domain or frequency-domain digital signals other than single trace spectral snapshots; and
> (v) Display time-vs.-frequency domain (e.g., waterfall or rising raster).

Microsearch has been providing TSCM services to private individuals, corporations, and government officials since 1995. The majority of the private individuals for whom we provide the service are high net worth people who maintain intellectual property in their homes, or are concerned about paparazzi. Corporate clients range from small startup companies to *Fortune* 100 corporations. Many of the corporations we work with are defense department contractors. We have worked for the governor of a state, the Speaker of the House at the state level, several U.S. Congressmen, police chiefs, mayors, and candidates running for election. I have been involved with the leadership of ASIS International, the largest private security organization in the world. The corporate directors of security I have interacted with are all aware of the value of regular TSCM surveys.

Economists estimate that two thirds of a company's value is made up of intellectual property. In addition to patents, trademarks, and copyrights, intellectual property such as customer lists, sales and marketing strategies, and good will are valuable assets. The Economic Espionage Act

of 1996 requires businesses to take measures to protect their intellectual property in order to prosecute cases of intellectual property theft.

In the May 11, 2012 edition of the *Wall Street Journal*, Frank Figliuzzi, the FBI's assistant director for counterintelligence, said "The FBI estimates that companies have suffered more than $13 billion in economic losses in cases opened in fiscal 2012, which began in October. The economic-loss figures include the estimated future market value of stolen trade secrets." Most companies take precautions to avoid losses from espionage, including regular TSCM surveys. Imagine the financial losses if counter-espionage measures were not in place. The negative impact on the U.S. economy would be substantial. The need for counter espionage programs, including TSCM surveys, extends to the foreign facilities of U.S. owned businesses.

A high quality hand held spectrum analyzer is an essential tool used in TSCM surveys. Our hand held spectrum analyzer was the primary instrument used during our most recent discovery of an eavesdropping transmitter.

I oppose the implementation of regulations that would instantly make widely available spectrum analyzers for commercial use into strictly military items. A spectrum analyzer poses no threat to national security, and they can be obtained from foreign as well as domestic manufacturers. Spectrum analyzers have wide commercial use in a variety of industries and hobbies. Many Ham Radio operators, for example, use spectrum analyzers to tune their transmitters. And finally, I am concerned that the equipment I have been using for years in a commercial application may now be controlled as military weapon/government intelligence tool.

I would like to know why the U.S. Government is trying to restrict U.S. spectrum analyzer technology. There are foreign made, easily obtainable, hand-held spectrum analyzers and software products for commercial use that meet and exceed the proposed specifications. Some examples of foreign products are: Rhode & Schwarz, Winkelmann, Shearwater, Kestral, Audiotel, and Kassandra. Restricting U.S. products may hurt the ability of U.S. corporate offices to protect intellectual property in foreign countries from corporate espionage from competitors and foreign state sponsored spies. The proposed restrictions will damage the U.S. security industry by creating an unfair advantage for foreign competition for spectrum analyzer products and will ship more jobs overseas.

Very truly yours,

R.C. Hofmann, President

ATTN:Ms. Candace M. J. Goforth, Dir Office of Defense Trade Controls Policy

Office of Defense Trade Controls Policy
U.S. Department of State
PM/DDTC, SA-1, 12th Floor
2401 E Street, NW
Washington, DC 20037

RE: ITAR Amendment – Category XI and "Equipment"

Dear Ms. Candace Goforth,

This letter is in response to the U.S. Department of State's published proposed revisions to United States Munitions List Category XI b (3) (Federal Register, Vol. 78, No. 143) on July 25, 2013, and the request for public comments from interested parties. The Espionage Research Institute International (ERII) is a U.S. organization located in Virginia Beach, Virginia. Please see the following comments regarding the proposed rules on spectrum analyzers.

Reference the relevant proposed text below:

> *XI b (3) Technical surveillance countermeasure (TSCM) or electronic surveillance equipment and counter electronic surveillance equipment (including spectrum analyzers) for the RF/microwave spectrum that:*
>
> *(i) Sweep or scan speed exceeding 250 MHz per second;*
> *(ii) Have built-in signal analysis capability;*
> *(iii) Have a volume of less than 1 cubic foot;*
> *(iv) Record time-domain or frequency-domain digital signals other than single trace spectral snapshots; and*
> *(v) Display time-vs.-frequency domain (e.g., waterfall or rising raster).*

As it is written, the proposed new regulation would be catastrophic to our commercial industry as it appears to basically capture practically all hand-held spectrum analyzers as ITAR restricted items.

Our organization, The Espionage Research Institute International, consists of an international membership of former Counterintelligence, Counterespionage, Cyber and Technical Surveillance Counter Measures (TSCM) practitioners both in and outside the United States. It was founded in 1995, as an Institute and Think Tank with the purpose of:

1) Combating industrial espionage to protect U.S. assets both CONUS and OCONUS.
2) To keep its membership on the cutting edge of training and knowledge in the identification of eavesdropping devices, espionage detection methods and the

intelligence collection tactics most often employed by domestic and foreign perpetrators of electronic espionage.

It is here that I must stress in our collective experience that U.S. entities and corporations both at home and abroad that do not practice a pre-emptive counterespionage strategy by incorporating scheduled Counter Surveillance / TSCM "Sweeps", suffer greatly the consequences of economic and industrial espionage. This is an undeniable fact, as The Office of The National Counterintelligence Executive has reported to congress every year since 1995.
Link: http://www.ncix.gov/publications/reports/fecie_all/
Furthermore, the FBI has well documented the need and concern for industrial espionage. Link: http://www.fbi.gov/about-us/investigate/counterintelligence/intellectual-property-protection

And, in this era of "Cyber Security" and hacking incidents on a daily basis, it is important to note that Technical Surveillance Counter Measures (TSCM) and Cyber Countermeasures, are very much dependent upon one another. As is referenced by the relatively new area of "Cyber TSCM", *all* data lives in the physical realm prior to its delivery to the cyber realm. Thus, the need for these collective skill sets.

Therefore, it is imperative that the need for the correct "tools" i.e.: US commercial hand held spectrum analyzers and software products not be classified as restricted and added to ITAR as a restricted military or defense only item. If this were allowed to go forward, U.S. corporations and assets abroad would *severely* pay the price, as USA TSCM and Cyber TSCM service providers would be prohibited to travel OCONUS to protect USA corporate assets. A spectrum analyzer is a *vital tool* to a TSCM or Cyber TSCM practitioner.

Restricting the availability of hand held spectrum analyzers, and the ability to travel with this tool when needed, would be like restricting US companies abroad from using computer *antivirus* programs or *firewalls* to protect their intellectual property. Not to mention the monetary consequences of this decision would be economically catastrophic to US assets abroad.

In a sense, it would have the same effect as completely eliminating the ability to protect US corporate and industrial assets abroad. Not to mention the nightmare of trying to enforce the addition of a handheld spectrum analyzer to the ITAR. This vital TSCM equipment has many commercial applications and is readily available worldwide. The lack of any clear technical definition as to why US handheld commercially manufactured spectrum analyzers should be considered a Mil/Defense item would cause an unnecessary burden to all entities involved.

As the Director of our trade organization, I speak for over 100 companies consisting of active counterintelligence, cyber and TSCM practitioners whose purpose is to protect US economic assets from Industrial Espionage, and I ask you to please reconsider your proposed addition of the inclusion of commercially available hand held spectrum analyzers to the ITAR.

Respectfully,

J.D. LeaSure
Director

Espionage Research Institute International

September 6, 2013

Sent via email to: DDTCResponseTeam@state.gov

Directorate of Defense Trade Controls
Office of Defense Trade Controls Policy
Sarah J. Heidema, Acting Director, Phone (202) 663–2809
ATTN: Regulatory Change, USML Category XI
U.S. Department of State
Washington, DC 20522-0112

RE: RIN 1400-AD25 (Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI)

Dear Sir or Madam:

Test Equipment Plus, a manufacturer of spectrum analyzers, is pleased to have the opportunity to provide additional feedback on the Administration's proposed language changes of USML Category XI (military electronics). These comments are limited to the proposed control for USML Cat XI(b) and (c) generally and entry XI(b)(3) in particular, as follows:

The combination of, the existing 4-1-13 edition of USML Cat XI(b) and (c) catch-all language, and the new ITAR 120.41 "Specially Designed" definition published in 78FR22754, makes it clear that the BB124A spectrum analyzer, which Test Equipment Plus is currently developing, is not subject to ITAR control because of its intelligence gathering capability. The BB124A will have a rising raster display, 24GHz/second sweep speed, 20MHz instantaneous bandwidth, less than 1 cu ft volume, ±50ns time-stamping of streaming RF data, RF recording to a PC at a sustained rate of 140MB/second, and be designed for civil applications.

However, because of proposed changes in language found in the USML Cat XI(b)(3)(ii), (c), and (c)(14) paragraphs dated July 25, 2013 and published in the Federal Register 78FR45018, I am forced to submit a CJ for the BB124A spectrum analyzer that I am currently developing for civil use. The BB124A meets all the criteria in Cat XI(b)(3), only because Cat XI(b)(3)(ii) "a built-in signal analysis capability" is not defined. A clear definition of "built-in signal analysis capability" is desperately needed.

I believe that DDTC intends to control "built-in signal analysis capability" such as: 1) detection and analysis of Low Probability of Intercept signals; 2) determining signal polarization; 3) performing signature reduction analysis of stealth technology, 4) and signal classification. The BB124A can do none of these analysis functions, but in the absence of a definition for "built-in signal analysis capability", I now have to submit a CJ.

The existing 4-1-13 edition of USML Cat XI(c) catch-all language only applies to components, parts, accessories, attachments, and associated equipment specifically designed or modified for use with the equipment in paragraphs (a) and (b) of this category, except for such items as are in normal commercial use, making this paragraph of no consequence to the BB124A design. Because the proposed changes in language found in the USML Cat XI paragraph (c), dated July 25, 2013, no longer reference that they are only applicable to items intended for use with paragraph (a) or (b) commodities, it causes paragraph

(c)(14) to become a concern. This eliminates the possibility of upgrading the BB124A design to a 30MHz instantaneous bandwidth without being ITAR controlled.

XI(c)(14)Tuners having all of the following:
(i) An instantaneous bandwidth of 30 MHz or greater; and
(ii) A tuning speed of 300 microseconds or less to within 10 KHz of desired frequency;

I am contemplating this upgrade of the BB124A design so that it can serve as standard test equipment for civil satellite signals. This would be impractical because of ITAR control being imposed through the proposed paragraph (c)(14). If the proposed language of paragraph (c)(14) is intended to capture any device containing a "tuner" then the proposed control criteria seems inconsistent with those specified under the Commerce Control List's revised Export Control Classification Number 3A002(c)(4).

- *3A002(c)(4) "Signal analyzers" having all of the following:*
  - *c.4.a. "Real-time bandwidth" exceeding 85 MHz; and*
  - *c.4.b. 100% probability of discovery with less than a 3 dB reduction from full amplitude due to gaps or windowing effects of signals having a duration of 15 µs or less;*

One solution would be to not adopt the proposed language for the USML Cat XI(c) catch-all paragraph, leaving it as written in the existing 4-1-13 edition of USML Cat XI(c) catch-all language. This would have the effect of the ITAR "Tuner" controls only being applied when "Tuners" are components, parts, accessories, attachments, and associated equipment specifically designed or modified for use with the equipment in Cat XI(a) and (b).

Finally, I believe that our suggested modifications would result in a control that accomplishes what DDTC seeks to achieve and we urge DDTC to consider them seriously.

Thank you once again for the opportunity to provide comments on this proposed rule. We would be pleased to discuss any of this with DDTC.

Sincerely,

Bruce C Devine
CEO, Test Equipment Plus

GARMIN.
Garmin International, Inc.
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VIA Email: DDTCResponseTeam@state.gov

September 6, 2013

U.S. Department of State
Bureau of Political – Military Affairs
Directorate of Defense Trade Controls
2401 E Streets, N.W.
12th Floor, S A – 1
Washington, DC 20522

Attn: Ms. Sarah Heidema, Acting Director, Office of Defense Trade Controls Policy, Department of State.

Regarding Notice of Proposed Rulemaking, ITAR Category XI

Dear Ms. Heidema:

I. Introduction

Garmin international, Inc. ("Garmin") appreciates the opportunity to comment on the radar provisions of the State Department's proposed revisions to Category XI of the United States Munitions List ("USML") as part of the Administration's Export Control Reform Initiative. 78 Fed. Reg. 45018 (hereafter "Proposed Cat. XI").

Garmin respectfully submits that Proposed Cat. XI(a)(3)(xii) as written over-controls weather radar by including commercial weather radar that lacks the functionality of military radar (the latter of which we agree should remain controlled). Proposed Cat. XI(a)(3)(xii) will inhibit innovation and the development of radar that will improve detection of severe weather and provide a leap forward in passenger air safety. These comments recommend specific criteria to exclude commercial weather radar units from the USML. These recommended criteria are taken from performance criteria already in Proposed Cat. XI for major components. None of the performance criteria are taken from classified information or are derived from experience in making radar with military functionality. Weather radar with only weather functionality should be excluded from the USML.

Additionally, Garmin believes very strongly that this proposed rule as written will be inconsistent with the spirit of Executive Orders 12866 and 13563. The proposed rule will be a detriment to the public health and safety, as electronically steerable commercial weather radar can increase public safety without compromising national security.

These comments will:

1. Introduce Garmin and the GWX 7000.
2. Explain how the major goal of the Administration is not met through the Proposed Cat. XI.
3. Propose specific performance criteria to exclude certain weather radar from the scope of Proposed Cat. XI(a)(3)(xii) (”weather radar”).
4. Describe how civil weather radar cannot perform military functions.
5. Summarize the large commercial aviation market that exists for electronically steered airborne weather radar.
6. Describe the policy and regulatory reasons Proposed Cat. XI(a)(3)(xii) should be modified by performance criteria to avoid the over-control of commercial weather radar that has no practical military capability.

II. Background of Garmin

A. Company

Garmin is a global leader in the design and manufacture of a broad array of communication and navigation devices for various applications, including automotive, aviation, marine, fitness, outdoor recreation, and personal wireless communication. The company’s U.S. headquarters, principal R&D facility and avionics products factory are in Olathe, Kansas.

Garmin designs, develops, manufactures and markets a diverse family of hand-held, portable and fixed-mount GPS-enabled products and other navigation, communications and information products for the automotive/mobile, outdoor, fitness, marine, and general civil aviation markets. Although widely known for its automobile GPS units, Garmin’s expertise extends to other specialized product categories, namely avionics for a broad array of aircraft and pilots. Indeed, avionics was a pioneer product category for Garmin and the company used its expertise in that area as a foundation for developing products for other applications.

Garmin’s aviation product line includes GPS-enabled navigation, weather radar, VHF communications transmitters/receivers, multi-function displays, electronic flight instrumentation systems (“EFIS”), automatic flight control systems, traffic advisory systems and traffic collision avoidance systems, terrain awareness and warning systems, instrument landing systems (“ILS”), wireless datalinks, and other product categories.

B. GWX 7000

The GWX 7000 weather radar that has been under development is designed to be integrated into a Garmin suite such as the G1000 and G5000 glass cockpit for civil aircraft.[1] The avionics

[1] A glass cockpit is an aircraft cockpit that features electronic instrument displays (“glass”). Where a traditional cockpit relies on numerous mechanical gauges to display information, a glass cockpit uses several displays driven by flight management systems that can be adjusted to display flight information as

cockpit panel is used by consumers for directional navigation in aviation applications. Weather radar aids in navigation to avoid bad weather. Weather radar is standard civil aviation equipment and required in all FAR Part 25 aircraft carrying passengers as required by FAA Regulation 14 CFR Part 135, §135.175. The GWX 7000 is based upon technology prevalent in the cell-phone industry. It was developed from inception as civil radar and is not derived from any other electronically steered radar. It should be stressed that techniques such as monopulse and null steering are not designed into the GWX 7000.

Today, an electronically steered weather radar could be developed from existing publicly available technology and commercially available civil components. Currently, civil aircraft rely on mechanically steerable radar that is prone to breakdown (e.g., mechanical failure of the moving components, gears, bearings, motor, etc.). In addition to increased reliability and safety, electronically steered weather radar contains no antenna mass to be moved from one position to another. This allows electronically steered weather radar to rapidly reposition the antenna beam, a significant performance benefit over a mechanically operated one. Although performing the same functions as mechanically steerable radar, the weather data provided to the pilot from electronically steerable radar is more current than that provided by mechanically steered weather radar. Simply put, this innovative civil weather radar moves from the old, less reliable mechanical system to electronically steerable technology that will drastically improve reliability, dependability, and pilot and passenger safety. Benefits include:

- **Rapid Steering:** Allows for more complete volume scans, increasing situational awareness through rapid beam scanning and agility.
- **Reliability:** Increased reliability through no moving parts.
- **Size:** Lacking a mechanically steered antenna, the GWX 7000 will only utilize a portion of the radome occupied by currently available weather radars, allowing a smaller lighter civil aircraft to incorporate larger antenna sizes, improving resolution of the weather radar.
- **Support of Search and Rescue, Firefighting, and Medevac:** Many commercially available weather radars also perform additional functionality such as search and rescue. As noted later, an electronically steerable radar can interleave this functionality, in real time, with many additional weather functions, providing safety to the crew in terms of weather analysis while performing a search and rescue function.

III. Proposed Category XI Improperly Captures Commercial Weather Radar

Proposed Cat. XI improperly captures commercial electronically steerable weather radar and should be revised to exclude such items. Specifically, Proposed Cat. XI(a)(3)(xii) covers the following: “Radar incorporating pulsed operation with electronics [sic] steering of transmit beam in elevation and azimuth.” Garmin’s GWX 7000 weather radar meets these criteria although it was developed exclusively for commercial aviation weather radar uses.

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needed. The Garmin G5000 is an all-glass avionics suite designed for OEM or custom retrofit installation on a wide range of business aircraft. See Attachment A.

Absent the revision contemplated in Proposed Cat. XI(a)(3)(xii), GWX 7000 would be subject to the Export Administration Regulations ("EAR"), controlled under ECCN 6A998.

The polestar of President Barack Obama's export control reform ("ECR") initiative is not to capture commercial items in the ITAR. President Obama stated in his August 31, 2010 speech to the audience of BIS Update that ECR is intended to "allow us to build higher walls around the export of our most sensitive items while allowing the export of less critical ones under less restrictive conditions."[2] Then-Secretary of Defense Gates stated in his 2010 "Charter Speech" on export control reform that the principal aim of ECR is that "higher walls are placed around fewer, more critical items."[3] Similarly, Secretary of Commerce Pritzker stated that ECR is "focusing on technologies that pose the greatest risk, while permitting more exports of items that pose less or no risk."[4] Under Secretary of Commerce Hirschhorn stated that, "[w]ith any regulatory reform effort as large as this, small mistakes and unintended consequences are inevitable. You [the regulated community] can help by pointing out any seemingly odd results from your application of the regulations in the day-to-day business of exporting."[5]

In recognition of this imperative, the Federal Register notice publishing Proposed Cat. XI states that, "[i]n light of the revised regulation, the Department requests that those who still believe it captures commercial articles to provide specific examples of such articles that would be covered by model or nomenclature, rather than the general comment that the regulation would capture commercial articles."[6]

Garmin's GWX 7000 weather radar will be such a commercial item, as explained in these comments. It was developed exclusively for commercial aviation weather radar application, without military know-how, involvement, and with no government funding.

It is nevertheless important to note that certain commercial items will remain on the USML where they confer critical military advantages. Under Secretary Hirschhorn stated that the goal of ECR is "to revise the U.S. Munitions List so that its categories are more specific and list only those defense articles that are critical to maintaining a military or intelligence advantage or that otherwise warrant the types of controls in the ITAR."[7]

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[2] President Barack Obama, video remarks to BIS Update August 31, 2010, available at http://www.whitehouse.gov/the-press-office/2010/08/30/video-remarks-president-department-commerce-annual-export-controls-updat.

[3] Secretary of Defense Robert Gates, speech to Business Executives for National Security April 20, 2010, available at http://www.defense.gov/speeches/speech.aspx?speechid=1453.

[4] Secretary of Commerce Penny Pritzger, speech to BIS Update July 23, 2013 available at http://www.commerce.gov/news/secretary-speeches/2013/07/23/remarks-2013-update-conference-export-controls-and-policy.

[5] Under Secretary of Commerce Eric Hirschhorn, speech to BIS Update July 23, 2013, available at http://www.bis.doc.gov/index.php/policy-guidance/deemed-exports/guidelines-for-foreign-national-license-applications/103-about-bis/newsroom/speeches/speeches-2013/568-remarks-of-under-secretary-eric-l-hirschhorn-as-prepared-for-delivery-at-the-bis-update-conference-july-23-2013.

[6] 78 Fed. Reg. 45017, 45019 (July 25, 2013) available at http://www.gpo.gov/fdsys/pkg/FR-2013-07-25/html/2013-17556.htm.

[7] Under Secretary of Commerce Eric Hirschhorn, speech to BIS Update July 23, 2013, available at http://www.bis.doc.gov/index.php/policy-guidance/deemed-exports/guidelines-for-foreign-national-license-

As noted *infra* in Section V, the Garmin GWX 7000 does not confer a military advantage because it does not perform a military function. As noted *infra* in Section IV, simple performance characteristics can be added to the description in Proposed Cat. XI(a)(3)(xii) to maintain USML control on electronically steerable phased array radar that confers a military advantage.

IV. Specific Performance Criteria Proposed that Exclude Certain Commercial Weather Radar from the Scope of Proposed Cat. XI(a)(3)(xii)

Garmin proposes that the Directorate of Defense Trade Controls ("DDTC") add the following exclusion note to Proposed Cat. XI(a)(3)(xii):

> XI(a)(3)(xii) does not apply to airborne radar that meets each of the following:
>
> 1. Does not incorporate a beam solid angle controlled under Category XI(a)(3)(x);
> 2. Does not incorporate T/R[8] modules controlled under Category XI(c)(4);
> 3. Does not incorporate an antenna controlled under Category XI(c)(10);
> 4. Operates with T/R modules with a maximum peak power of 1 Watt per module;
> 5. Operates only within the following frequency bands:
> a. S Band: 2.7 – 2.9 GHz
> b. C Band: 5.35 – 5.47 GHz
> c. X Band: 9.3 – 9.5 GHz
> d. Ku Band: 15.5 – 15.7 GHz;
> 6. Operates with an average transmit power less than or equal to 250 Watts,
> 7. Does not operate with a null steer beam; and
> 8. Achieves an FAA certification authorization or will achieve an FAA certification authorization prior to use as standard weather radar for civil aircraft.

Garmin engineers developed these proposed performance criteria from published sources without any access to classified information, classified technology, classified performance standards, or classified contracts. See Section VII.F below for additional details.

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applications/103-about-bis/newsroom/speeches/speeches-2013/568-remarks-of-under-secretary-eric-l-hirschhorn-as-prepared-for-delivery-at-the-bis-update-conference-july-23-2013.

[8] Transmit/Receive

V. Phased Array Civil Weather Radar Cannot Perform Military Functions

This section attempts to anticipate the military functions of military electronically steered radar and describes the limitations of commercial weather radar that prevent the commercial radar from performing each military function. We also explain the relevant control parameters suggested in Section IV above that define performance criteria in order to exclude electronically steered civil weather radar from Proposed Cat. XI of the USML while not excluding electronically steered radar that performs a military function. This information is presented in the form of the chart below that describes commercial weather radar's ineffectiveness for military applications such as we have anticipated, and suggests limitations to assure such weather radar's ineffectiveness for those military applications.

Military Functionality Not Achievable with GWX 7000	GWX 7000 Weather Radar Limitations for Military Function	Suggested Control Parameter(s)
All Weather Performance Radar effective in all weather conditions.	**Water most reflective at 9.4 GHz.** Our radar is least attractive for military; most attractive for weather/water detection. *(Cannot see missiles or aircraft behind clouds with precipitation causing shadows)*	Limit occupied frequency range.
Stealth Performance Ability to avoid detection of the radar.(remain "invisible")	**Narrow frequency of operation precludes ability to "hide" by hopping around in frequency.**	Limit occupied frequency range.
First Look Ability *See someone else before they see you.*	**Low peak and average power** Cannot detect small targets at long range.	Limit peak and/or average power.
Target Classification Characterizing target, including as friend or foe.	**Inadequate range resolution.** *Range resolution inversely proportional to frequency bandwidth. The GWX 7000 cannot resolve features necessary to characterize targets.*	Limit occupied frequency range.
First Shoot Ability See someone else first (First Look) and characterize that 'target'.	**Does not have "First Look" ability** and ineffective "Target Classification". Narrow bandwidth limits resolution.	Limit occupied frequency range, and peak and/or average power.
First Kill Ability First Shoot Ability and ability to deliver ordnance.	**Does not have First Shoot Ability** or null steering ability. Lack of a steerable null precludes ability to have a missile "ride" the radar beam to the target.	Limit occupied frequency range, peak and/or average power, and null steering.
Electronic Warfare – Jamming.	**Frequency band** is <8% of just X band, so ineffective for jamming.	Limit occupied frequency range.

In addition, commercial weather radar cannot measure the true velocity of the missile or aircraft moving towards or perpendicular to its path. A missile or aircraft moving directly at the commercial weather radar has a maximum discernible velocity of +/-165 mph. Depending on the speed of approach, a missile or plane could appear to be **moving backwards** *(similar to the "stroboscopic" effect of a hubcap appearing to rotate backwards when moving forward at speed)*, moving at a very **slow speed**, or **standing still**. A missile or aircraft moving cross

track/perpendicular at any range appears to have a Doppler velocity of 0 knots (i.e., to be standing still). None of the outcomes listed above would make for an effective military radar system, which is why we believe that, historically, civil meteorological radar has been excluded from the munitions list as well as licensing controls under the EAR.

VI. A Substantial Civil Aviation Market Exists for Electronically Steered Airborne Weather Radar

A strong business rationale exists to support the development of electronically steered weather radar. Commercial airlines and operators of business and general aircraft will benefit greatly from the development of a civilian electronically steered weather radar. It will provide greater reliability and ease of maintenance when compared to mechanically steered weather radar and will provide a substantial leap forward in passenger air safety over mechanically steered weather radar. For reasons of air passenger safety, greater reliability, and ease of maintenance, several OEMs of civil general aviation aircraft have expressed a strong desire to install the GWX 7000 in their aircraft. On the left side of Attachment B is an illustration of a 3D graphic representation of a forward-looking image a pilot would see with an electronically steered radar. On the right side of this image is a typical image a pilot now sees from mechanically steered radar.

We estimate the current annual market for weather radar for use in civil passenger aircraft is on the order of 2,000 aircraft annually for which electronically steered weather radar technology is financially viable. However, we assess that aircraft manufacturers and their customers, including airlines, will not adopt electronically steered weather radar made in the United States if the State Department makes it subject to the ITAR. The history of ITAR controls points to this substantial risk, in which case U.S. developers will likely be forced to stop their domestic development programs for such weather radar.

VII. Policy And Regulatory Reasons Proposed Cat. XI(A)(3)(Xii) Should Be Modified By Performance Criteria To Avoid Over-Control

A. Major components and features of electronically steered weather radar (i.e., T/R modules, antenna, and transmission beam performance) are not captured by Proposed Cat. XI

The performance criteria in Proposed Cat. XI do not capture the major components of electronically steerable weather radar. Within GWX 7000, the T/R module is not captured by Cat. XI(c)(4); the antenna is not captured by Cat. XI(c)(10); the performance of the transmission beam is not captured by Cat. XI(a)(3)(x). Furthermore, the technical data used to integrate the major components of weather radar are publicly available.[9] Additional public domain information is available in a published patent for a weather radar at Patent Number US 8,098,207 B1 dated January 17, 2012.

[9] Phased Array Antenna Handbook, Second Edition, Robert J. Mailloux, Artech House, copyright 2005, page 45.

If Proposed Cat. XI became final, then the USML would incentivize parties to develop electronically steerable weather radar outside of the United States, as stated above, and avoid US-based competition. This would damage the industrial base of the United States. Foreign firms would quickly fill the electronically steerable weather radar gap.

B. Electronically steerable weather radar significantly increases passenger air safety

Electronically steered weather radar significantly improves air safety for passengers in commercial and general aviation aircraft in several ways. Firstly, it removes the single most failure-prone component from existing radars – the mechanical motors. Increased reliability of the radar improves safety by increasing the probability that the radar will be functional when needed in flight. Secondly, an electronically steered radar can move the beam from any one point in the scan volume to another nearly instantaneously (much more quickly than a mechanically steered system) and is not constrained to repositioning the beam to a location adjacent to the current one. This allows the weather radar to interleave in time multiple functions, such as weather detection, turbulence detection, and windshear detection, providing the most current weather data. Furthermore, the rapid data collection and functional interleaving capabilities of an electronically steered weather radar do not require that certain functions be given priority (like windshear) over other functions during certain phases of flight due to increased criticality and the time needed to reposition the beam. Instead, electronically steered weather radar allows all weather radar-gathering tasks to be done practically simultaneously, providing the pilot with the greatest level of information to make decisions about weather threats, thus improving passenger safety. Finally, the rapid repositionability of the antenna beam can allow for increased *automatic* modes, which are currently not feasible in a mechanically repositionable antenna. This rapid repositioning in electronically steered weather radar can allow higher levels of radar signal processing, which can reduce nuisance alerts and improve weather threat analysis. This reduces pilot workload and potential pilot fatigue by providing only the information the pilot needs.

For these reasons, Garmin believes innovative electronically steered weather radar could have prevented the loss of Air France 447 and the 228 souls on board. Of the aforementioned advantages of electronically steerable radar, the ability to have automatically analyzed the critical parts of the storm more accurately through rapid beam steering in both azimuth and elevation could have detected and characterized the threat earlier, giving the crew more time to respond. The weather emergency faced by Air France 447 was thoughtfully described in a PBS show. It is that challenge Garmin seeks to overcome with the GWX 7000 electronically steered weather radar.[10]

C. The spirit of Executive Orders compels the export control agencies to consider the public safety implications of their proposed regulations

We understand that U.S. government agencies involved in the review of Proposed Cat. XI may not have been aware of, and may not have considered, the safety benefits to the flying public accruing from the development and use of commercial electronically steered weather radar. Having provided this information, Garmin respectfully asks the agencies now to consider the safety benefits of electronically steered weather radar and exclude it from Proposed Cat. XI and

[10] See Attachment C for information from the PBS story.

thereby encourage the innovation and adoption of electronically steered weather radar. Executive Orders issued by Presidents Bill Clinton and George W. Bush require most regulatory agencies to consider the impact of their proposed regulations on safety.

We realize Section 3(d)(2) of Executive Order 12886 signed by President Clinton excludes military and foreign policy regulations except those "involving the import or export of non-defense articles and services." Nevertheless, we believe it is important for the Administration to give great weight to the substantial safety benefits for the air traveling public. This is especially so when exclusion of electronically steered weather radar will not entail the exclusion of any radar with military functionality from the USML. As noted in Section IV and *infra*, we believe the agencies can craft language that permits the development of electronically steerable weather radar with the functional advantages we have outlined while, at the same time, not reducing the military advantages of electronically steered radar with military functions.

D. Without proper performance criteria in Proposed Cat. XI, electronically steered weather radar will be developed outside the United States with negative consequences for both the U.S. national security and national economy

Without performance criteria that modify and narrow Proposed Cat. XI(a)(3)(xii), Garmin believes electronically steered weather radar can and will be developed and produced largely outside the United States (particularly without the threat of U.S. competitors) with negative consequences for both the national security and national economy. In Proposed Cat. XI, the control performance criteria for T/R modules, antenna, and beam performance do not capture components suitable for weather radar, will be freely exported and will thereby enable foreign development and production. As Proposed Cat. XI is drafted, electronically steered radar is subject to the ITAR merely if it scans in elevation and azimuth. In laymen's terms, that is simply up/down, and left/right from the position of the aircraft. All electronically steered radar may meet this standard even if the radar performs no military functions whatsoever.

The short sentence at Proposed Cat. XI(a)(3)(xii) appears deep in the midst of the text of Proposed Cat. XI and the radar performance criteria. However, none of the performance criteria for T/R modules, antenna, beam forming, or resolution determine the scope of controls over the completed radar. If the State Department were to eliminate all radar text other than Proposed Cat. XI(a)(3)(xii), the scope of the proposed USML over the end radar would not be expanded in any way. The scope of Proposed Cat. XI(a)(3)(xii) is so overly broad that the rest of Proposed Cat. XI is irrelevant to the determination of commodity jurisdiction.

E. Positive list

One goal of ECR has been to create a positive list for the USML. As such, items must be described on the USML with performance criteria to the maximum extent possible. Better performance criteria are available to achieve this goal; those criteria are largely elsewhere in Proposed Cat. XI but are not applied to end radar as Proposed Cat. XI(a)(3)(xii) as currently drafted. Section IV recommends an exclusion note that makes Proposed Cat. XI a positive list entry on the USML for electronically steered radar.

F. Performance criteria are available from unclassified sources that are understood by companies that do not produce military radar

The performance criteria we recommend do not come from classified sources. Proposed Cat. XI itself, as published, provides most of these criteria. The criteria are also based on published military functions that can be identified or anticipated with research over a very short period (hours or days) on the Internet. Identifying appropriate performance criteria for radar in Proposed Cat. XI does not require production experience from engineers who have worked on historically ITAR-controlled military electronically steered radar.

Another source of information to create performance criteria for Proposed Cat. XI radar is information that is taught in universities. Garmin notes that development of phased array antenna is already taught in universities. One example is the course offered by the Massachusetts Institute of Technology and Lincoln Laboratories described in Attachment D.

Weather radar of the type excluded from Proposed Cat. XI(a)(3)(iii) by Garmin's proposal at Section IV above does not perform any of the military functions we anticipate and describe in Section V of these comments. We have identified such military functions from published sources available on the Internet. We have not identified such military functions from classified information, classified technical data, classified criteria, or performance of classified contracts, and we have not received advice from any corporation that could identify such military functions from classified information, classified technical data, classified criteria, or the performance of classified contracts.

G. <u>Change in controls and the potential for foreign availability</u>

Civil weather radar of all types, regardless of method of steering, has long been subject to the EAR and not to the ITAR. Civil weather radar is not "specially designed, modified or configured for military application."[11] The electronically steered weather radar excluded from the USML by the recommendation in Section IV is currently subject to the EAR and is classified as ECCN 6A998.

We believe that, in the context of such a proposed change in agency through the language in the newly proposed controls under the ITAR that would now capture civil weather radar in Proposed Cat. XI, providing performance criteria that limit the reach of Proposed Cat. XI is particularly important. Such limiting criteria will avoid ineffective controls due to U.S. unilateral controls and the likelihood of future foreign availability. Non-U.S. radar manufacturers will certainly develop electronically steered weather radar and export such radar from abroad without U.S. competition because U.S. manufacturers will be blocked by Proposed Cat. XI(a)(3)(xii). Importantly, the U.S. Government will lose the effective export control options described below.

Moreover, we doubt the U.S. Government will be able to convince other Wassenaar Arrangement members to impose the same controls on weather radar in the International Munitions List. As such, only U.S. manufacturers are harmed, with no consequent increased multilateral effectiveness through the export control regime. Thus, we believe the Proposed Cat. XI(a)(3)(xii) over-controls. With the exclusion note that we recommend at Section IV above, we believe it is much more likely that the U.S. Government can achieve a multilateral control for electronically steered radar with military functionality.

[11] Category XI(a) as currently in effect in the ITAR.

H. No trade-off between the public passenger air safety provided by electronically steered weather radar and the military advantage of radar that performs military functions is necessary

There is no need for the export control and review agencies to make a trade-off between public passenger air safety in severe weather using civil weather radar versus a military advantage using radar that performs a military function. The functions are fundamentally different in electronically steered radar between the military functions anticipated above in these comments at Section V and the civil electronically steered weather radar that Garmin suggests at Section IV be excluded from Proposed Cat. XI of the USML. Military functions of radar are not generally designed to detect weather because such military radar must perform in all weather conditions and detect aircraft and missiles through clouds and precipitation. Weather detection radar must be set at certain bandwidths in order that its radar transmissions best reflect off precipitation. Moreover, weather radar cannot perform military functions as anticipated in Section V of these comments. The two types of electronically steered radar do not overlap.

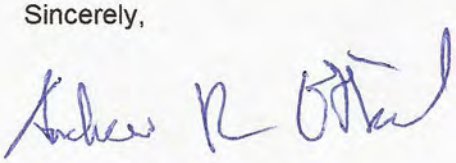
VIII. Conclusion

Garmin believes that Proposed Cat. XI(a)(3)(xii) as written over-controls commercial weather radar that lacks the functionality of military radar. Proposed Cat. XI(a)(3)(xii) will inhibit innovation and the development of radar that will improve detection of severe weather. This will substantially improve passenger air safety.

These comments recommend specific criteria to exclude weather radar units from the USML. These criteria are taken from performance criteria already in Proposed Cat. XI for major components. None of the performance criteria are taken from classified information or derived from experience in making radar with military functionality. Thus, electronically steered weather radar should be excluded from Proposed Cat. XI based upon the performance criteria Garmin recommends in Section IV of these comments.

Please feel free to contact us if you have any comments or questions.

Sincerely,



Andrew R. Etkind

Vice President and General Counsel

Attachment A

Features at a glance.

- Fully integrated glass flight deck technology for crew-flown Part 25 business jets*
- Scalable for installation in a wide range of aircraft: From light jets to super-midsize and larger models
- Features one of the most intuitive pilot/vehicle interface offered in any business jet avionics system
- Supports multiple display and touchscreen Vehicle Management System control unit configurations
- Provides enhanced situational awareness through Garmin SVT™ synthetic vision technology
- Offers global operations capability with NextGen/SESAR growth provisions
- WAAS technology enables GPS-guided LPV/RNP "glidepath" approaches to ILS-comparable minimums – without reliance upon ground-based navaids
- Multi-frame PFD and MFD displays place more – and more usable – graphical data at the pilots' fingertips
- Supports "paperless flight deck" concept with display capability for electronic charts, flight manual data, and more
- Growth-oriented architecture allows many future technologies to be accommodated via software updates
- Voice/data communications supported by digital radios and satellite datalink capability
- Graphical synoptics displays help simplify systems control, monitoring and troubleshooting
- Advanced weather detection and avoidance technology
- Optional Iridium-based worldwide satellite weather datalink access
- ADS-B enhanced active and passive traffic surveillance with TCAS II/ACAS II technology
- Multiple Vehicle Management System touchscreen controllers enable each crew member to have full operational accessibility
- System reliability backed by industry's top-ranked Garmin Avionics Support network

*Specifications and descriptions are preliminary and subject to change without notice. The breakdown of which features will be standard and which will be optional will vary depending upon the specific implementation chosen by the airframe OEM.

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Today, a new jet age begins.

Introducing Garmin G5000.

Integrated glass flight deck technology for a whole new echelon of business jets.

Bigger jets. Faster jets. Part 25 transport category jets. Now, they're all becoming Garmin jets – with the introduction of our new G5000 digital avionics suite.

Designed specifically for the operational environment of today's most sophisticated crew-flown turbine aircraft, the G5000 system brings fresh thinking, vision, sensibility and leadership to a segment of the market that's clearly overdue for all of the above.

On everything from light and midsize jets to super-midsize and larger models, this fully scalable Garmin system supports an unprecedented range of flight deck configurations and capabilities. New Vehicle Management units with infrared touchscreen interface replace a myriad of knobs, buttons and switches scattered throughout the cockpit – bringing centralized systems management and input right to the pilots' fingertips. The G5000's streamlined pilot/vehicle interface offers jet-fast access to more data, controls and sensors, requiring fewer keystrokes to sequence through menus and pages. As a result, you're looking at one of the most efficient, most intuitive electronic flight deck systems ever designed for high-end business jet aircraft.

Multi-tasking panoramic displays.

The G5000's sleek WXGA high-resolution displays (available in 12- or 14-inch diagonal widescreen formats) feature multi-frame capability on both the PFDs and MFDs – thus vastly expanding the amount of graphical information that can be viewed concurrently. With this pilot-selectable functionality, a three-display flight deck can essentially become a six-display presentation – to meet the demands of those high-workload phases of flight. Supplementing this multi-frame capability, selectable inset windows can accommodate additional smaller views of traffic, terrain/obstacles, flight path mapping, video inputs, and more*.

For enhanced attitude/heading reference, Garmin's SVT™ Synthetic Vision Technology provides a 3-D "virtual reality" topographic landscape on the G5000 PFD displays – showing airports, runways, obstacles, towers, traffic, and other visual aids to situational awareness. A dimensional Pathway view – also called "highway in the sky" – displays the selected route of flight by sequencing a series of windows or "flying rectangles" on the display. With this technology, pilots can more easily visualize terminal and approach procedures, course intercepts, enroute legs and other transitional stages of flight.

A clear path to global NextGen operations.

Like all Garmin integrated systems, the G5000's architecture is designed with future growth and technologies in mind. Built-in provisions will enable many of these capabilities to be added or updated via software – oftentimes precluding the need for hardware upgrades or replacement as tomorrow's ATC system requirements evolve.

Designed to satisfy the global operational requirements of emerging NextGen (Next Generation for U.S. airspace) and SESAR (Single European Sky ATM Research) initiatives– as well as similar Air Traffic Modernization programs now in development around the world – Garmin's G5000 system offers a clear and all-encompassing window on the future. Active and passive traffic surveillance functionality using advanced TCAS II technology and featuring Garmin ADS-B target correlation and tracking will provide state-of-the-art traffic management and airspace monitoring. Plus, worldwide weather datalinks, graphical system synoptics, crew alerting and flight parameter reporting, WAAS-enabled self-guided approaches, and much more will be integrated with the G5000's core comm/nav/ident system avionics.

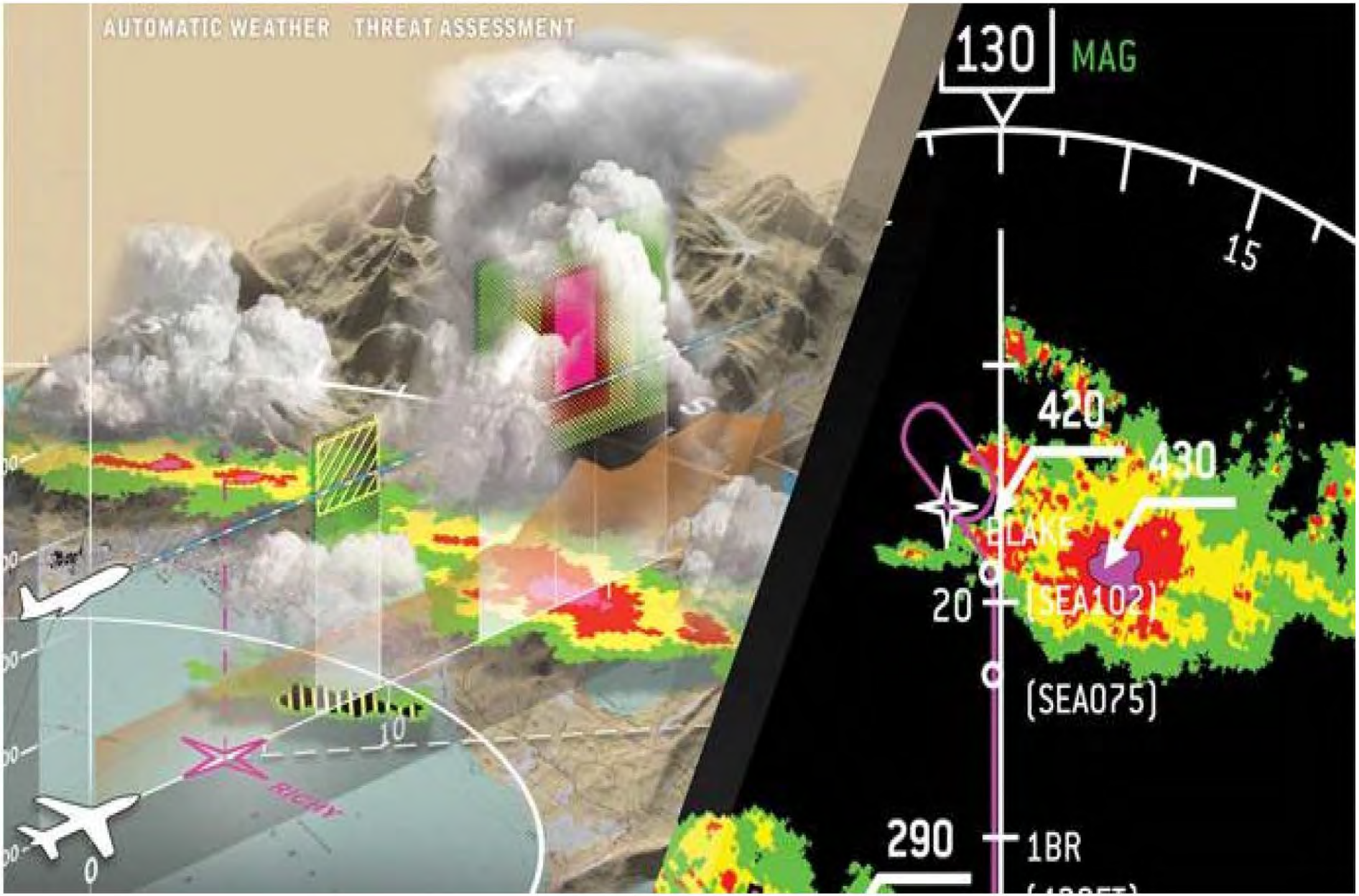
Further highlighting the G5000's advanced multi-sensor FMS features will be the ability to calculate aircraft-specific performance data for all flight regimes – thus minimizing the time spent trying to locate and interpolate such information from the aircraft flight manuals.

All in all, the new G5000 system promises to leverage Garmin experience, technology, innovation and top-ranked customer support to bring a whole new level of flight deck performance to Part 25 business aircraft.

Garmin G5000. It's a new day, a new age, a new flight experience. And for two-pilot jets, it's one easy choice. To find out more, go to www.garmin.com.

*Suggested applications may require optional equipment, sold separately.

Attachment B



REF: Rockwellcollins.com
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ATTACHMENT C

THE LESSON OF AIR FRANCE FLIGHT 447

An example of the benefit of phased array weather radar is found in an analysis of the events leading to the tragic crash of flight 447, a series of events that overwhelmed the crew and resulted in the catastrophic loss of all life on the aircraft.

Flying into the large weather cell triggered the subsequent events. The rapid steer-ability of electrically steered weather radar allows for increased situational awareness of the system for increased information gathering and ultimately greater safety. In the flight 447 scenario, electrically steered weather radar could have fully characterized the smaller storm in front of the larger one in 3 dimensions in a much better fashion than radar that was on-board flight 447. This would have warned the crew about radar shadows or possibly showed them some of the extent of the larger storm around the sides of the smaller one and so provided warnings to the crew of impending adverse weather. Weather radar is often a misunderstood tool to pilots and, in this case, led to the Air France Flight 447 crash into the Atlantic Ocean on June 1, 2009, killing all 228 passengers on board.

The analysis of the flight 447, since the recovery of the black boxes, shows a sequence of incidents which culminated in loss of control of the aircraft and ultimately its crash. The sequence of events is as follows.

1. The aircraft flies into a large storm that was behind a smaller storm.
2. The pitot tubes, which are used for detecting airspeed, become obstructed by super-cooled water in the storm clouds.
3. The lack of airspeed causes the auto throttle and auto pilot to disengage.
4. The crew manually reacts incorrectly to the situation in which high cruising speed and high altitude has a very small window for stable flight operation and put the plane into a stall.
5. The aircraft stalls and falls into a flat spin, crashing into the ocean belly first.

As these events relate to weather radar operation, the first mistake that was made by the crew was flying into a radar shadow. Although it has been established that electrically steered weather radar does not provide superior information to other weather radars in terms of displaying information in radar shadows, there are two main points where the capabilities of electronically steerable weather radar might have helped in this situation. They are highlighted below in red in the transcript of the PBS Nova special “Crash of Flight 447”, which first aired on February 16, 2011.

> ***NARRATOR:*** *At 2:10 a.m., Flight 447 is in the vicinity of an Atlantic thunderstorm, 250 miles wide. Did it cause the crash?*

To find out, our investigation turns to John Williams, an aviation weather specialist at the National Center for Atmospheric Research, in Boulder, Colorado.

Williams has access to new satellite images taken by NASA on the actual night of the crash. They show a massive storm developing as Flight 447 approaches.

JOHN WILLIAMS: *I'll step through by 30-minute intervals, and you'll see these storm systems starting to grow.*

NARRATOR: *The final position of Flight 447 is marked on the top of the map.*

JOHN WILLIAMS: *This storm system is hundreds of miles across and maybe 60 miles wide. Wow, look at the size of that growth right there.*

NARRATOR: *Pilots are trained to avoid large storms like this.*

JOHN COX: *The idea that a pilot would fly through a thunderstorm? Absolutely not.*

MARTIN ALDER: *Pilots, remember, are at the front end of the airplane, the first people to meet any accident. We have a great incentive not to meet accidents.*

NARRATOR: *So why is Flight 447 flying straight into the storm? In daylight, the thunderclouds would span the horizon, towering from the ocean to 50,000 feet. But at night, pilots can't see them, so they use onboard weather radar. This radar has a limited range of around 50 miles, and it can't see wind or lightning. It works by detecting the water and ice in storm clouds. But ice is five times less reflective than water, and pilots must continually adjust radar settings to see storms of different size and intensity.*

At the National Center for Atmospheric Research, Williams pores through the NASA satellite data from that night and makes an important find, not mentioned in the French reports.

JOHN WILLIAMS: *What you can see is that there is a small storm that, as they approached it, may have blocked their radar's view of the larger storm system and the more hazardous storm system behind.*

NARRATOR: *Williams' new theory: Flight 447s weather radar can't see through the smaller storm to detect the larger storm system building behind.*

MARTIN ALDER: *You could find yourself in a position, with this absorption of the signal, where you are almost into the storm before the signal strength actually reflects the reality.*

NARRATOR: *This is crucial in understanding what happened to Flight 447. It's possible that by the time the pilots detect the now-massive storm, they are already in it.*

MARTIN ALDER: *You have no option but to take the least worst exit: the crew must ride it out.*

Top down and profile pictures of the storm described above are shown in Figures 1 and 2, respectively.

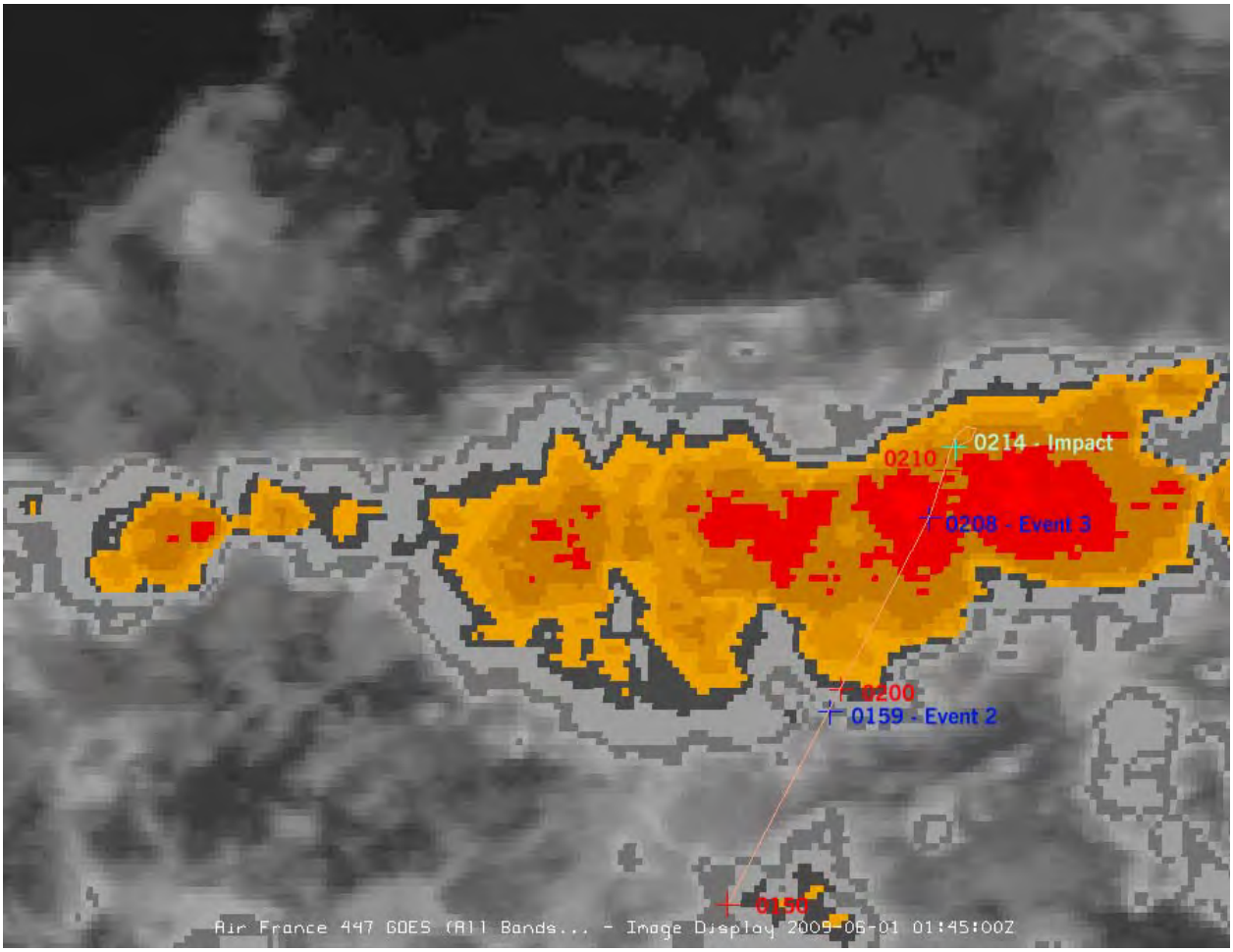

Figure 1 - Flight path and times of Flight 447 showing the significant storm which was flown into due to shadowing from a smaller storm.

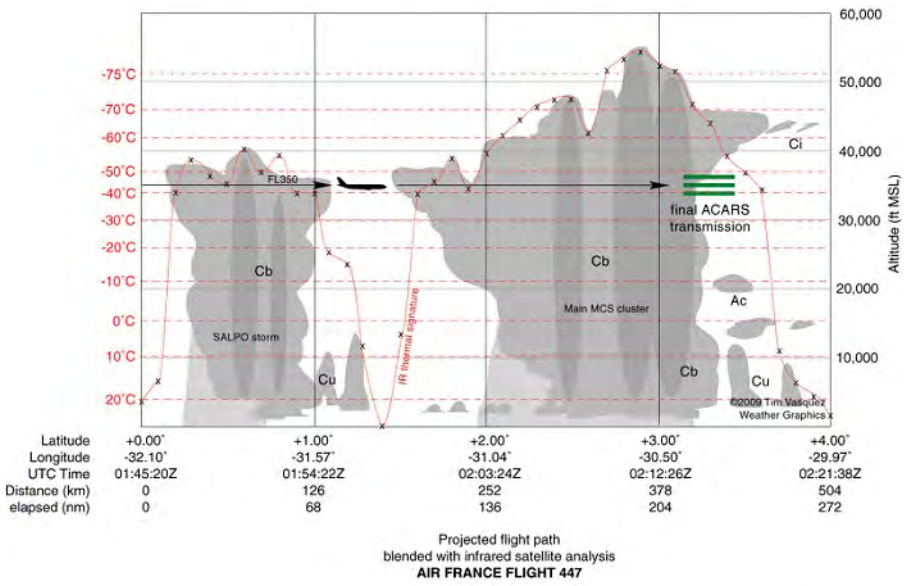

Figure 2 - Vertical profile of the storms in question related to Flight 447.

Attachment D

PROFESSIONAL EDUCATION

BUILD A SMALL PHASED ARRAY RADAR SENSOR

Date: TBD | Tuition: TBD | Continuing Education Units (CEUs): TBD

***This course has limited enrollment. Apply early to guarantee your spot.**

Application Deadline »

Share |

Course Summary | Learning Objectives | Who Should Attend | Program Outline | Schedule | About the Lecturers | Location | Updates

STATUS PENDING New dates will be released in October. Click here to be notified.

COURSE SUMMARY

Are you interested in learning about phased array radar systems by building and testing your own?

MIT Professional Education is offering a unique course in the design, fabrication, and testing of a laptop-based, time-division multiplexed, digital phased array radar sensor capable of ground moving target imaging (GMTI). Lectures will be presented on the topics of applied electromagnetics, antennas, RF design, analog circuits, radar system modeling, and digital signal processing while at the same time you build your own phased array radar system and perform field experiments. Each student will receive a radar kit, designed by MIT Lincoln Laboratory staff, and a course pack.

This course will appeal to those who want to learn array-based radar systems engineering or digital beamforming, use radar technology in a product or experiment, or make components or sub-systems.

During the course you will bring your radar kit into the field and perform experiments including range time intensity (RTI) plots, digital beamforming, and GMTI imaging of an urban target scene.

Build It | Test It | Take it Home

Each student will receive a radar kit, designed by MIT Lincoln Laboratory staff, and a course pack.

Content

0% 100%

- **Fundamentals:** Core concepts, understandings, and tools **(50%)**
- **Latest Developments:** Recent advances and future trends **(25%)**
- **Industry Applications:** Linking theory and real-world **(25%)**

Delivery Methods

0% 100%

- **Lecture:** Delivery of material in a lecture format **(34%)**
- **Discussion or Groupwork:** Participatory learning **(33%)**
- **Labs:** Demonstrations, experiments, simulations **(33%)**

Level

0% 100%

- **Introductory:** Appropriate for a general audience **(50%)**
- **Specialized:** Assumes experience in practice area or field **(40%)**
- **Advanced:** In-depth explorations at the graduate level **(10%)**

LEARNING OBJECTIVES
The participants of this course will be able to:

1. Understand how radar systems work.
2. Understand antennas, aperture, and digital beamforming.
3. Understand pulse compression and basic radar signal processing.
4. Design and build a small phased array radar system.
5. Acquire and process GMTI imagery in the field.

WHO SHOULD ATTEND
This course is targeted for engineers and scientists who plan to design phased array radars or sensors; use phased array radar systems in a product or as the final product; work on phased array radar systems, components, or subsystems; or are interested in using phased array radar systems for observation of physical phenomenon. Students will learn how radar systems work by attending lectures, making their own phased array radar, and acquiring data in the field. Those who should attend include:

- Developers of radar systems or components
- Users of radar technology
- Purchasers of radar technology such as automotive and government organizations
- Commercial enterprises seeking to use or add radar technology to their product or develop a radar-based product
- Defense industry or government personnel who want to learn how phased array radar systems work
- Defense industry or government organizations seeking to quickly educate employees
- Unmanned vehicle or robot developers seeking to use radar sensor packages
- Scientists who are interested in using radar technology for the observation of nature

You do not have to be a radar engineer but it helps if you have at least a bachelor's degree in electrical engineering or physics and are interested in any of the following: electronics, electromagnetics, signal processing, physics, or amateur radio. It is recommended that you have some familiarity with MATLAB. Each student is required to bring a laptop with the Microsoft Windows operating system installed.

PROGRAM OUTLINE

Day One

Session 1--1.5 hours: Introduction to the Course and Radar Basics (Lecture)

Break

Session 2--1 hour: Modular RF Design (Lecture)

Lunch

Session 3--1 hour: Antenna Basics (Lecture)

Break

Session 4--1 hour: System Description and Radar Build Instructions (Lecture)

Session 5--1.5 hours: Radar Construction (Lab)

Day Two

Session 6--1.5 hours: Radar Construction and Initial Tuning (Lab)

Break

Session 7--1 hour: Pulse Compression and Ranging (Lecture)

Lunch

Session 8--1 hour: Detection Processing (Lecture)

Break

Session 9--2.5 hours: Ranging Experiment and Radar Debugging (Lab)

Day Three

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Session 10--1.5 hours: Ranging Experiments (Lab)

Break

Session 11--1 hour: Ranging Experiment and Wrap-up (Lab)

Lunch

Session 12--1 hour: Doppler Processing (Lecture)

Break

Session 13--1 hour: Digital Beamforming (Lecture)

Sesion 14--1.5 hours: DBF Experiment (Lab)

Day Four
Session 15--1.5 hours: DBF Experiments and Radar Debugging (Lab)

Break

Session 16--1 hour: DBF Experiments and Radar Debugging (Lab)

Lunch

Session 17--1 hour: DBF Experiments and Radar Debugging (Lab)

Break

Session 18--2.5 hours: DBF Experiments (Lab)

Day Five
Session 19--1.5 hours: DBF Experiments (Lab)

Break

Session 20--1 hour: DBF Experiments (Lab)

Lunch

Session 21--1.5 hours: Imaging Contest and Course Wrap-up

COURSE SCHEDULE
View 2013 Course Schedule

Class runs 9:30 am - 5:30 pm every day except Friday when it ends at 3:00 pm.

Registration is on Monday morning from 8:45 - 9:15 am.

Please note that laptops are required for this course, along with MATLAB (minimum 2009b; Instrument Control Toolbox preferred). OS requirement: Windows 7 or later, or Mac OS X 10.6 or later. Additional recommended software includes: Atmel Studio 6.1 (Optional for firmware modification and development) and Flip (Optional for flashing firmware via USB).

ABOUT THE LECTURERS
Mr. Todd Levy
Todd J. Levy received his B.S. and M.S. in electrical engineering from Case Western Reserve University in 2004. He was employed at L-3 Communications and the Johns Hopkins University Applied Physics Laboratory prior to joining MIT Lincoln Laboratory in 2011, where he is currently an associate staff member of the Airborne Radar Systems and Techniques group. Throughout his career, Mr. Levy has worked on a wide spectrum of signal processing applications ranging from radio frequency direction finding to decoding intent from biological signals for use in controlling prosthetic limbs. His current research interests are in developing radar detection algorithms.

Michael Watts
Michael Watts is Associate Professor of Electrical Engineering in the Department of Electrical Engineering and Computer Science at MIT. He received his B.S.E.E. from Tufts (1996) and his S.M. (2001) and Ph.D. (2005) from MIT. From 1996 to 1999, he was a member of the technical staff at Draper Labs, and from 2005 to 2010 he was a member of the technical staff at Sandia National Laboratories, where he led their silicon microphotonics effort. Michael's research focuses on electromagnetics, photonics, and optical networks, with particular interest in microphotonic circuits for application in communication networks, high-frequency

scenarios, and new sensor modalities. A key example of his work is an ultralow-power, high-bandwidth silicon microphotonic communications platform.

Dr. Nicholas O'Donoughue
Nicholas A. O'Donoughue received his B.S. in Computer Engineering from Villanova University, in 2006, and his M.S. and Ph.D. from Carnegie Mellon University in 2008 and 2011, respectively, both in Electrical & Computer Engineering. In 2012, he joined the Airborne Radar Systems & Techniques Group at MIT Lincoln Laboratory. His PhD thesis was titled "Stochastic Time Reversal for Radar Detection," and his current research areas at the Laboratory include system analysis and advanced techniques for electronic warfare systems, with a special focus on electronic protection in airborne surveillance radar.

Dr. O'Donoughue is a recipient of the 2006 National Defense Science and Engineering Graduate (NDSEG) Fellowship, the 2006 Dean Robert D. Lynch Award from the Villanova University Engineering Alumni Society, and the 2006 Computer Engineering Outstanding Student Medallion from Villanova University. Dr. O'Donoughue has published more than twenty-five technical journal and conference papers, including two that were chosen as Best Student Paper. Dr. O'Donoughue is a member of several IEEE societies, Tau Beta Pi, and Eta Kappa Nu.

Dr. Shakti Davis
Shakti K. Davis received her B.S. from New Mexico State University, Las Cruces in 1999 and her M.S. and Ph.D. from the University of Wisconsin, Madison in 2002 and 2006, respectively, all in electrical engineering. In 2006 she joined the technical staff at MIT Lincoln Laboratory and is currently a member of the Airborne Radar Systems and Techniques group. Her research areas at the Laboratory include radar signal processing for moving target detection and classification with a focus on space-time adaptive processing (STAP) and feature-based processing methods.

Dr. Patrick Bell
Patrick J. Bell is a Member of the Technical Staff at MIT Lincoln Laboratory in Lexington, Massachusetts. He received his B.S. from the University of Virginia in 2001 and his M.S. and Ph.D. from the University of Colorado at Boulder in 2003 and 2006, all in electrical engineering. Since joining Lincoln Laboratory in 2006, Dr. Bell has conducted research in microwave circuit design, including power amplifiers for MILSATCOM systems on moving platforms, agile frequency synthesizers, and active wideband phased arrays for airborne electronic warfare systems. He is currently a member of the RF and Quantum Systems Technology Group. Dr. Bell is a member of the IEEE and the Microwave Theory and Techniques Society.

Dr. Bradley Perry
Bradley T. Perry received his B.S., M.S., and Ph.D. in Electrical Engineering from Michigan State University in 2001, 2002, and 2005, respectively. He has been a member of the Technical Staff at MIT Lincoln Laboratory in Lexington, Massachusetts since 2005. Dr. Perry is currently working in the areas of microwave circuit and antenna design with the RF and Quantum Systems Technology group at the Laboratory. Recent work at the Laboratory has included compact receiver and transmitter designs for ground-based electronic warfare systems and active decoys, along with work on RF cancellation techniques 0for simultaneous transmit and receive (STAR) applications.

Dr. Perry is a member of Commission B of URSI and the IEEE Antennas and Propagation and Microwave Theory and Techniques Societies. He served as the Chairman of the Boston section of the IEEE Antennas and Propagation Society from 2006 through 2008 and continued in the role of Past Chair through 2009. Dr. Perry has presented work at numerous IEEE AP-S and AMTA symposiums and published articles in a number of refereed journals. Dr. Perry is currently serving as the Student Programs Chair for the 2013 IEEE Phased Array Systems and Technology Symposium.

Dr. Jeffrey Herd
Jeffrey S. Herd received his B.S., M.S., and Ph.D. in Electrical Engineering from the University of Massachusetts, Amherst, in 1982, 1983, and 1989, respectively. From 1983 to 1999, he was with the Antenna Technology Branch of the Air Force Research Laboratory at Hanscom AFB, Massachusetts. From 1992 to 1994, he was a visiting scientist with the Antenna Group of the Institute for High Frequency Physics, German Aerospace Research Establishment (DLR) in Wessling, Germany.

In 1999, he joined the MIT Lincoln Laboratory in Lexington, Massachusetts, where he is currently an Associate Group Leader in the RF and Quantum Systems Technology Group. Dr. Herd's research interests include ultra-wideband phased arrays, multifunction T/R modules, digital sub-array architectures, and wideband digital receivers.

LOCATION
This course takes place on the MIT campus in Cambridge, Massachusetts.

UPDATES
Please note that laptops with MATLAB are required for this course.

Communications & Power Industries

September 6, 2013

PM/DDTC, SA-1, 12th Floor Directorate of Defense Trade Controls
Bureau of Political Military Affairs
U.S. Department of State
Washington, D.C. 20522-0112

Subject: ITAR Amendment –Category XI

Dear Sir or Madam:

Communications & Power Industries LLC's Beverly Microwave Division (CPI BMD) designs and manufactures a broad range of RF and microwave products for radar, communications and scientific applications. CPI BMD is the world's largest manufacturer of receiver protectors and related products; magnetrons, TWTs, CFAs, transmitter assemblies, solid state power amplifiers, scientific systems, high-power solid state switches and switch assemblies, pressure windows, a wide variety of Integrated Microwave Assemblies.

Proposed Change
In response to the DDTC's proposed changes to USML XI, CPI BMD recommends clarifying Part 121.1 Category XI, paragraph (c)(4) to read as follows:

"Transmit / receive modules or transmit modules that have any two perpendicular sides, with either length d (in cm) equal to or less than 15 divided by the lowest operating frequency in GHz [$d \leq 15$ cm * GHz / f_{GHz}], that incorporate a Monolithic Microwave Integrated Circuit (MMIC) or discrete RF power transistor and an *electronically variable* phase shifter or a phaser"

Rationale
The proposed language in paragraph XI(c)(4) will control under the ITAR transmit/receive or transmit modules of a certain size that contain *either* an *electronic* or a *mechanical* phase shifter or phaser.

CPI believes the intent of paragraph XI(c)(4) is to control under the ITAR transmit/receive or transmit modules of a certain size that contain an *electronically variable* phase shifter or phaser that are required for *Active Electronically Scanned Array (AESA) radars* used by the military.

CPI proposes adding "electronically variable" to phase shifters to preclude transmit receive modules and transmit modules with mechanical phase shifters from the ITAR which are less sophisticated and are not used in AESA radars.

CPI believes capturing under the ITAR transmit/receive or transmit modules that meet a certain dimension containing MIMICs or discrete transistors that incorporate *mechanical* phase shifters or phasers will have a negative impact because mechanical phase shifters are commonly used establish a fixed electrical length in power combined transmit modules.

Mechanical phase shifters enable transmit/receive or transmit modules to be power combined in a cost-effective manner by allowing the transmission length for each transmit/receive or transmit module to be set mechanically (for example by adjusting the length of the mechanical phase shifter or "line stretcher" and by turning a locking nut as shown in http://media.digikey.com/pdf/Data%20Sheets/Hirose%20PDFs/HLS%20Series.pdf) instead of

607 Hansen Way Palo Alto, CA 94304 USA Phone: (650) 846-2900 Fax: (650) 846-3276
www.cpii.com

Communications & Power Industries

manufacturing a customized fixed-length transmission line for each transmit/receive or transmit module. The use of a mechanical phase shifter to set the electrical length in a solid state power amplifier also facilitates maintenance as a transmit module used in a high-power solid state amplifier made up of a number of lower power amplifiers power-combined together can be readily replaced.

CPI uses transmit modules with discrete transistors and MMICs that incorporate mechanical phase shifter that fall within the proposed dimensional requirements in high power Solid State Power Amplifiers (SSPAs) that are not specifically designed for military applications which can be used in various commercial applications such as weather radar, commercial air traffic control, and monitoring of wind farms.

Capturing transmit modules containing discrete transistors or MMICs that incorporate a mechanical phase shifter under the ITAR will result in CPI controlling its EAR-controlled SSPAS under the ITAR because the EAR-controlled SSPAs fall within the proposed dimensional requirements and contain a mechanical phase shifter for fixing the electrical length of the SSPA

CPI recommends that "electronic" be added to the paragraph to exclude the less sensitive transmit/receive or transmit modules of a certain size that contain a *mechanical* phase shifter or phaser from the ITAR. Moreover, CPI believes that MMIC Transmit/receive or transmit modules incorporating *mechanical* phase shifters or phaser are appropriately controlled under the EAR, and those that are "specially designed" for a commodity enumerated on the USML or a 600 series ECCN will be controlled as a 600 series ECCN.

In the event that the government wishes to control transmit/receive or transmit modules of a certain size that contain micro electromechanical (MEMS) phase shifters then CPI proposes the following language:

"Transmit / receive modules or transmit modules that have any two perpendicular sides, with either length d (in cm) equal to or less than 15 divided by the lowest operating frequency in GHz [$d \leq 15$ cm * GHz / f_{GHz}], that incorporate a Monolithic Microwave Integrated Circuit (MMIC) or discrete RF power transistor and an electronic phase shifter, MEMS phase shifter, or a phaser."

CPI BMD appreciates this opportunity to comment on the proposed changes. If you have any questions or require additional information concerning this submission, please contact me at 650-846-3021 or by e-mail at Creighton.chin@cpii.com.

Thank you.

Regards,

Creighton K Chin

Digitally signed by Creighton K Chin
DN: c=US, o=DST ACES Business Representative, ou=COMMUNICATIONS AND POWER INDUSTRIES LLC, cn=Creighton K Chin, 0.9.2342.19200300.100.1.1=A01097C0000013D045ED79E0000063E
Date: 2013.09.06 13:33:50 -07'00'

Creighton Chin
Export Compliance Manager
Communications & Power Industries LLC

Perry A Smith
Director, Export and Import Compliance
Export and Import Compliance
Office of the General Counsel

Rockwell Collins

400 Collins Road NE
Cedar Rapids, IA 52498
319.295.5396 Fax 319.295.8909
pasmith@rockwellcollins.com

September 06, 2013

Ms. Sarah J. Heidema
Acting Director, Office of Defense Trade Controls Policy
U.S. Department of State
Washington, DC

Re: ITAR Amendment – Category XI

Rockwell Collins appreciates the opportunity to provide comments on the proposed rules issued by the U.S. Department of Commerce (DoC), Bureau of Industry and Security (RIN 0694-AF64), and by the U.S. Department of State (DoS) (RIN-1400-AD25), published in the Federal Register on 25 July 2013. The proposed rules describe the articles that warrant continued control under Category XI (Military Electronic Equipment) of the U.S. Munitions List (USML) and address how articles that are no longer controlled under Category XI would be controlled under the Commerce Control List (CCL).

I. Corporate Background and Interest in Category XI Proposed Changes

Rockwell Collins, Inc. is a leader in the design, production and support of communications and aviation electronics for commercial and military customers worldwide. While our products and systems are primarily focused on aviation applications, our Government Systems business also offers products and systems for ground and shipboard applications. The integrated system solutions and products we provide to our served markets are oriented around a set of core competencies: communications, navigation, automated flight control, displays/surveillance, simulation and training, integrated electronics and information management systems. We also provide a wide range of services and support to our customers through a worldwide network of service centers, including equipment repair and overhaul, service parts, field service engineering, training, technical information services and aftermarket used equipment sales. We are headquartered at 400 Collins RD NE, Cedar Rapids, Iowa 52498 and employ approximately 20,000 individuals worldwide. Our 2012 sales totaled almost $5 billion.

Rockwell Collins appreciates the opportunity to provide comments on these proposed changes and supports the stated intent of the proposed regulatory amendments which is to make the USML and the CCL a more positive list by creating a clearer "bright line"

regarding articles controlled between the USML and CCL. These changes are intended to advance the national security objectives of the U.S. by creating greater interoperability with U.S. allies, enhancing the defense industrial base and allow the government to focus its resources on controlling and monitoring the export and re-export of more significant products and technology.

Given the majority of Rockwell Collins defense products are captured within Category XI of the USML we are very much interested in ensuring the changes being proposed not only further the national security objectives of the export control reform initiatives, but also allow for efficient international trade activities in the future .

II. Comments

A. Category XI USML Changes

Rockwell Collins believes the proposed reforms to the United States Munitions List (USML) Category XI – Military Electronics (RIN-1400-AD25), goes a long way towards the government's goal of establishing a positive list that draws a "bright line" between the USML and the Commerce Control List (CCL). We believe the changes set forth in the Department of State's proposed rule (RIN 1400–AD25), for the most part, articulate the equipment and technologies the government feels warrant the more stringent controls offered by the ITAR. We believe this will lead to more accurate export classifications and license applications by the defense industries impacted by the proposed changes. However, we have some concerns regarding the proposed change defined in Category XI(c)(15) *Electronic assemblies and components specially designed for rockets, SLVs, missiles, drones, or UAVs capable of achieving a range greater than or equal to 300 km and capable of operation at temperatures in excess of 125 °C (MT).*

Specifically, this proposed change seems to be in conflict with certain final rules published in Category VIII – Aircraft and Related Articles. Category VIII (a)(5) and (6) control military unmanned aerial vehicles (UAVs). Category VIII (e) controls the Inertial Navigation Systems, Inertial Measurement Units, and Attitude and Heading Reference Systems used in UAVs. Additional controls on UAVs systems and equipment are defined in VIII (h), including flight control systems and vehicle management systems.

In addition, the proposed change related to electronic assemblies for UAVs, as written, would seem to include all unmanned aerial vehicles, military or civil, if they have a range equal to or greater than 300 km.

Rockwell Collins respectfully suggests that controls on electronic systems for UAVs are adequately controlled in USML Category VIII, and that UAVs electronic systems be removed from Category XI. If it is felt these additional controls in category XI are necessary, we request it be explicitly stated they apply to military UAVs, and the specific electronic assemblies being controlled be identified.

B. CCL Changes

Rockwell Collins believes the proposed reforms to the Export Administration Regulations (EAR) Commerce Control List (CCL) (RIN 0694-AF64) are, by and large, positive; but believe some changes will lead to confusion and the potential for misclassification of certain commodities. Our specific comments on the proposed changes follow.

- We believe including computers, telecommunications equipment, radar "specially designed" for military use, parts, components, accessories, and attachments "specially designed" therefor, and related software and technology in the new 3A611, 3B611, 3D611, and 3E611 categories will lead to confusion and misclassification/licensing of controlled items. Rockwell Collins believes military computers, telecommunication devices, and radars should be placed in the appropriate existing CCL chapters as 611 items. For example, military computers and related test equipment, software and technology that no longer warrant ITAR controls should be moved to ECCN 4A611, 4B611, 4D611 and 4E611. Likewise, telecommunication devices no longer controlled by the ITAR should be transferred to CCL in category 5A611, and radars in CCL chapter 6A611. We further believe that enumerating military computers, telecommunication devices, and radars in existing chapters of the CCL as 600 series items will eventually be necessary as the government moves towards its stated goal of a single control list for both military and commercial articles.

- Rockwell Collins believes the proposed CCL category 3A611.c, controlling microwave monolithic integrated circuit (MMIC) power amplifiers, and 3A611.d controlling discrete microwave transistors is a positive move that clearly defines the articles covered.

- As stated previously, we believe the proposed CCL category 3A611.e controlling high frequency (HF) surface wave radar capable of "tracking" surface targets on oceans will lead to confusion and misclassification. We believe a better move would be to control these devices in chapter 6 of the CCL (ECCN 6A611).

- Rockwell Collins believes the proposed CCL category 3A611.f, controlling microelectronic devices and printed circuit boards that are certified to be a "trusted device" from a defense microelectronics activity (DMEA) accredited supplier is a positive move that clearly defines the articles covered.

III. Conclusion

As drafted, the proposed changes to Category XI represent a positive step forward in establishing a clearer/bright line between the USML and CCL. However, as noted above, we believe some proposed changes related to Unmanned Aerial Vehicle electronics

conflict with existing final rules and warrant review. Additionally, Rockwell Collins believes controlling military computers, telecommunication devices and radars in chapter 3 of the CCL, as opposed to placing them in existing chapters provided for similar commercial items, increases the possibility of misclassification of these devices. We also believe this move will eventually be required as the government moves towards a single control list for both military and commercial commodities.

Rockwell Collins is fully committed to supporting the Administration's efforts in moving export control reform forward. We greatly appreciate the opportunity to provide comments to the proposed changes.

If you have any questions or would like to discuss the comments provided above, feel free to contact me directly at 319-295-5396, or via email at pasmith@rockwellcollins.com.

Sincerely,

Perry A. Smith
Director, Export and Import Compliance
Rockwell Collins, Inc.

	Current Language	DoS Proposed Language	JTNC Justification/ Comments
Category XI - Section **(a)(4)**	Electronic combat equipment, such as:	Electronic Combat (i.e. Electronic Warfare) systems and equipment, as follows:	Ok
	(i) Active and passive countermeasures	**(i)** ES systems and equipment that search for, intercept and identify, or locate sources of intentional or unintentional electromagnetic energy specially designed to provide immediate threat detection, recognition, targeting, planning, or conduct of future operations	Ok
	(ii) Active and passive counter-countermeasures	**(ii)** Systems and equipment that detect and automatically discriminate acoustic energy emanating from weapons fire (e.g., gunfire, artillery, rocket propelled grenades, or other projectiles), determining location or direction of weapons fire in less than two seconds from receipt of event signal, and able to operate on-the-move (e.g., operating on personnel, land vehicles, sea vessels, or aircraft while in motion)	Ok
	(iii) Radios (including tranceivers) specifically designed or modified to interfere with other communications devices or transmissions	**(iii)** Systems and equipment specially designed or modified to introduce extraneous or erroneous signals into radar, infrared based seekers, electro-optic based seekers, radio communication receivers, navigation receivers, or that otherwise hinder the reception, operation, or effectiveness of adversary electronics (e.g., active or passive electronic attack, electronic countermeasure, electronic counter-countermeasure equipment, jamming, and counter jamming equipment)	Need to keep original wording that includes "or modified" in order to address export cases where capability, not design, is at issue.

Category XI - Section **(a)(5)**	Command, control and communications systems to include radios (transceivers), navigation, and identification equipment	Command, control, and communications (C3); command, control, communications, and computers (C4); command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR); and identification systems or equipment, that:	Ok
		(i) Are specially designed or modified to integrate, incorporate, network, or employ defense articles controlled in this subchapter	Need to include "or modified" in order to address export cases where capability, not design, is at issue.
		(ii) Incorporate U.S. Government identification friend or foe (IFF) Modes 4 or 5	Ok
		(iii) Implement active or passive ECCM used to counter acts of communication disruption (e.g., radios that incorporate HAVE QUICK I/II, SINCGARS, SATURN, Networking Waveforms, etc.)	Limited examples. Need to include, at a minimum, networking waveforms.
		(iv) Specially designed, modified, rated, certified, or otherwise specified or described to be in compliance with U.S. Government NSTISSAM TEMPEST 1–92 standards or CNSSAM TEMPEST 01–02, to implement techniques to suppress compromising emanations of information bearing signals	Need to include "modified" in order to address export cases where capability, not design, is at issue.
		(v) Transmit voice or data signals specially designed or modified to elude electromagnetic detection	Need to include "or modified" in order to address export cases where capability, not design, is at issue.
		(vi) Contain militarily unique SDR capability as defined by DoD Software Defined Radio (SDR) Export Policy	Need to include systems or equipment that fall under the Military Uniqueness Criteria. This criteria will be part of the DoD SDR Export Policy currently under development by DTSA-TSFDO.

Category XI - Section **(a)(6)**	Computers specifically designed or developed for military application and any computer specifically modified for use with any defense article in any category of the USML	Reserved	Ok

Category XI - Section **(a)(7)**	Any experimental or developmental electronic equipment specifically designed or modified for military application or specifically designed or modified for use with a military system	~~Developmental electronic equipment or systems funded by the Department of Defense via contract or other funding authorization~~ Any experimental or developmental electronic equipment specifically designed or modified for military application or specifically designed or modified for use with a military system	Keep original language. Proposed language does not address Non Developmental Item (e.g., developer uses Independent Research And Development funding to develop equipment or system for military use).

Point of Contact: Greg Rassatt <greg.rassatt@navy.mil>

Research Electronics International, LLC
455 Security Place, Algood, TN 38506 USA

September 6, 2013

Sent via email to: DDTCResponseTeam@state.gov

Directorate of Defense Trade Controls
Office of Defense Trade Controls Policy
ATTN: Regulatory Change, USML Category XI
U.S. Department of State
Washington, DC 20522-0112

RE: ITAR Amendment – Category XI and "Equipment"

Dear Sir or Madam:

The undersigned electronic test and measurement company, Research Electronics International LLC ("REI"), is pleased to have the opportunity to provide additional feedback on the Administration's proposed rule, Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI (Military Electronics). REI along with [Aeroflex Inc., Agilent Technologies Inc., Anritsu Company, National Instruments Inc., and Tektronix Inc.], which represent the vast majority of domestic production capability for signal analyzers ("Domestic Spectrum Analyzer Industry"), cooperated in the review of the July 25, 2013 (78FR45018) proposal, share similar concerns, and concur on the proposed changes presented in this letter.

As an owner and General Manager of REI, my concerns are that the proposed rule's control criteria are both overly inclusive and ambiguously worded. As written, the rule does not establish a clear line between Commerce Control List and United States Munitions List products and technology. This will lead to exactly the kind of industry consternation and confusion that export reform is meant to alleviate, which in turn will spur companies like mine to inundate the Department of State with commodity jurisdiction classification requests as we develop new products. The resulting product development lag and drain on resources – for both the State Department and industry – will likely be significant.

XI(b)(3) Comments and suggestions

The following comments are limited to the proposed control for USML Cat XI(b) generally and entry XI(b)(3) in particular, as follows:

Phone: +1 (931) 537-6032 ● Fax +1 (931) 537-6089
www.reiusa.net

(XI)(b) Electronic systems or equipment specially designed for intelligence purposes that collects, surveys, monitors, or exploits the electromagnetic spectrum (regardless of transmission medium), or for counteracting such activities.

(XI)(b)(3) Technical surveillance countermeasure (TSCM) or electronic surveillance equipment and counter electronic surveillance equipment (including spectrum analyzers) for the RF/microwave spectrum having all of the following:

- *(i) A sweep or scan speed exceeding 250 MHz per second;*
- *(ii) A built-in signal analysis capability;*
- *(iii) A volume of less than 1 cubic foot;*
- *(iv) Record time-domain or frequency domain digital signals other than single trace spectral snapshots; and*
- *(v) Display time-vs-frequency domain (e.g., waterfall or rising raster).*

A brief survey of the spectrum analyzers available on the commercial market today shows that none of these capabilities are unusual. They are all common to modern spectrum analyzers in varying configurations, and all are available globally. None of them are unique or particularly suited to surveillance or counter-surveillance applications, and are just as common in spectrum analyzers designed for the myriad other tasks that people use spectrum analyzers to perform. These include wireless communications system installation, radio frequency (RF) spectrum emissions analysis, and electronic device development and testing.

By setting the control criteria threshold so low, DDTC is perhaps unwittingly proposing to impose strict export restrictions on a broad array of standard equipment used by a range of commercial entities – the exact opposite of what export control reform is intended to do.

A critical point in this discussion is that even if certain spectrum analyzers are marketed as counter-surveillance equipment, that does not necessarily mean that they were developed for intelligence purposes as described by XI(b). There is a strong demand for counter-surveillance equipment in the private sector. Businesses want to protect their trade secrets and intellectual property from industrial espionage, as our own Federal Bureau of Investigation recognizes and supports.[1] This is the market segment REI was founded to serve, and it continues to be our company's primary focus. Thus, REI's spectrum analyzer products – like most spectrum analyzers – are truly dual-use items, in that they are not only useful in a range of applications, but also to a variety of user types for any given application, including the one that the government is concerned with, TSCM.

[1] For reference, please see the FBI guidance on protecting intellectual property at: http://www.fbi.gov/about-us/investigate/counterintelligence/intellectual-property-protection

We understand and acknowledge that the U.S. government has a prevailing interest in protecting its sensitive intelligence information and operations, and, by extension, our national security. But in protecting that interest, the government should use the least intrusive means necessary so as to minimize disruption to industry. In this case, that means choosing control criteria that are unambiguous and specific to technology that is unique to the United States. By placing export restrictions on technology that many other countries are already manufacturing for themselves, the U.S. government is accomplishing nothing more than putting the companies under its jurisdiction at a commercial disadvantage. The same is true of imposing control criteria that give rise to technical ambiguity, which the proposed rule does.

In offering these points, we readily acknowledge that this second proposed rule is greatly improved by having clarified that XI(b)(3) applies to instruments "…having all of the following." Nevertheless, REI and the Domestic Spectrum Analyzer Industry remain concerned that this rule still depends largely on subjective and potentially confusing terms, which increase regulatory uncertainty. We recognize that some USML Categories will necessarily retain a catch-all structure. However, when a control entry contains and is limited by technical parameters, these parameters should be clearly and objectively defined.

Specifically to this point, REI remains extremely concerned about several aspects of the proposed XI(b)(3):

- First, inclusion the parenthetical phrase "(including spectrum analyzers)" in the XI(b)(3) header will be broadly and generally be interpreted as superseding any limitation of XI and XI(b).
- Second, the control criterion "built-in signal analysis capability" in XI(b)(3)(ii) is all-encompassing: it, too, will be broadly and generally be interpreted by industry and by customers and potential customers as superseding any limitation of XI and XI(b). That is, there will be widespread concern that any spectrum analyzer could be captured by the ITAR, with devastating impact to the industry.
- Third, the lack of quantitative control criteria which gives meaning and clarity to the desired control parameters.

Proposed revisions to XI(b)(3):

To address these concerns, REI and the Domestic Spectrum Analyzer Industry recommend the following revisions to the proposed rule (proposed additions are indicated in boldface text and underlined). Following that are comments and discussion regarding the bases for these recommendations.

XI(b): Electronic systems or equipment ***"****specially designed****"*** *for intelligence purposes that collects, surveys, monitors, or exploits the electromagnetic spectrum (regardless of transmission medium), or for counteracting such activities.*

Research Electronics International, LLC
455 Security Place, Algood, TN 38506 USA

XI(b)(3): Technical surveillance countermeasure (TSCM) or electronic surveillance equipment and counter electronic surveillance equipment ~~(including spectrum analyzers)~~ for the RF/microwave spectrum having all of the following:

- *(i) A built-in* ***TSCM*** *signal analysis* ***with signal identification and classification capabilities for modulation techniques other than standardized commercial formats****;*
- *(ii) Record time-domain or frequency domain digital signals other than single trace spectral snapshots* ***where the gap-free recording time exceeds 250 ms****;*
- *(iii) Display time-vs-frequency domain (e.g., waterfall or rising raster)* ***whereby the trace capture rate exceeds 250 traces per second, regardless of the rate at which the raster is then sent to the display****;*
- *(iv) A sweep or scan speed exceeding 250 MHz per second; and*
- *(v) A volume of less than ~~1~~* ***one-half (0.5)*** *cubic foot* ***and weight less than 25 lbs****.*

Note: We recommend reordering technical parameters (i) through (v) in decreasing order of importance.

Comment [XI(b) header]: Add quotes around specially designed to designate use of an approved definition (*see* 78 FR 22740) of the term.

Comment [XI(b)(3) sub-header]: First, there is a longstanding U.S. and multinational understanding that spectrum analyzers are dual use instruments. Spectrum analyzers (signal analyzers) have been controlled on the Wassenaar Dual-Use List for many years. Indeed, this was reconfirmed as recently as June 20, 2013 (78 FR 37372), when entries 3A002.c.4 and 3A002.c.5 of the US Commerce Control List were updated to align with the Dec 2012 version of the Wassenaar Dual Use List.

Even experienced industry trade compliance professionals have varying opinions on the intent and interpretation of the included parenthetical. While it can be argued that the limitation "specially designed for intelligence purposes" in XI(b) applies to the spectrum analyzers of XI(b)(3), it is nevertheless likely that specifically and uniquely calling out spectrum analyzers will lead readers, especially customers, to believe that all spectrum analyzers that meet the criteria of (i)-(v) are controlled by XI(b)(3), whether or not they are have TSCM functionality, and whether or not they are even useful for TSCM.

This regulatory confusion will lead to commercial problems for the domestic spectrum analyzer industry, especially with respect to European Union sales, where buyers are now specifically designing out ITAR-controlled products in their equipment and integrated systems. Uncertainty surrounding the possibility that all spectrum analyzers are potentially subject to the ITAR will likely cause EU-based customers to demand documentation (CJ) to substantiate the export-control status of each and every instrument.

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Finally, spectrum analyzers are inherently included in the equipment described in XI(b) and in XI(b)(3); specifically calling them out in the parenthetical of XI(b)(3) is duplicative and unnecessary. We therefore urge that the parenthetical reference to spectrum analyzers be completely removed, to ensure that the potential for confusion and for devastating adverse impact to the industry is eliminated.

Comment [XI(b)(3)(i) sub-entry, "Sweep or scan speed exceeding 250 MHz per second"]: A sweep speed of 250 MHz per second is extremely slow by contemporary commercial spectrum analyzer standards. In fact, I am not aware of any hand-held spectrum analyzer from across the globe that does not exceed this threshold, and therefore, this proposed threshold is almost meaningless as it is written, and could be stricken. However, one benefit from this parameter is that it does imply that these requirements are intended to apply to sweeping spectrum analyzer type receivers.

Comment [XI(b)(3)(ii) sub-entry, "built-in signal analysis capability"]: If USML Category XI(b) is to remain a catch-all classification for "Electronic systems or equipment specially designed for intelligence purposes," subsections (i)-(v) should provide for the release mechanism. However, as proposed, the release section is just another catch-all as "signal analysis capability" is inherent in all spectrum analyzers, and this proposed regulation provides neither a definition for nor insight into what "signal analysis capability" DDTC seeks to control.

We are confident that this entry is not intended to capture parameter measurement for standard commercial communications signals and subcarriers, such as 'modulation depth', 'modulation error ratio'; 'error vector magnitude' 'I/Q imbalance', 'signal-to-noise ratio', 'carrier frequency error', 'Eb/No', 'BER', 'Eye Diagram', 'Phase Noise', and the like. Rather, we believe that DDTC's intent is to control only equipment that is able to characterize digital transmission modulation types that may be used in secure intelligence transmissions.

As an approach to address this concern, we look to the current proposed XI(b)(1) as a model: With regard to direction-finding systems, this entry explicitly limits the scope of control by means of an exclusion: control is limited to systems ' "specially designed" for applications ***other than navigation***'. Thus, we recommend similarly limiting XI(b)(3)(ii) "signal analysis capability" by limiting the scope of control to TSCM signal analysis "***other than*** *signal identification and classification capabilities for modulation techniques other than standardized commercial formats"*. Otherwise, this control would inexplicably and unreasonably capture hand-held spectrum analyzers that are inherently designed for commercial communication analysis.

Furthermore, it is unclear that TSCM activity is uniquely for military/intelligence purposes; as previously stated, there is a strong demand for counter-surveillance equipment in the private sector, because business entities want to protect their trade secrets and intellectual property from industrial

espionage. General purpose spectrum analyzers provide functionality needed by industry, but may not rise to the level of sophistication contemplated by the proposed by XI(b)(3). But if XI(b)(3)(ii) is not more tightly defined/limited, such as we recommend here, this ambiguity will perpetuate the need for spectrum analyzer manufacturers to seek CJ determinations.

Comment [XI(b)(3)(iv) and (b)(3)(v) sub-entries, "record…" and "display…"]: For these two entries, the existing controls are qualitative. We recommend that they be further defined by addition of quantitative numerical parameters. This change serves two purposes. First, it elaborates on the meaning and intent of the qualitative parameter, thereby clarifying to readers what items are potentially within the scope of control. Second, it adds a numerical control threshold, thereby simultaneously establishing an objective "bright-line" and eliminating ambiguity surrounding the amount of recording and speed of displaying that is needed to be controlled.

To elaborate, most commercial spectrum analyzers are able to record time domain information. They can also repeatedly capture frequency trace snapshots and display them in a time-vs-frequency format as a method of viewing frequency domain information. In the latter case, though, these captured trace snapshots do not represent gap-free recording. Gap-free recording in either the time or frequency domain allows the user to capture and analyze an unknown signal's transmission characteristics, and then export the data for further analysis. We understand that this feature could compromise U.S. national security if used to analyze the frequency changing characteristics of sophisticated intelligence signals. But in protecting its interest in restricting this feature, the government should seek to make that restriction as narrow as possible. In practical terms, this means (1) defining this recording capability, preferably using maximum gap-free recording time; and (2) clarifying that "recording" in the frequency domain is not simply saving individual trace snapshots in a sequential format, which is a fairly low-level capability in most commercial spectrum analyzers. For these reasons we strongly recommend the need for quantifying the maximum allowed recording time and display rate for frequency spectrum updates.

Comment [XI(b)(3)(iii) sub-entry, "volume of less than 1 cubic foot"]: We believe that the intent of XI(b)(3)(iii), "volume of less than 1 cubic foot" is to differentiate portable/handheld from rack-mount and benchtop instruments and to limit control to bona fide portable handheld instruments. If so, then the one cubic foot threshold is problematic because many rack-mount instruments have volume slightly less than that. If the intent is to control only those instruments that are bona fide "handheld/portable", then 0.5 cubic feet would be a better threshold. Alternately, a combination of size and weight (perhaps less than 25 lbs), or size and "battery-powered" (which connotes portability), or size and weight and "battery-powered" would be effective differentiators.

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Summary XI(b)(3)

As previously mentioned, REI is extremely concerned that the parenthetical phrase "(including spectrum analyzers)" that appears in the XI(b)(3) sub-header and the over-encompassing control "built-in signal analysis capability" of XI(b)(3)(ii) will result in confusion, not clarity. REI is also extremely concerned that XI(b)(3) contains broad and subjective terms that are susceptible to multiple interpretations and are prone to misinterpretation.

The practical impact of XI(b)(3) is that manufacturers of signal/spectrum analyzers will be forced to submit Commodity Jurisdiction requests for nearly all instruments (both existing and new/future); we respectfully suggest that this outcome is neither rational nor practical. We also note that such outcome would have a significant adverse effect on competition: publication of multiple CJs pertaining to new/future products would tend to reveal internal developments that most companies would consider proprietary. It is probable that customers will demand CJs for existing spectrum analyzers as well, so that they will have definitive guidance as to whether a specific product is or is not subject to the ITAR. Obtaining CJs for existing products poses a very real difficulty, because it is customary to treat products as being subject to the ITAR when a CJ is in progress. Altering one's business strategy to temporarily treat a product as ITAR when for years that product was treated as being subject to the EAR would have a devastating adverse business impact.

In conclusion, we believe that the proposed Category XI(b)(3) fails to differentiate between those spectrum analyzers that are useful for sensitive TSCM activities and those that are not. As written, it would cause confusion, not clarity; it could unnecessarily and inappropriately result in many spectrum analyzers becoming controlled on the USML. At minimum it will result in significant and ongoing CJ activity as manufacturers attempt to determine which spectrum analyzers are controlled by XI(b)(3) and which are not. Additionally, if spectrum analyzers previously treated as dual-use items were to become captured by the ITAR, this would have a significant adverse impact on the competitive position of US signal analyzer manufacturers relative to our foreign competitors. Finally, we believe that our suggested modifications would result in a control that accomplishes what DDTC seeks to achieve and we urge DDTC to consider them seriously.

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XI(c)(14) Comments and suggestions

The following comments are limited to the proposed control for USML Cat XI(c)(14) regarding "Tuners." The current proposed rule reads:

> *(c) (14) Tuners having all of the following:*
> *(i) An instantaneous bandwidth of 30 MHz or greater; and*
> *(ii) A tuning speed of 300 μsec or less to within 10 KHz of desired frequency;*

The broad terminology of XI(c)(14) threatens to swallow a broad range of products that contain tuners, including spectrum, signal, and network analyzers; radios; receivers; and stand-alone tuner modules. A clear definition of the intended use of the term "tuners" is therefore needed as a preliminary matter. Furthermore, if the proposed requirement is intended to capture any device containing a "tuner," then the proposed control criteria which is below commercial standards seem inconsistent with those specified under the Commerce Control List's revised Export Control Classification Number 3A002(c)(4).

> *c.4. "Signal analyzers" having all of the following:*
> *c.4.a. "Real-time bandwidth" exceeding 85 MHz; and*
> *c.4.b. 100% probability of discovery with less than a 3 dB reduction from full amplitude due to gaps or windowing effects of signals having a duration of 15 μsec or less;*

For example, a signal analyzer will always contain a tuner, and will almost always have a tuning speed exceeding 300 μsec to within 10 KHz. With the word "tuner" going undefined, any signal analyzer with a 30 MHz instantaneous bandwidth would therefore be controlled for export under the ITAR, while the EAR would not require export licensing for the same product until it exceeded an instantaneous bandwidth of 85MHz.

Also: 3A001(b)(11)

> *b.11. "Frequency synthesizer" "electronic assemblies" having a "frequency switching time" as specified by any of the following:*
> *b.11.a. Less than 156 ps;*
> *b.11.b. Less than 100 μsec for any frequency change exceeding 1.6 GHz within the synthesized frequency range exceeding 4.8 GHz but not exceeding 10.6 GHz;*

A "tuner" will most certainly contain a frequency synthesizer and yet the commercial thresholds for tuning speed or frequency switching time are below the proposed XI(c)(14) regulations.

Both of these examples suggests to us that XI(c)(14) is overly-inclusive and not consistent with current commercial regulations. Because of these inconsistencies and overlapping commercial regulations, REI recommends that the proposed (c)(14) regulation be stricken. But, failing that recommendation, REI proposes the following:

First, limit the scope of tuners to refer to non-commercial devices that were *"specially designed for defense articles in this subchapter"* and possibly to add a definition in the form of a note. For example:

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<u>Note: Tuner definition</u>- externally controlled standalone RF hardware used to capture military or intelligence signals that provides a frequency conversion and/or filtering function to select and feed the desired signal to other electronic hardware for further processing.

Secondly, as stated above, we believe that the proposed quantitative numbers are below current commercial standards as indicated in the CCL. REI recommends that the technical parameters be adjusted to be more consistent with current CCL regulations. To summarize:

*c) (14) Tuners **<u>"specially designed" for defense articles in this subchapter and</u>** having all of the following:*
*(i) An instantaneous bandwidth of **<u>85 MHz</u>** or greater; and*
*(ii), a tuning speed of **<u>[**] µsec</u>** or less to within 10 KHz of desired frequency.*

** Note: Recommending a specific number is difficult because tuning speed is a function of the frequency jump indicated by the CCL approach to defining switching speeds. But, it is important to note that with current commercially available VCO technology, tuning speeds well below the proposed 300 µsec are easily achievable. Therefore, I cautiously suggest a number of ***50 µsec*** if single number is desired.

In closing, thank you in advance for your time and consideration on these important issues regarding XI(b)(3) and XI(c)(14). If you would like to discuss the technical aspects of any of the critiques or recommendations offered in these comments, please contact me by phone at (931) 537-6032 or by email at tom@reiusa.net.

Sincerely,

Thomas H Jones
REI General manager/50% owner

MILLER
CHEVALIER

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September 9, 2013

U.S. Department of State
Bureau of Political – Military Affairs
Department of Defense Trade Controls
2401 E Street, N.W.
12th Floor, S A – 1
Washington, DC 20522

Attn: Ms. Sarah Heidema, Director, Office of Defense Trade Controls Policy
Department of State

Regarding Notice of Proposed Rulemaking, ITAR Category XI

Dear Ms. Heidema:

I. Introduction

We hereby provide comments on the radar provisions of the State Department's proposed revisions to Category XI of the United States Munitions List ("USML") as part of the Administration's Export Control Reform ("ECR") Initiative. 78 Fed. Reg. 45018 (hereafter "Proposed Cat. XI"). Proposed Cat. XI(a)(3)(xii) as written over-controls weather radar by including commercial electronically steerable weather radar that lacks the functionality of military radar (which should remain controlled). The radar provision of Proposed Cat. XI(a)(3)(xii) should be modified by performance criteria and a requirement that the radar qualifies under rules and standards of the Federal Aviation Administration ("FAA") related to civil or commercial aircraft. [1]

More specifically, we describe a regulatory reason and a policy objective under the ECR Initiative to explain why Proposed Cat. XI(a)(3)(xii) should be narrowed to exclude commercial weather radar subject to the criteria at Attachment "A" ("weather radar"). These comments

[1] This means qualification under 14 CRF 23, 25, 27, or 29 and includes FAA processes related to Type Certificates ("TCs"), Supplemental Type Certificates ("STCs"), Technical Standard Order Authorizations ("TSOAs"), Parts Manufacture Approval ("PMA"), or other qualification processes or standards related to commercial or civil aircraft. This does not include any FAA qualification or authorization related to military aircraft.

concern the State Department's expressed positions on section 17(c) of the Export Administration Act ("EAA") ("section 17(c)") and a normal commercial use standard.

II. Commercial weather radar must be excluded from the USML under the State Department policy honoring section 17(c)

In its preamble to the April 16, 2013 rule regarding Category VIII of the USML, the State Department committed to apply section 17(c) to all categories of the USML:

> One commenting party requested clarification that the intent of ITAR § 120.41(b)(3) is to provide the same function as the note to USML Category VIII (the "Section 17(c) rule") and that its scope extends beyond USML Category VIII. The Department confirms this understanding.

78 Fed. Reg. 22740, 22747 (April 16, 2013).

Although section 17(c) is no longer statutory law, it is a regulatory limitation adopted by the President by Executive Order from time-to-time under the International Emergency Economic Powers Act. This limitation applies to Proposed Cat. XI as well as the current Category VIII(h) of the USML in effect until October 15, 2013.

Section 17(c) provides:

> (c) Civil Aircraft Equipment. Notwithstanding any other provision of law, any product (1) which is standard equipment, certified by the Federal Aviation Administration, in civil aircraft and is an integral part of such aircraft, and (2) which is to be exported to a country other than a controlled country, shall be subject to export controls exclusively under this Act. Any such product shall not be subject to controls under section 38(b)(2) of the Arms Export Control Act (22 U.S.C. 2778(b)(2)).

The commercial weather radar excluded per Attachment "A" of these comments meets the section 17(c) standard and should be excluded from the USML. Such commercial weather radar is standard equipment, certified by the FAA for civil aircraft, and is integral to such civil aircraft.

Note that section 17(c) applies to all equipment and not solely parts and components. The announced policy regarding section 17(c) should be applied to Proposed Cat. XI and not just Category VIII now and in the future. Moreover, commercial weather radar as defined in the proposed exclusion note at Attachment "A" of these comments is a component as defined by Section 121.8(b) of the ITAR, which provides in part that a component "is an item which is useful only when used in conjunction with an end-item." Commercial weather radar of the type

described in Attachment "A" is useful only when used with an aircraft. Commercial weather radar is civil aircraft equipment within section 17(c).

The limiting principle of section17(c) is not limited to catch-all clauses. It applies equally to enumerated clauses, such as Proposed Cat. XI(a)(3)(xii). In the same preamble, the State Department indicated that it will not retain the section 17(c) footnote to current Category VIII(h) excluding certain aircraft parts and components from the USML because the application of the new "specially designed" definition will serve that purpose:

> The Department did not accept the recommendation of three commenting parties to retain the note to USML Category VIII(h) (the "17(c)" note), which discussed jurisdiction of certain aircraft parts and components, because application of the specially designed definition will serve that purpose for the exporter.

78 Fed. Reg. 22740, 22743 (April 16, 2013).

Proposed Cat. XI(a)(3)(xii) is not modified by the term "specially designed." For that reason, Proposed Cat. XI does not adhere to the stated policy to apply the principle of section 17(c). If the State Department were to apply the "specially designed" standard to Proposed Cat. XI(a)(3)(xii), it would not capture the type of commercial weather radar defined at Attachment "A." The FAA does not provide a commercial type certificate for an aircraft with military functionality and therefore section 17(c) does not apply to exclude a part or component for such aircraft. Nonetheless, it is prudent to list all the criteria at Attachment "A" in the exclusion note because this proposal includes both performance-based criteria and the section 17(c) limitation principles.

III. The State Department's expressed intent not to apply a "normal commercial" standard

In initial discussions with the export control and review agencies, they gave the impression that the only way to convince the U.S. Government to exclude commercial weather radar from Proposed Cat. XI was to establish that such radar is in normal commercial use now. We believe this is not the correct sole standard or even a secondary standard under the ECR Initiative.

In its preamble to the July 25, 2013 publication of Proposed Category XI, the U.S. State Department indicated it does not intend to list any article on the USML that has "commercial application":

> One commenting party recommended the inclusion of the phrase, "except for such items as are in normal commercial use," in paragraph (c). The Department's intent is to not list any articles in that paragraph that have commercial application, and requests specific

> identification of such articles that would be captured, but does not believe use of the phrase would be helpful.

78 Fed. Reg. 45018, 45020 (July 25, 2013).

Commercial weather radar in development has a commercial application. More importantly, certain electronically steered radar with weather functions does not have military functions.

We understand the State Department will take jurisdiction under the ITAR if warranted to maintain a military advantage over other countries. However, because of the distributed nature of weather targets, which are much larger than discrete military targets such as planes and vehicles, commercial weather radar described in Attachment "A" does not require the same performance specifications as military grade radars. Through limiting the transmit power, operational bandwidth, and other performance criteria of commercial weather radar as would be excluded from the USML per Attachment "A," electronically steered commercial weather radars will be developed and implemented with the capability of improving weather detection while not meeting or compromising the military functionality of electronically steered military radar.

IV. **Conclusion**

For these reasons, it is important to modify Proposed Cat. XI(a)(3)(xii) with performance criteria and a requirement that the radar qualifies under rules and standards of the Federal Aviation Administration ("FAA") related to civil or commercial aircraft as recommended in Attachment "A."

Sincerely,

Larry E. Christensen

Attachment A

Attachment "A"

XI(a)(3)(xii) does not apply to airborne radar that meets each of the following:

1. Does not incorporate a beam solid angle controlled under Category XI(a)(3)(x);

2. Does not incorporate T/R[2] modules controlled under Category XI(c)(4);

3. Does not incorporate an antenna controlled under Category XI(c)(10);

4. Operates with T/R modules with a maximum peak power of 1 Watt per module;

5. Operates only within the following frequency bands:
   a. S Band: 2.7 – 2.9 GHz
   b. C Band: 5.35 – 5.47 GHz
   c. X Band: 9.3 – 9.5 GHz
   d. Ku Band: 15.5 – 15.7 GHz;

6. Operates with an average transmit power less than or equal to 250 Watts;

7. Does not operate with a null steer beam; and

8. Achieves an FAA certification authorization or will achieve an FAA certification authorization prior to use as standard weather radar for civil aircraft.

[2] Transmit/Receive

BEFORE THE

Department of State

Washington, DC

In the Matter of Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI	RIN 1400-AD25 Public Notice 8388

To: Directorate, Defense Trade Controls, Department of State

Introduction

1. These comments are hereby submitted by Kymeta Corporation in response to the above captioned Notice of Proposed Rule with Request for Comments (hereinafter "Second Category XI NPR"), in which the Directorate, Defense Trade Controls, U.S. Department of State ("DDTC" or "Directorate") proposes to amend Category XI of the U.S. Munitions List.[1] The Second Category XI NPR supersedes the similarly captioned Notice of Proposed Rule, Public Notice 8091(hereinafter "First Category XI NPR").[2]

2. Kymeta Corporation is based in Redmond, Washington and currently is engaged in the design and development of surface scattering metamaterial surface scattering antennas for use in commercial radiocommunications; particularly for the fixed-satellite services ("FSS"), mobile satellite services ("MSS", which includes land, maritime and aeronautical mobile-satellite services). Future commercial radiocommunication services applications for Kymeta antennas include fixed and mobile services.

[1] 78 Fed. Reg. 45018 (July 25, 2013).

[2] 77 Fed. Reg. 70958 (November 28, 2012).

3. These comments focus on paragraph (c)(10) of the proposed rule, which is proposed to read as follows -

> (c)(10) Antenna, and specially designed parts and components therefore, that:
>
> (i) Electronically steers both angular beams and nulls with four or more elements with faster than 50 milliseconds beam switching;
>
> (ii) Form adaptive null attenuation greater than 35 dB with convergence time less than 1 second;[3]
>
> (iii) Detect signals across multiple RF bands with matched left hand and right hand spiral antenna elements for determination of signal polarization; or [4]
>
> (iv) Determine signal angle of arrival less than two degrees (*e.g.*, interferometer antenna);[5]
>
> **Note to paragraph (c)(10):** This category does not control Traffic Collision Avoidance Systems (TCAS) equipment conforming to FAA TSO C–119c.

4. We have noted with interest the difference between the language of paragraph (c)(10) in the First Category XI NPR and the Second Category XI NPR. In particular, we note the addition of the words "with faster than 50 millisecond beam switching" to the end of (10)(c)(i).

5. While the first generation of Kymeta metamaterial surface scattering antennas are being designed and developed to have a "beam switching" capability of approximately 100 milliseconds and the second generation of Kymeta metamaterial

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[3] We have no comment on proposed subparagraph (ii) of (10)(c) except that there does not appear to be an internationally or US agreed nomenclature for frequency bands. See Footnote 9 and accompanying text, *infra*.

[4] We have no comment on proposed subparagraph (iii) of (c)(10).

[5] This subparagraph (iv) appears to need redrafting as the wording is not consistent with the definition of an interferometer antenna. We would like to point out that commercial satellite antennas, such as those used for the direct television satellite service, have a capability of determining the signal angle of arrival to within 1/10th of a degree. We assume that this subparagraph (iv) is not intended to cover such antennas and therefore suggest that a rewording may be in order.

surface scattering antennas are being designed to have a beam switching capability of 30 milliseconds, Kymeta intends to improve the beam switching speed to 500 microseconds. A beam switching speed of 500 microseconds is consistent with the demonstrated speed of liquid crystal, which is used in the adaptive elements of the Kymeta antenna.

6. Even at 500 microseconds, the beam switching speed of a Kymeta antenna would be more than 100,000 times slower than the beam switching speed of silicon based phased arrays (which have beam switching speeds in the nanosecond regime).

7. Such a beam switching speed is a fundamental requirement for the mobile terminal antennas that are being developed for use on planes, trains and automobiles to communicate over commercial mobile-satellite services offered by GSO satellite operators such as INMARSAT and NGSO operators such as O3B.

8. Because metamaterial surface scattering antennas are fundamentally different than all other antennas in use today, we believe that DDTC needs to reconsider whether proposed paragraph (c)(10) is appropriate for metamaterial surface scattering antennas and, if not, how should the USML and the CCL be written for such articles.

9. We have a number of proposals for DDTC to consider. However, before we discuss those proposals, we would like to: (1) review metamaterial surface scattering antenna technology; and (2) review the performance requirements that Kymeta must satisfy for the commercial radiocommunication services in which the Kymeta antennas are intended to operate. We then will focus our comments on the issue of whether metamaterial surface scattering antennas provide the US with a critical national security or intelligence advantage, whether metamaterial surface scattering antennas are purely defense related, unique to the U.S. military industrial base[6] or whether metamaterial

[6] These are the standards used by the Secretary of Defense and the Secretary of State to determine which satellites, parts and components should be controlled as defense articles controlled by the State Department and which should be controlled as dual-use articles by the Department of Commerce. See,

technology necessary to prevent global terrorism, the proliferation and delivery systems of weapons of mass destruction, or the proliferation of advanced conventional weapons.[7]

Metamaterial Surface Scattering Antennas

10. Metamaterial surface scattering antennas, like many other types of antennas, convert guided waves into free space waves (and vice-versa). While the conversion of guided waves into free space waves is not unique, the manner of the conversion is unique and is fundamentally different than all other antennas that are currently in use.

11. As was noted in Comments filed the First Category XI NPR,[8] metamaterial technology is new technology that can be used to cause microwave radiation to behave in ways previously thought to be impossible. Kymeta is using this technology to develop flat panel antennas that use very little power (particularly as compared to phased-array antennas), can electronically steer beams and are lighter and have a much smaller profile than mechanically steered antennas.

12. The metamaterial surface scattering antennas being developed by Kymeta employ periodic arrangements of sub-wavelength sized adaptive elements (complementary electric inductive-capacitive resonator ("complementary electric LC" or "CELC") conductors), to convert guided microwaves into free-space microwaves (and vice-versa). An analogue electronic control of the excitation of the CELCs employing holographic principles is used to control the beam of the free space radiation pattern; *i.e.*, to achieve beam steering.

Report to Congress, Section 1248 of the National Defense Authorization Act for Fiscal Year 2010 (Public Law 111-84), RISK ASSESSMENT OF UNITED STATES SPACE EXPORT CONTROL POLICY (March 15, 2012).

[7] *Remarks as Delivered by Secretary of Defense Robert M. Gates,* Ronald Reagan Building and International Trade Center, Washington DC, (April 20, 2010), http://www.defense.gov/Speeches/Speech.aspx?SpeechID=1453

[8] *See*, D. Burnett, Comments on Proposed USML Category XI (28 January 2013).

13. The analog control of the excitation of the CELCS differentiates the Kymeta metamaterial surface scattering antennas from phased array radars, which employ digital signal processing and phase shifting to electrically form and steer beams (phased array radar antennas do not have adaptive elements).

14. Another difference between Kymeta metamaterial surface scattering antennas and other types of conventional antennas is that the laws of physics constrain the bandwidth of a metamaterial surface scattering antenna. The CELC's are uniquely designed to be resonant for a specific frequency band. Two constraints result: (1) the antenna works only in the frequency band for which it is designed; and (2) the contiguous bandwidth of the antenna within that frequency band is limited.

15. Kymeta currently is exploring the boundaries of the contiguous bandwidth limitation and it appears that it will not be possible to design a metamaterial surface scattering antenna using CELCs to create a contiguous channel that exceeds approximately ten per cent (10%) of the frequency*; e.g.,* no more than 3 GHz of contiguous bandwidth for an antenna operating at 30 GHz, no more than 1.2 GHz of contiguous bandwidth for an antenna operating at 12 GHz, etc.).

16. Even greater performance limitations that are inherent in the hardware can be created by the control software (a metamaterial surface scattering antenna is a software defined antenna).

17. With both hardware and software limitations, a Kymeta antenna designed to operate in one frequency band will not operate in another frequency band; *e.g*., a Ka-band antenna will not function in X-band. A metamaterial surface scattering antenna operating in Ka-band would have different CELCs and different software than a metamaterial surface scattering antenna operating in X-band.[9]

[9] It appears that there is no universally agreed upon nomenclature for frequency bands and that there are a variety of nomenclatures in use that are not identical. See, http://www.radioing.com/eengineer/bands.html. Furthermore, it appears that the FCC avoids usage of

18. There are some additional consequences of these limitations. One of them is that a transmit antenna operating at 30 GHz and a receive antenna operating at 20 GHz are not identical and one antenna cannot be used for both transmit at 30 GHz and receive at 20 GHz. Kymeta is exploring interleaving the CELC's arrays for transmit and receive, but while the resulting antenna may look like just one antenna, functionally it will still be two antennas.

19. The same consequence results for dual-band or multiple-band antennas. While it may be possible to interleave arrays resonant to different frequencies (with associated software specific to those frequencies), the resulting antenna could look like one antenna but functionally would be two or more antennas.

20. As is apparent from the above description, metamaterial surface scattering antennas work fundamentally different than both conventional dish antennas and phased array antennas. The chief advantages of metamaterial surface scattering antennas is that they will have a much smaller form factor, will use only a fraction of the power when compared to other types of antennas and should be less expensive to build and operate.

21. It is quite understandable that the operators and users of commercial radio services are welcoming the development of Kymeta metamaterial surface scattering antennas that will meet their requirements. Before discussing our proposals to amend proposed paragraph (10)(c), in the next section of these comments we will review the radiocommunication services for which Kymeta metamaterial surface scattering antennas are being developed and what antenna performance requirements are necessary for those services.

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terms such as Ku-band or Ka-band when assigning frequencies. We recommend that if the term "frequency band" is used in the regulations, that some definition be provided to avoid confusion. Also see, Recommendation ITU-R V.431-7, *Nomenclature of the Frequency and Wavelength Bands used in Telecommunications,* (2000), http://www.itu.int/dms_pubrec/itu-r/rec/v/R-REC-V.431-7-200005-I!!PDF-E.pdf.

Commercial Radiocommunication Services and Antenna Requirements

22. As noted above, Kymeta is developing antennas that are intended to be used in several different commercial radiocommunication[10] services: fixed-satellite services[11] (GEO[12], LEO[13] and MEO[14] systems), broadcasting-satellite services,[15] mobile-satellite services[16] (aeronautical mobile-satellite[17], land mobile-satellite[18] and maritime mobile-satellite[19] – also GEO LEO and MEO systems), fixed services[20] and mobile services.[21]

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[10] "Radiocommunication" means "[t]elecommunication by means of radio waves." Article 1 – Definitions, ITU Radio Regulations ("ITU RR"), http://www.ictregulationtoolkit.org/en/toolkit/notes/PracticeNote/2824. "Telecommunication" means "Any transmission, emission or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems. ITU RR.

[11] "Fixed-satellite service" or "FSS" means "A radio-communication service between earth stations at given positions, when one or more satellites are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the inter-satellite service; the fixed-satellite service may also include feeder links for other space radiocommunication services. ITU RR, Footnote 6, *supra*.

[12] Geostationary Earth Orbiting or "GEO".

[13] Low Earth Orbiting or "LEO".

[14] Medium Earth Orbiting or "MEO".

[15] "Broadcasting-satellite service" or "BSS" means "A radio-communication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public. In the broadcasting-satellite service, the term "direct reception" shall encompass both individual reception and community reception." ITU RR, Footnote 6, *supra*.

[16] "Mobile-satellite service" or "MSS" means "A radio-communication service
- between mobile earth stations and one or more space stations, or between space stations used by this service; or
- between mobile earth stations by means of one or more space stations. This service may also include feeder links necessary for its operation."

ITU RR, Footnote 6, *supra*.

[17] "Aeronautical mobile-satellite service" or "AMSS" means "A mobile-satellite service in which mobile earth stations are located on board aircraft; survival craft stations and emergency position-indicating radio beacon stations may also participate in this service. ITU RR, Footnote 6, *supra*.

[18] "Land mobile-satellite service" or "LMSS" means "A mobile-satellite service in which mobile earth stations are located on land. ITU RR, Footnote 6, *supra*.

[19] "Aeronautical mobile-satellite service" means "A mobile-satellite service in which mobile earth stations are located on board ships; survival craft stations and emergency position-indicating radio beacon stations may also participate in this service." ITU RR, Footnote 6, *supra*.

23. The first Kymeta antenna for the Kymeta Portable Satellite Terminal ("PST) is intended to be marketed to users of the Geostationary-Satellite Orbit systems ("GSO") operating in the Fixed-Satellite Service ("FSS") and utilizing the Ka-band frequencies.[22]

24. GSO FSS operators generally provide one or more communication channels to their users. These communication channels are derived from a portion of the frequency bandwidth assigned to them by their Responsible National Regulatory Administration.[23] These communication channels can vary in the amount of bandwidth they utilize pending on the type of modulation and data speeds required. An 80 MHz channel is not uncommon for users of an FSS system.

25. Consequently the first generation Kymeta antennas to be used on the PSTs are designed to operate in the Ka-band frequency band assigned to an FSS system operator and to provide a communication channel with a contiguous bandwidth of 100 MHz within the frequency band assigned to that operator.

26. Because the market for Ka-band GSO FSS antennas is world-wide and the operators of GSO FSS systems can be located in any country, the Kymeta antennas

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[20] "Fixed service" or "FS" means "A radio-communication service between specified fixed points." ITU RR, Footnote 6, *supra*.

[21] "Mobile service" or "MS" means "A radio-communication service between mobile and land stations, or between mobile stations." ITU RR, Footnote 6, *supra*.

[22] For the purposes of these comments we are using the term "Ka-band" with respect to the FSS to refer to the frequency spectrum between 18.3 GHz and 21.2 GHz (primarily for space-to-Earth or "downlink" communications) and the frequency spectrum between 24.75 and 31 GHz (primarily for Earth-to-space or "uplink" communications) allocated by the ITU for use by FSS on a primary basis. See, the ITU Table of Frequency Allocations, which is reproduced in the FCC Table of Frequency Allocations, On-Line FCC Table of Frequency Allocations (April 13, 2013) http://transition.fcc.gov/oet/spectrum/table/fcctable.pdf.

[23] The "Responsible National Regulatory Administration" in the United States for making frequency "assignments" for commercial radio services (i.e., radio station authorizations to Non-Federal users) is the Federal Communications Commission ("FCC"). The "Responsible National Regulatory Administration" in the United States for making frequency "assignments" for Federal radio services (i.e., radio station authorizations to Federal users) is the National Telecommunications and Information Administration ("NTIA") which is part of the U.S. Department of Commerce.

must be able to operate in any portion of the Ka-band allocated[24] by the ITU for such services and assigned[25] by the Responsible Regulatory Administration to be utilized for particular GSO FSS provider.

27. Because the earth-stations and the space-stations that communicate using FSS GSO systems are relatively fixed, there is no requirement for fast beam switching for this service. Consequently, the first generation antennas being designed for the PSTs to be used with FSS GSO systems have a beam switching speed of approximately 100 milliseconds. Kymeta believes this beam switching speed is sufficient to meet the needs of users of FSS GSO systems.

28. The second generation of Kymeta antennas currently under development are antennas for use in the Aeronautical Mobile Satellite Service ("AMSS"). As publicly announced, Kymeta and INMARSAT are developing such a terminal for use by airplane operators (both commercial airlines and private aircraft).

29. Mobile-station AMSS antennas will operate in the Ka-band frequencies allocated for MSS and assigned to an MSS operator. These are the same Ka-band frequencies allocated for FSS.

30. Nevertheless, there are requirements for antennas to be used in terminals for AMSS that go beyond the requirements for the FSS GSO earth-station antennas. Unlike FSS earth-stations, the earth-stations that need to communicate with the MSS satellite are mobile. This means that the mobile earth-stations can be moving relatively

[24] "Allocated" means "Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the radio astronomy service under specified conditions. This term shall also be applied to the frequency band concerned." ITU RR, Footnote 6, *supra*.

[25] "Assigned" means "Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions." ITU RR, Footnote 6, *supra*. For the United States, the term "administration" used in this definition is the same as the term "Responsible National Regulatory Administration" as defined in Footnote 19, *supra*.

fast within the footprint of the satellite service area and the antenna bore sight of the mobile earth-station can be pitching, rolling and yawing if the aircraft pitches, rolls and yaws.

31. In order for the antenna to maintain beam pointing at the satellite (which is necessary to maintain continuous communication) the antenna needs to be able to steer the beam to compensate for the motion of the aircraft. This means that the beam switching speed for aeronautical mobile terminal antennas must be much faster than for FSS GSO.

32. To meet this requirement, the second generation of Kymeta metamaterial surface scattering antennas are being designed to have a beam switching capability of 30 milliseconds. Such a beam switching speed is a fundamental requirement for the aeronautical antennas that are being developed for the commercial aeronautical mobile-satellite services offered by satellite operators such as INMARSAT.

33. The third generation Kymeta antennas are being designed to have a 500 microsecond beam switching ability. This beam switching speed is being driven by the requirements of land mobile (car and truck) terminals and maritime terminals that require even faster beam switching speeds than aeronautical terminals. NGSO systems require even faster beam switching capability (beam slewing) than GSO systems because in such systems both the satellite and the mobile terminal may be moving in opposite directions at a high speed. Furthermore, a beam switching speed is consistent with the performance of the liquid crystal used in the configurable elements of the Kymeta antennas.

34. As was noted previously, DDTC has proposed that the boundary for determining whether an antenna be controlled by ITAR or by EAR should be antennas with four or more elements and a beam switching speed of 50 milliseconds (pursuant to paragraph (c)(10)(i). This proposed beam switching speed of 50 milliseconds is far too slow to accommodate the requirements for the second and third generation antennas being

designed and developed by Kymeta. We are proposing that no limitation on beam switching speed is necessary, but if a beam switching speed is deemed necessary by DDTC that it be specified at 1 millisecond, but then only in combination with other functional capabilities. See paragraphs 48, 49 and 50, *infra*.

35. Other technical developments related to proposed paragraph (c)(10)(i)) also are on Kymeta's development road map. These include, improving the instantaneous bandwidth, dual-frequency beam antennas and independent steering of beams and nulls.

36. Of particular interest to GSO FSS service providers who provide both Ku-band and Ka-band services is a Portable Satellite Terminal ("PST") with an antenna that can operate in both Ku-band and Ka-band. Kymeta intends to develop a Ku/Ka-band antenna to meet the requirements of these commercial operators.

37. The consequence of such a development would be an apparent single antenna that could operate in more than one frequency band. As explained previously, the word "apparent" is used intentionally because, while from outward appearances such an antenna would look like a single antenna, in reality it would, of necessity, be two separate antennas with the CELC arrays interleaved to share the same footprint. See the discussion at paragraphs 18 and 19, *supra*.

38. Kymeta also has received expressions of interest from potential customers for a "single" transmit and receive antenna. While it is possible that the transmit and receive CELC arrays could be interleaved, the transmit and receive antennas would be physically and functionally separate. See the discussion at paragraphs 18 and 19, *supra*.

39. The expansion of Kymeta's market to users of non-geostationary satellite systems ("NGSO") raises an additional requirement: forming and steering beams independently from forming and steering nulls. Kymeta has received an expression of

interest for such a capability by FSS GSO and NGSO operators. The root of this requirement for NGSO systems is that NGSO satellites cross orbital paths with both GSO systems and other NGSO systems. This imposes high coordination requirements on the NGSO operator (who cannot cause harmful interference with any GSO operator and who must coordinate with other NGSO systems according to Part 25 of the FCC regulations and the ITU Radio Regulations). Harmful interference could be avoided and coordination could be made more easily achievable if it were possible for the NGSO earth stations to steer nulls independently from steering the beams. However, as we discuss below, the depth of the null does not have to exceed 20 dB for communication purposes (*i.e.*, to meet FCC and ITU requirements).

40. Other future developments that are anticipated are antennas for use by users of FSS, MSS, FS, and MS spectrum in other portions of the microwave frequency bands above 30 GHz. In particular, Q/V (35-75 GHz) and W (75-110 GHz) bands represent a new spectrum resource that could be used to realize gigabit-connectivity (in fixed-, mobile, and satellite-services). In order to support innovative broadband applications, Kymeta will continue to develop its technologies for use across these frequencies.

41. It should be understood that the higher frequency bands are more suitable for metamaterial surface scattering antennas than lower frequencies. The configurable elements generally are 1/3rd to 1/4th the size of the frequency length. At 30 GHz (uplink) the wavelength would be approximately 10 millimeters and the elements for a 30 GHz antenna would be approximately 2.5 – 3.3 millimeters in diameter. As the frequency decreases, the wavelength increases and doubles in length each time the as the frequency is reduced by fifty percent. The obverse also is true: as the frequency increases, the wavelength decreases and reduces by fifty percent for every doubling of the frequency. Consequently an element in a 10 GHz antenna would be approximately 5-7 millimeters in diameter and an element in a 40 GHz antenna would be approximately 1.25 – 1.65 millimeters in diameter.

42. However, the overall size of the antenna array would increase or decrease by a factor of 4 as the frequency is halved or doubled (respectively) in order to achieve the same performance. Thus an antenna operating at 10 GHz would have to be 3,600 square inches (60x60) to achieve the same performance as a 900 square inch (30x30) antenna operating at 20 GHz and an antenna operating at 40 GHz could achieve the same performance in 225 square inches (15x15). This means that metamaterial surface scattering antennas operating in frequencies below 6 GHz would be rather unwieldy.

Metamaterial Surface Scattering Antennas Should Not be Listed as Defense Articles

43. The Export Control Reform ("ECR") initiative is intended, *inter alia*, to make the USML a more positive list that describes the articles that are controlled in a positive and less subjective manner than "designed or developed for defense purposes." ECR also is intended to focus the more stringent controls on articles that provide the United States with a critical national security or intelligence advantage, technology that is unique to the U.S. military industrial base,[26] or equipment or technology that needs to be controlled to prevent global terrorism, the proliferation or use of weapons of mass destruction or the proliferation of advanced conventional arms. [27]

44. Metamaterial surface scattering antennas are Not Unique to the U.S. Military Industrial Base – Metamaterial surface scattering antennas are being developed by Kymeta for commercial purposes. Kymeta is not a defense contractor, is not using DOD funding for its design or development and has no security clearance. Kymeta clearly is not part of the U.S. military industrial base. The metamaterial surface

[26] These are the standards used by the Secretary of Defense and the Secretary of State to determine which satellites, parts and components should be controlled as defense articles controlled by the State Department and which should be controlled as dual-use articles by the Department of Commerce. See, Report to Congress, Section 1248 of the National Defense Authorization Act for Fiscal Year 2010 (Public Law 111-84), RISK ASSESSMENT OF UNITED STATES SPACE EXPORT CONTROL POLICY (March 15, 2012).

[27] *Remarks as Delivered by Secretary of Defense Robert M. Gates,* Ronald Reagan Building and International Trade Center, Washington DC, (April 20, 2010), http://www.defense.gov/Speeches/Speech.aspx?SpeechID=1453

scattering antennas and metamaterial surface scattering antenna technology being developed by Kymeta clearly are not unique to the U.S. military industrial base.

45. Metamaterial surface scattering antennas are not Purely Defense Related – The focus of the development of the metamaterial surface scattering antenna technology by Kymeta is purely commercial, not defense. As described above, the Kymeta antennas under development are intended for users of commercial communications systems; particularly commercial communication satellite systems. Of course, these products may prove to be useful for defense users as well as commercial users of these communications systems but that use does not change the inherently commercial (non-defense) nature of the antennas.

46. Strict Control of Metamaterial surface scattering antennas and Metamaterial surface scattering antenna Technology is not required to Prevent Global Terrorism, Proliferation of Weapons of Mass Destruction or Proliferation of Advanced Conventional Weapons – Kymeta's metamaterial surface scattering antennas are not weapons and have no relation to advanced conventional weapons. Strict control of metamaterial surface scattering antennas or technology is not required to prevent proliferation of conventional weapons or advanced conventional weapons. Metamaterial surface scattering antennas and technology have no application in the fabrication, proliferation or delivery of weapons of mass destruction. Therefore, strict control of metamaterial surface scattering antennas or technology is not required to prevent the proliferation of weapons of mass destruction. Similarly, Kymeta's metamaterial surface scattering antennas and technology have no relation to the spread of global terrorism and therefore strict controls of metamaterial surface scattering antennas or technology is not required for that purpose.

47. Metamaterial Surface Scattering Antennas or Technology do not Provide the U.S. with a Critical National Security or Intelligence Advantage – Kymeta's metamaterial surface scattering antennas, because they may be uniquely designed to operate in frequencies assigned for use by commercial communication service providers, cannot

be viewed as providing the U.S. with a critical national security or intelligence advantage. More difficult to assess is whether the control of such antennas or technology is necessary to protect a critical national security or intelligence advantage. We believe that critical national security or intelligence advantages are not threatened by the Kymeta metamaterial surface scattering antennas because of the inherent limitations of such antennas that have been discussed above.

48. However, if it is deemed necessary to control, as defense articles, metamaterial surface scattering antennas that provide functionalities above a certain defined threshold, we believe the best way to protect national security without destroying the commercial future of metamaterial surface scattering antennas is to define that threshold in (c)(10)(i) as a combination of four factors: (1) the number of elements; (2) beam and null steering capability; (3) beam switching speed; <u>and</u> (4) the null depth. As discussed in our proposed option 3 below (see paragraph 56, *infra*), we are proposing that the threshold in (c)(1)(i) be: (1) antenna with four or more elements; (2) antenna with the capability to independently steer beams and nulls; (3) antenna with beam switching speed of faster than 1 millisecond; <u>and</u> (4) and antenna with a null depth of 20 dB or more.

49. As we have demonstrated in the discussion above, Kymeta needs to provide its customers with an antenna that will have a beam switching speed that meets the beam switching (antenna slewing) requirements of the GSO and NGSO mobile satellite services (see paragraphs 31-13, *supra*), an antenna that is capable of independently steering beams and nulls (see paragraph 30, *supra*), an antenna that incorporates the state of the art for liquid crystal, and a capability to create and steer nulls with depth of 20 dB or less to meet FCC Part 25 and ITU Radio Regulation requirements.

50. Kymeta asserts that any antenna that does not meet all four of these requirements should not be captured by (c)(10)(i). It should be noted that even if an antenna did not meet all four requirements proposed for (c)(10)(i), the antenna may be captured if it exceeds any of the other requirements enumerated in (c)(10)(ii), (iii) or (iv).

For example, if the antenna produces a null depth of 35 dB or more, then it is captured by (c)(10)(ii) regardless of whether it is captured by (c)(10)(i).

Suggested Changes to the Draft Regulations

51. It is our assumption that paragraph (c)(10) was intended to cover phased array antennas and not metamaterial surface scattering antennas (which did not exist at the time of the first draft of the proposed rules). Even if the intent of the rules was not to be so narrow as to cover only phased array antennas, metamaterial surface scattering antennas could not have been intended to be covered because they did not exist at the time of the first draft.

52. Furthermore, we believe it is fair to say that Kymeta's metamaterial surface scattering antennas are being "specially" designed for as commercial articles. However, because of the manner in which the revised rules for all Categories of the USML are being drafted, there is no release from the USML for articles that are enumerated but that are "specially designed" as commercial articles. Consequently, any article that is "specially designed" as a commercial article must not be enumerated on the USML if it is not be subject to the controls of the EAR and not the strict controls of the ITAR.

53. That having been said, we can understand that metamaterial surface scattering antennas may, in future, be specially designed for defense articles and that export control of such specially designed metamaterial surface scattering antennas may fit the criteria for strict controls as discussed above. With these ideas in mind, we would like to propose alternative language for paragraph (c)(10).

54. Option One – Our proposed first option for amendment of paragraph (c)(10) is to add a new paragraph (c)(10), revise and renumber existing paragraph (c)(10) as (c)(11) and renumber remaining paragraphs under (c) as follows:

> (10) Antenna operating in frequencies between 6 GHz and 300 GHz employing a periodic arrangement of sub-wavelength sized configurable elements

> that are specially designed for defense articles in this subchapter and specially designed parts and components therefor.
>
> (11) Antenna, other than antenna enumerated in (c)(10) above, and specially designed parts and components therefor, that: . . .

This option would clearly capture a metamaterial surface scattering antenna specially designed for a military radar (paragraph (a)(3)) or an electronic combat system (paragraph (a)(4)), just to cite two examples, but would not capture a metamaterial surface scattering antenna designed for transmitting or receiving radiocommunications via a commercially operated FSS or MSS system (which we assert should be controlled under ECCN 5A991.f).

55. Option Two – An alternative option would be to add a new footnote to (c)(10) either as a stand-alone footnote or in combination with the language proposed above. Such a footnote would provide as follows:

> **Note 2 to paragraph (c)(10):** This category does not control antenna operating in frequencies between 6 GHz and 300 GHz employing periodic arrangements of sub-wavelength sized configurable elements and operating in frequency spectrum assigned, consistent with the ITU Radio Regulations, to a radiocommunication system operator for provision of radiocommunication services as a common carrier or as a non-common carrier. Such antenna are controlled in ECCN 5A991.f.

This proposed note, even if used without Option One, would achieve the same result as Option one because it would not exempt metamaterial surface scattering antennas operating in frequencies used for enumerated defense articles and would not apply to frequencies outside of the range 6 GHz to 300 GHz (*e.g.*, would not apply to military sensitive frequencies below 6 GHz and would not apply to light frequencies). It would impose one additional requirement and that would be that the frequency be "assigned" for use by a radio communication operator. As may be recalled from the discussion above (see paragraph 25 and accompanying text, *supra*) an assignment is an authorization issued by a responsible regulatory administration. This language would accommodate commercial antennas that operate in slightly different frequencies in

different ITU Regions consistent with the frequency allocations for the ITU Regions and the assignments by various administrations in each ITU Region. Furthermore, the assignment must be consistent with the ITU Radio Regulations for the proposed Footnote to apply.

56. Option Three – A slightly less satisfactory option (from Kymeta's point of view) to the two options above is to amend paragraph (c)(10)(i) to apply only to antenna that: (1) employ four or more elements; (2) electronically steer the nulls and beams independently of each other;[28] (3) create angular nulls with a null depth of greater than 20 dB; and (4) achieve a beam switching speed faster than one millisecond. Such an amendment would read as follows:

> (10) Antenna, and specially designed parts and components therefor, that:
>
> (i) employ four or more elements, electronically steer angular beams and independently steer angular nulls, create angular nulls with a null depth greater than 20 dB, and achieve a beam switching speed faster than 1 millisecond;
>
> (ii) Form adaptive null attenuation greater than 35 dB with convergence time less than 1 second;
>
> (iii) Detect signals across multiple RF bands with matched left hand and right hand spiral antenna elements for determination of signal polarization; or
>
> (iv) Determine signal angle of arrival less than two degrees (*e.g.*, interferometer antenna);

[28] As was noted in the comments to the First Category XI NPR, null forming has many commercial applications and is an unattended by-product of any beam steering technology and is a part of signal optimization that is inherent in the design of "smart" antennas. DDTC was advised that the beam and null steering language in proposed Article XI(c)(9) appears to capture MIMO technology in home routers. Kymeta has limited its comments to the treatment of metamaterial surface scattering antennas and technology under the proposed rules. Kymeta does not know if the home router and other potentially affected cellular equipment industries are aware of the potential consequence on their industries of the proposed rules.

We believe that the proposed changes to (c)(10)(i) above would be sufficient to protect critical national security or intelligence advantages and at the same time allow the design and development of Kymeta's commercial metamaterial surface scattering antennas. These changes would accommodate the requirements that have been communicated to Kymeta by potential customers and that were discussed above.

Conclusion

57. Kymeta asserts that it is not in the interest of the United States to control strictly the export of the metamaterial surface scattering antennas being designed by Kymeta. We have demonstrated that the metamaterial surface scattering antennas and metamaterial surface scattering antenna technology are not purely related to defense. We also have demonstrated that strict export controls on metamaterial surface scattering antennas or technology are not necessary to prevent the development or spread of –

- Global Terrorism;
- Weapons of Mass Destruction
- Advanced Conventional Weapons

58. We also have demonstrated that strict control of the export of metamaterial surface scattering antennas that have the functions necessary for the commercial marketplace are not necessary to protect critical national security or intelligence capabilities because the threshold for protecting such capabilities can be satisfied without impinging on the functions essential for commerciality.

59. Kymeta is creating new U.S. technology, new U.S. jobs and new world-wide markets for U.S. products. Kymeta is the type of company that is leading the reemergence of the U.S. economy through new inventions and new investments.

60. The high stakes for Kymeta and for the U.S. economy underscores the importance of Kymeta's suggested revisions to the proposed rules. We believe that the proposed revisions would avoid unnecessarily subjecting an entire new commercial industry to ITAR control when a few judicious changes would allow this new commercial industry to flourish. Kymeta respectfully urges DDTC to amend the proposed rules as suggested by Kymeta.

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September 6, 2013

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EXELIS

September 9, 2013

To: DDTC Response Team

Subject: Comments on Amendment to ITAR 121.1: Revision of USML Category XI – Military Electronics

Exelis Inc. is pleased to respond to the Department of State's request for comment to the proposed amendment of USML Category XI. Exelis appreciates the years of work that has gone into this amendment, and we believe the recommendations set forth by DDTC offer a vast improvement to the current rendering of USML Category XI. DDTC and its interagency partners have done an admirable job identifying critical technologies for continued ITAR-control in creating the enclosed positive list. Exelis has sought to provide thoughtful and constructive comments that are consistent both with the aims of Export Control Reform and the commercial interests of Exelis Inc.

§121.1 General. The United States Munitions List.
* * * * *
Category XI— Military Electronics

> *(a)(1)(i) Active or passive acoustic array sensing systems or acoustic array equipment capable of "real-time processing" that survey or detect, and also track, localize (i.e., determine range and bearing), classify, or identify surface vessels, submarines, other undersea vehicles, torpedoes, or mines, having any of the following:*

Exelis proposes the insertion of quotation marks around the term "real-time processing" along with a note to paragraph (a)(1)(i) to define "real-time processing" perhaps with a specific latency figure. This will alleviate existing ambiguity around the term and set a common understanding for industry.

> *(d) Technical data (see § 120.10 of this subchapter) and defense services (see § 120.9 of this subchapter)* ***directly related*** *to the defense articles enumerated in paragraphs (a) through (c) of this category and classified technical data directly related to items controlled in CCL ECCNs 3A611, 3B611, 3C611, and 3D611 and defense services using the classified technical data.*

Exelis seeks clarification of the phrase "directly related." Specifically, would the phrase "directly related" include software applications previously controlled under USML Category Xl(d) that were developed to store, disseminate, and manage imagery and other data collected by sensor systems controlled by other categories of the USML as well as the CCL? The phrase "directly related" implies that such software applications are not controlled herein. Though such software is utilized with Xl(b) collection systems, it is not exclusive (i.e. "directly related") to that paragraph and can perform storage, dissemination, and management of data collected from multiple ground, airborne, or space sensors, including sensors commercially controlled on the CCL.

Regards,

Ronald R. Roos
Deputy General Counsel and
Assistant Secretary,
International Trade and Compliance

RR/lp

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September 9, 2013

Ms. Sarah Heidema
Acting Director
ODTC Policy, SA-1, Room 1200
Directorate of Defense Trade Controls
Bureau of Political Military Affairs
U.S. Department of State
Washington, DC 20522-0112

Subject: Response to the Proposed Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI - 78 FR 45018, RIN 1400-AD25

Dear Ms. Heidema,

DRS Technologies, Inc. is fully supportive of the U.S. Government efforts to reform the regulations and systems for controlling exports. As a 7,000+ employee company with products and customers in both the international commercial and defense markets, we are very familiar with the current export control systems. The reforms are much needed to help the U.S. export control apparatus stay in step with the ever evolving and changing global markets and national security climates.

Overall, this newest version of the proposed rule revising USML Category XI is a significant improvement over the December 2012 version. Most of the document contains clear and rational positive criteria that help to establish a clear line between what is subject to the jurisdiction of the ITAR and what is not. There are exceptions to this however, noted below, that we urge the department to further evaluate.

Specific Comments on USML Category XI-Electronics

1. XI(a)(7), Developmental electronic devices, systems, or equipment funded by the Department of Defense.

As proposed, the only criteria for USML control is that an item be an electronic device, developmental, and funded by the DoD. There is not even a requirement the item be enumerated in Category XI or designed solely for a military-only application. The current category XI entry at least requires the developmental electronic equipment to be specifically designed or modified for a military application or military use. This proposed revision appears inconsistent with both Executive Order 11958, which delegates the determination of defense articles to the Secretary of State, and with one of the key purposes of export control reform, that of providing a bright line regarding the export control jurisdiction of articles and services. This proposed revision does not

define the criteria the DoD will use in determining a developmental electronic device or system to be a defense article. This approach of not citing the specific positive criteria to enable the public to determine if such an item is or is not a defense article also appears to be in conflict with the 7th Circuit Court of Appeals decision in *U.S. v. Pulungan*, 2009 WL 1650382 (C.A.7 (Wis.)). In this 2009 case the 7th Circuit overturned the conviction of the defendant, who was found guilty of exporting rifle scopes in violation of the International Traffic in Arms Regulations (ITAR), stating in part "a designation by an unnamed official, using unspecified criteria, put in a desk of a drawer, and taken out only for use at a criminal trial, and immune from any evaluation by the judiciary, is the sort of tactic usually associated with totalitarian regimes." Additionally, it sets up the real possibility of an identical item being developed by another party, not under DoD contract, this is commercial because it is not enumerated on the USML. An item, electronic or otherwise, in development or not, funded by the DoD or not, either is or is not a defense article. Its phase of development and source of funding have no place in deciding export control jurisdiction. A defense article must be clearly enumerated on the USML. If it is enumerated, it is a defense article, regardless of development and regardless of who paid for it. As such, we strongly recommend this entry be deleted.

2. XI(b), Electronic systems or equipment specially designed for intelligence purposes that collects, surveys, monitors, or exploits the electromagnetic spectrum (regardless of transmission medium), or for counteracting such activities.

The revisions to this entry are a significant improvement to the December 2012 draft category XI. However, the lack of definition of what constitutes "intelligence purposes" continues to be problematic.

The note to paragraph (b) states "Examples of articles within the scope of this paragraph include:"

> (1) Direction finding systems for non-cooperative objects that have an angle of arrival (AOA) accuracy better than (less than) two degrees root mean square (RMS) and ''specially designed'' for applications other than navigation;
> (2) systems and equipment specially designed for measurement and signature intelligence (MASINT); and
> (3) technical surveillance countermeasure (TSCM) or electronic surveillance equipment and counter electronic surveillance equipment (including spectrum analyzers) for the RF/microwave spectrum having all of the following:
>
> > (i) A sweep or scan speed exceeding 250 MHz per second;
> > (ii) a built-in signal analysis capability;
> > (iii) a volume of less than 1 cubic foot;
> > (iv) record time-domain or frequency domain digital signals other than single trace spectral snapshots; and
> > (v) display time-vs-frequency domain (*e.g.,* waterfall or rising raster).

The note to paragraph (b) provides examples of what the entry is trying to control, but is not exhaustive. Absent a clear definition for "intelligence purposes," any electronic system or

equipment that collects, surveys, monitors, or exploits the electromagnetic spectrum could be captured by this entry. Given that "electromagnetic spectrum" is defined as the entire range of wavelengths or frequencies of electromagnetic radiation extending from gamma rays to the longest radio waves and including visible light, a commercial police radio scanner purchased from Radio Shack could be determined to meet the above criteria and therefore be captured by this entry. We recommend the department provide additional clarifying guidance as to what constitutes "intelligence purposes" for this entry.

3. XI(c)(2), Printed circuit boards (PCBs) and populated circuit card assemblies for which the layout is specially designed for defense articles in this subchapter.

As written, this entry not only applies to items listed in Category XI, but to all defense articles listed on the entire USML. We agree there are certain printed circuit boards and populated circuit card assemblies of such importance as to warrant control under the ITAR. However, we do not agree that all printed circuit boards and populated circuit card assemblies with the layout so designed for defense articles would require such control. The layout of a circuit board may or may not be important. Regardless, the layout is only the path that electrons must take to get from the entry point on the board to the exit point. As such, circuit boards are simply one low level step in the multi-layered building block of a defense article. Additionally, in the vast majority of cases the computer chips, resistors, transistors, and other components that make up the populated circuit card assembly are all commercial items. In general, the critical technology lies not with the board itself or with those commercial components, but with any unique, specially designed chips mounted on the board, with any unique firmware installed on the components on the board, and the software that runs through the overall system. Special chips, firmware, and software are the critical pieces to a defense article. Yet, the proposed amendment for PCBs is overly generic. There are certain printed circuit boards whose layout is directly responsible for the defense article performing the defense functions that are the identified reason for controlling the end item on the USML. Such printed circuit boards should be controlled. The result of setting as the positive criteria the requirement to tie the layout of the board to the function of the defense article for the reasons it is controlled would result in such critically important boards as those associated with guiding missiles to their intended targets, encrypting or decrypting secure communications, and electronic jamming systems to remain controlled on the USML while the printed circuit boards associated with mundane tasks such as starting an engine on an aircraft or tank would be appropriately governed by the Export Administration Regulations (EAR). This recommended approach is consistent with the stated objectives of the export control reform effort. We recommend this paragraph be amended to read "Printed circuit boards (PCBs) and populated circuit card assemblies which, as a result of development, are peculiarly responsible for an end item enumerated in this subchapter meeting or exceeding the positive criteria identified as the reason(s) for control."

4. XI(c)(14), Tuners having all of the following:
   (i) An instantaneous bandwidth of 30 MHz or greater; and
   (ii) A tuning speed of 300 microseconds or less to within 10 KHz of desired frequency.

Tuners meeting the above positive criteria are currently commercially available in both the U.S. and in several foreign countries, including such commercial vendors as Kalman Creations in the US and numerous vendors in Germany and India. Most tuners use digital technology. These commercially available tuners actually measure their tuning speed in low, single digit microseconds or nanoseconds, not the very lethargic 300 microsecond threshold proposed in the draft rule. Additionally, the instantaneous bandwidth of these devices greatly exceeds the 30 MHz threshold. The RF spectrum has become saturated with commercial use, as a result there is an ever increasing commercial need for portable and non-portable high performance RF tuners capable of performing well above both of these thresholds for commercial Wi-Fi, Industrial Remotes, Wireless Microphone, Business & Emergency Two-Way, Assisted Listening, Telco / Cellular, Intercom, and Radio / TV Broadcast applications. Because of this ever growing commercial need for high performance RF tuners, the above thresholds are completely inadequate to define what is uniquely military such that these items require control on the USML. If there are unique, military-only features such as the ability to tune in on **and** decrypt military secure communications, those unique military capabilities should be cited as the reason for control. Absent that, a tuner that can simply accurately and quickly tune to a desired RF frequency and instantaneously monitor a wide swath of the RF band, most of which is apportioned by the FCC for non-military use, should not be controlled on the USML. As such, we recommend this entry be deleted.

5. XI(c)(17), Any part, component, accessory, attachment, equipment, or system that contains classified software.

Determining an item to be a defense article simply because it has classified software loaded on it is a significant digression from current practice. Such an approach will cause significant confusion regarding the jurisdiction of hardware. The current practice is that hardware with such software loaded on it must be protected from unauthorized access due to the software, but the hardware retains its export jurisdiction. Loading classified software on an electronic item is no different than putting a classified document in a safe. In the case of the safe, access to it is controlled, but the safe remains a commercial safe. An example of the negative impact of the proposed change would be that commercial laptop computers used by the US government for processing classified information would themselves become defense articles simply because of the classified software. Given that the computer itself would be determined to be a defense article every part, component, accessory, and attachment would then have to be reviewed to see if they meet the definition of specially designed. For example, based on the draft entry XI(c)(2) regarding printed circuit boards, the commercial printed circuit boards in the computer would then be regarded as USML because they are specially designed for a commercial computer that is now USML simply because it contains classified software. Additionally, the computer user manual, as information required for "use" would be considered USML controlled technical data, thus mandating that the U.S.G. mark it as such. The negative implications of the consequences of this entry could be staggering. Access to such hardware must be controlled due to the presence of the classified software. But, unless the hardware itself is somehow modified by having the classified software installed on it, the hardware should retain its export control jurisdiction. As such, we strongly recommend this entry be deleted.

As we stated earlier, with the above exceptions, the proposed rule conforms extremely well to the tenants of the export control reform effort. It establishes a clear jurisdictional line and limits control under the ITAR to those items truly requiring such control. We do strongly urge the department to consider our above comments in amending the proposed rule before final publication.

Should you have any questions in this matter or require additional information, please contact Mr. Greg Hill at (703) 412-0288, ghill@drs.com.

Sincerely,

Heather C. Sears
Vice President, Trade Compliance
& Associate Corporate Counsel
DRS Technologies, Inc.

September 9, 2013

Mr. Timothy Mooney
Regulatory Policy Division
Room 2099B
Bureau of Industry and Security
U.S. Department of Commerce
14th Street & Pennsylvania Ave., N.W.
Washington, D.C. 20230

Ms. Sarah J. Heidema
Acting Director
Office of Defense Trade Controls Policy
U.S. Department of State
2401 E Street N.W.
Washington, D.C. 20037

Re: Revisions to the Export Administration Regulations (EAR): Control of Military Electronic Equipment and Related Items the President Determines No Longer Warrant Control Under the United States Munitions List (USML) (*Federal Register* Notice of July 25, 2013; RIN 0694-AF64) and Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI (*Federal Register* Notice of July 25, 2013; RIN 1400-AD25)

Dear Mr. Mooney and Ms. Heidema:

The Semiconductor Industry Association ("SIA") is the premier trade association representing the U.S. semiconductor industry. Founded in 1977 by five microelectronics pioneers, SIA unites over 60 companies that account for nearly 90 percent of the semiconductor production of the United States. The semiconductor industry accounts for a sizeable portion of U.S. exports.

SIA is pleased to submit the following public comments in response to the request for public comments issued by the Commerce Department's Bureau of Industry and Security ("BIS") on proposed revisions to the Export Administration Regulations ("EAR") pertaining to military electronic equipment and related items the President determines no longer warrant control under United States Munitions List ("USML")

("Proposed EAR Revisions"),[1] and revisions to USML Category XI ("Proposed ITAR Revisions").[2] SIA is mindful of the fact that as the President's Export Control Reform Initiative is implemented, new Export Control Classification Numbers (ECCN's) may be contemplated and created that would potentially cover integrated circuits. SIA urges BIS to ensure that new ECCN's are constructed in a manner that would avoid overlapping coverage and create confusion for exporters, and we would like to work with BIS to ensure that result.

USML Category XI (c) (1)

As SIA noted in its September 13, 2011 comments on the initial proposed "specially designed" definition[3] and reiterated by SIA in its August 3, 2012 comments on the revised proposed "specially designed" definition,[4] the term "Application Specific Integrated Circuit" (or "ASIC") is a well understood and clearly defined term within the semiconductor industry. The definition of ASIC generated by the JEDEC Solid State Technology Association -- "an integrated circuit developed and produced for a specific application or function and for a single customer" – is longstanding and generally accepted and captures the essence of an ASIC as being a custom integrated circuit designed particularly to conform to a single customer's unique requirements.

SIA urges that, for purposes of the U.S. export control regime, the U.S. Government adopt a definition of ASIC that matches the JEDEC definition of that term. Specifically, the State Department and Commerce Department should clarify that the term "ASIC" employed in the proposed revised version of USML Category XI (c)(1) is defined to be: "an integrated circuit developed and produced for a specific application or function and for a single customer." Doing so will utilize existing industry terminology and, accordingly, will provide exporters with a clear basis upon which to classify an integrated circuit.

USML Category XI (a) (7)

The SIA would also like to suggest that USML Category XI (a)(7) in regard to "Developmental electronic equipment or systems that are funded by the Department of Defense (DOD) via contract of other funding authorization" is overly broad and may

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[1] Revisions to the Export Administration Regulations (EAR): Control of Military Electronic Equipment and Related Items the President Determines No Longer Warrant Control Under the United States Munitions List (USML), 78 Fed. Reg. 45,026 (Jul. 25, 2013) ("Proposed EAR Revisions").

[2] Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI , 78 Fed. Reg. 45,018 (Jul. 25, 2013) ("Proposed ITAR Revisions").

[3] Comments by Semiconductor Industry Association to U.S. Department of Commerce Re: Proposed Amendments to the Export Administration Regulations, RIN 0694-AF17 (Sep. 13, 2011) at 5

[4] Comments by Semiconductor Industry Association to U.S. Department of Commerce Re: "Specially Designed" Definition , RIN 0694-AF66 (Aug. 3, 2012) at 5; Comments by Semiconductor Industry Association to U.S. Department of State Re: "Specially Designed" Definition, RIN 1400-AD22 (Aug. 3, 2012) at 5.

result in confusion and delays in development of new technologies that were intended for both civil and military applications.

Notwithstanding the addition of Notes 1-3, we are concerned that some DOD funded systems may be incorrectly labeled as ITAR simply because they are funded by DOD. Today DARPA funds a variety of types of activity, both purely military and a combination of military and civilian. We believe some additional clarity should be added to prevent the accidental classification of a project as ITAR in the event a contracting officer does not elect to specify it as civil in the contract. This could be done by mistake or omission. The SIA would suggest some additional language be added to specify that the contracting officer is not making a final decision as to whether something is ITAR-controlled. Further we also suggest an adjustment to the definition in XI (a) (7) to read: "Developmental electronic devices, systems or equipment for a military application funded by the Department of Defense."

SIA appreciates the opportunity to comment on the Proposed Revisions and looks forward to continuing its cooperation with the U.S. Government on this subject. Please feel free to contact the undersigned or SIA's counsel, Clark McFadden of Orrick, Herrington & Sutcliffe LLP, if you have questions regarding these comments.

* * * * *

Cynthia Johnson
Co-Chair, SIA Trade Compliance Committee

David Rose
Co-Chair, SIA Trade Compliance Committee

MILLENNIUM RISK MANAGERS

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September 9, 2013

Attn. Ms. Candace M. J. Goforth
Office of Defense Trade Controls Policy
U.S. Department of State
PM/DDTC, SA-1, 12th Floor
2401 E Street, NW
Washington, DC 20037

RE: Public Comment Response to Proposed Revisions to the U.S. Munitions List Category XI b (3) (Federal Register, Vol. 78, No. 143) published on July 25, 2013

Ms. Goforth:

Please accept this correspondence as our company's input into the above referenced proposed regulations as referenced in the "RE line" of this correspondence.

The relevant proposed text below for your reference:

> XI b (3) Technical surveillance countermeasure (TSCM) or electronic surveillance equipment and counter electronic surveillance equipment (including spectrum analyzers) for the RF/microwave spectrum that:
>
> (i) Sweep or scan speed exceeding 250 MHz per second;
>
> (ii) Have built-in signal analysis capability;
>
> (iii) Have a volume of less than 1 cubic foot;
>
> (iv) Record time-domain or frequency-domain digital signals other than single trace spectral snapshots; and
>
> (v) Display time-vs.-frequency domain (e.g., waterfall or rising raster).

The published revisions requested public comment, and Millennium Risk Managers, LLC, a U.S. Company located in Birmingham, Alabama, offers the following response specific to the proposed rules for spectrum analyzers.

For the past 8 years, our company invested over $500,000 purchasing TSCM equipment, and undergoing extensive training in this area so that our company's business model could expand to provide a service to our local municipalities that was not being filled by other government agencies, i.e. data and communication system vulnerability audits, and as well as expanding these services to private businesses operating within and outside of the United States borders.

As I understand, the proposed regulations will prohibit or limit our company's ability to freely perform these corporate services outside of the United States, and I also understand that the manufacturing industry of this type of equipment will be severely limited in selling this equipment outside of the United States.

The cost of this equipment is extremely expensive, and if the United States manufacturers are limited to marketing the equipment only to United States vendors, then companies such as mine will not be able to afford the equipment to perform these vital services. Restricting the United States manufacturers of this equipment does not make justifiable business sense, because these types of devices are manufactured throughout the world. So, the underlying purpose of having this commercial equipment moved under ITAR (and the corresponding restrictions) does not achieve any real purpose, and increases the cost to the United States end users for no justifiable national security purposes.

It is extremely important to note that if the cost of the equipment is increased due to the inability of the manufacturer to sell abroad, we will not be able to continue offering these services.

It is important to note that we offer our services to local government entities.

These "front line" first responder government entities, do not have the funding to purchase this type of equipment, nor do they have the technical expertise in this area to perform these types of critical audits at the local level, and most importantly, there is no other upper level government agency available to perform these services at the volume required for the protection of our local government infrastructures.

Correspondingly, our company developed this business service to fill those needs to our local governments operating in the State of Alabama.

Our services assist local governments in protecting preplanned expansions of our local government and local communities' infrastructures, such as electrical and utility industries with an underlying zoning component.

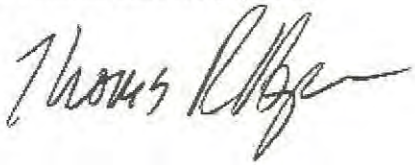
Because the municipal entities cannot afford the equipment as currently priced, nor do they have sufficient funding for training staff members to use the current equipment, increasing the cost of the equipment by prohibiting out of country sales nearly compounds already existing problems that is critical to the local government level in the United States of America.

For the record, Millennium Risk Managers is in total opposition to the proposed regulation as written and up for consideration, primarily due to the restrictions placed upon the United States manufacturers from being able to market these devices outside of the United States and the corresponding significant increase in cost to the United States entities operating in this industry.

The ramifications of such an increase will directly affect our country's local governments' abilities to protect infrastructure expansion because private entities operating within this industry will not be able to afford the cost of the equipment to perform these vital services, both within and outside of the United States.

Thank you for allowing our company to provide our input into these proposed regulations that will be have extreme negative impact to our country.

I remain sincerely yours,



Tom R. Roper
President & Senior General Counsel

U.S. Department
of Transportation
**Federal Aviation
Administration**

September 9, 2013

Ms. Sarah J. Heidema
Acting Director
U.S Department of State
Bureau of Political – Military Affairs
Directorate of Defense Trade Controls Policy
2401 E Street NW
Washington, DC 20037

Subject: ITAR Amendment – Category XI

Dear Ms. Heidema,

Federal Aviation Administration (DOT), in partnership with National Oceanic and Atmospheric Administration (DOC), DHS, and DOD, is considering deploying a network of approximately 230 – 350 active phased array radars to sustain and enhance the nation's aircraft and weather surveillance capability. The consortium of departments is researching the feasibility of replacing the domestic network of legacy radars with a common radar platform that fulfills their individual mission needs through a project referred to as Multifunction Phased Array Radar (MPAR). Phased array technology which has been historically utilized for defense applications is becoming more viable for commercial / civilian purposes. Enabling the transition out of the defense sector is the affordability of the underlying technologies of Active Electronically Scanned Arrays through unrestricted, open market business practices. The proposed changes in USML Category XI ITAR amendment puts at great risk an opportunity to leverage the inherent performance benefits of phased array radars for civilian applications given the anticipated cost implications of ITAR restrictions. Specific comments and rationale are contained herein.

1. Paragraphs (a)(3)(ix), (a)(3)(xii) refer to broad statements pertaining to phased array beam structure and control. Multiple beams and adaptive electronic steering are essential features of MPAR that are necessary to meet scanning timeline requirements. These features are inherent capabilities of modern digital phased array radars and have been implemented on foreign instantiations of digital radars. Examples include the SMART-L (Thales, The Netherlands), SAMPSON (BAE Systems, United Kingdom), CEAFAR (CEA, Australia), AD-STAR (Elta, Israel) to name just a few. These statements as they are currently written apply to nearly all digital phased array radars. It is recommended that these statements be removed, or at a minimum, define specific constraints that apply wholly to tactical applications.
2. Paragraphs (a)(3)(vii-viii), (a)(3)(x) refer to $1m^2$ +RCS at range and altitude. The capabilities identified in these paragraphs already exist in the legacy National Airspace System. For example, the ARSR-4 long range surveillance radars can detect $1m^2$ targets to 225 nm. With the integration of Unmanned Aircraft Systems (UAS) into the National Airspace System, civilian aircraft surveillance radars may be required to

detect and track even smaller cross section targets. These requirements don't necessarily apply to phased array systems and represent current civilian detection requirements. It is recommended that these statements be removed, or at a minimum, provide a caveat that these statements only apply to radars whose primary mission is defense.

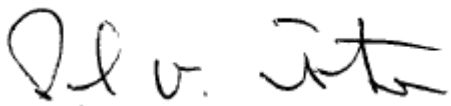
3. Paragraph (a)(3)(xvii) refers to clutter filtering which is an integral feature of all radars. 50db clutter suppression is a current requirement of FAA's Terminal Doppler Weather Radar. Furthermore, even greater filtering performance is becoming necessary with the growth and expansion of wind farms where greater than 50db attenuation is possible. It is recommended that this statement be removed.
4. Paragraph (a)(3)(xxi) refers to target recognition of a "specific platform type." Please provide a clearer meaning for this requirement. The FAA is considering requirements to discriminate between fixed wing vs. rotary wing aircraft or aircraft vs. biological targets, but not specific platforms such as MiG-35 and B737. It is recommended that further detail pertaining to intent be provided.
5. Paragraphs (c)(4-11) should also contain the same constraints as Paragraphs (c)(1-3) specifically referring to components being "programmed" or "designed for defense articles." All components identified in Section (c) may be leveraged for civilian radar system applications including MPAR. The more manufactures capable of selling products will enable competition and further drive down prices, potentially expanding use and demand, and further stimulating overall commerce. It is recommended that Section (c) clearly indicate that restrictions apply to defense articles.

Preliminary analysis has determined there will be an approximate cost increase of at least 30% to MPAR should these restrictions be put into place. This is due to the increased cost of phased array component packaging and manufacturing in ITAR restricted facilities. In approving and applying the comments above into the ITAR amendment, there is a greater likelihood MPAR will be deemed an affordable alternative as a replacement system for the nation's legacy radars.

Substantial societal benefit is expected through the implementation of MPAR. It will enable safer, more efficient flight; support more timely and accurate weather forecasts and warnings; offer enhanced non-cooperative target detection and tracking; and increase overall air domain situational awareness.

The FAA is also willing to participate in the comment adjudication process, as appropriate, to offer our opinions to the review committee. Any questions, comments, or concerns to the content of this memo should be directed to the MPAR PM, Michael Emanuel (Michael.emanuel@faa.gov).

Sincerely,



Paul Fontaine
Director, FAA NextGen Advanced Concepts &
Technology Development

Office of the Federal Coordinator for
Meteorological Services and Supporting Research (NOAA)

Comments on
ITAR Amendment—Category XI
September 9, 2013

Background

The Office of the Federal Coordinator for Meteorology (OFCM) provides infrastructure and facilitation to support the cooperation and collaboration of the Federal agencies on issues related to meteorology. We are currently involved with four agencies (FAA, NOAA, DoD, and DHS) on a project (referred to as Multifunction Phased Array Radar, or MPAR) to replace all weather and aircraft surveillance radars in the US with one type of radar system. The likely technology for such a system would include active electronically scanned array (AESA) antennas. While DoD could be involved in the program and some of the radars could be used some of the time for national defense, this program is largely an effort to transition well-established phased array technology to civil systems.

Certain weather-related functionality requires dual orthogonal linear polarization (dual pol), a capability that has not been, to our knowledge, incorporated into past AESA systems. Developing and testing dual pol arrays has been a pacing item for MPAR, and we anticipate having a small array available for validation of weather sensing capability within a year and a larger demonstration array available in mid to late 2015. If MPAR proved to be the system of choice, full-scale development would proceed in 2018 with operational deployment starting in 2023.

Operational phased array radar (PAR) has existed solely in the military domain because of its high cost. To apply PAR technology to the civil domain, we have concentrated on reducing cost. Elements of the cost reduction effort include the adoption of commercial manufacturing materials and processes and stepping back from bleeding edge performance specifications enabling the use of commercial off the shelf components from the wireless industry.

ITAR Challenges to R&D

PAR R&D is conducted within industry and at universities, labs, and research institutes. Almost all the work specifically on MPAR is unclassified, so it can be conducted in a fairly open environment, and the employment of foreign nationals in the research is common. ITAR restrictions would not only reduce the R&D talent pool but would require that foreign nationals be isolated from information; data; equipment; software; and verbal, written, and electronic communications related to any captured articles. This would reduce the efficiency and effectiveness of the research process, increase cost, and extend timelines. It should also be expected that some institutions would choose to avoid these issues entirely, thereby eliminating whole organizations, particularly, universities, from participating in this work.

ITAR Challenges to Production

The validity of MPAR as a solution for the replacement of civil-application radars hinges on significantly reducing its production cost. While there are a number of factors that affect production cost, a key factor is allowing the prime contractor to acquire parts (including printed circuit boards) and assemblies (such as populated circuit card assemblies and multichip modules) from any reliable vendor. A significant increase in product cost could mean the difference between selecting MPAR or some other less optimal technology for replacement of current systems. Our colleagues at Lincoln Laboratories have designed and fabricated a dual pol phased array panel that will be the basic building block for a demonstration antenna. One of the design parameters was a challenging cost target, and they believe they are approaching that target. They have estimated that restricting production in accordance with the proposed rule would result in an increase of about 30% in the cost of the antenna (which is considered to account for a large proportion of the overall radar cost).

It's not clear how long the provisions of the new rule would be in force, but we assume that at some point phased array technology would become sufficiently commonplace that the proposed restrictions would be replaced by restrictions on only the more exotic phased array technologies. MPAR is not expected to go into production until at least 2023. A decision could be made in 2016 to forego MPAR in favor of a less expensive (and less capable) technology because of costs inflated by export restrictions. It's possible that at production time the original restrictions no longer apply, and that MPAR could have been built had the restrictions been assigned a reasonable life expectancy.

Mission impacts

None of the agencies participating in MPAR have provided validated requirements for the proposed system, so we can't be specific about loss of mission capability if MPAR is not deployed as a replacement for current radar systems because of cost considerations associated with export restrictions. However, we know enough about potential MPAR capabilities and potential mission needs to suggest some of the enhancements it could provide over current capabilities.

Weather:

- Faster updates of thunderstorm patterns, which have been shown to provide longer tornado warning lead times with reduced false alarms.
- The only potential source of rapid volumetric observations required to initialize storm-scale weather models needed to extend the current average tornado lead time of about 15 minute to a long as an hour.
- Enhanced probability of detection and lead time for thunderstorm "microbursts" in the vicinity of runways, one of the leading weather threats to aviation passenger safety.
- More accurate estimation of high spatial resolution rainfall amount.
- Effective mitigation of wind turbine clutter.
- Wind shear (including microburst) detection expanded from 45 to about 150 airports serving scheduled airlines.

- Enhanced coverage.

Air Surveillance:

- Detecting targets with smaller RCS.
- Determining the altitude of aircraft
- Flexible tracking capability to focus on specific targets of interest; for example, updating tracks more often.
- Possible characterization of aircraft targets (jet vs propeller vs rotor wing).
- Characterization of biological targets (birds).
- Effective mitigation of wind turbine clutter.
- Enhanced coverage.

Primary Areas of Concern

Paragraphs (a)(3)(vii), (viii), (ix), (x), (xii), (xvii), and (xxi) all would capture aspects of MPAR as presently conceived for civil applications.

- (vii) Captures the current ARSR-4 radar, which is considered to be "old technology."
- (viii) States that being able to observe one square meter RCS targets at an elevation angle above 20 degrees makes a radar, by definition, "counter-battery." This criterion captures current legacy ARSR-4s, which are definitely not useful as counterbattery radar. As a minimum, "i.e." should be changed to "e.g." to avoid calling any system meeting these criteria "counter battery." But better yet, this should be removed or more carefully defined to specifically call out counter battery systems. MPAR would be used above for 20 degrees for air traffic control in this context, and also for microburst detection for the weather surveillance function.
- (ix) Multiple beams is a fairly common tool used on a number of radar applications (including foreign production radars) to provide additional occupancy for multiple functions. With MPAR it allows for collecting weather and air traffic data within the required timeframes for those functions. A more discrete definition focused on sophisticated military applications should be applied to multiple beam criteria.
- (x) With the low RCS requirement, relatively broad beam, and 3 second revisit rate, this captures most phased array systems. Although mission requirements may not specify a narrower beam or faster revisit rate, some systems will be capable of achieving those specifications simply by virtue of their design.
- (xii) This captures almost any phased array radar, including 40 year old passive array systems. Suggest this be deleted in favor of more focused definitions of restrictions.
- (xvii) We have a national goal of increasing the supply of renewable energy, which is driving the deployment of thousands of wind turbines creating clutter which seriously impacts the effectiveness of radar. Clutter attenuation of this sort is a way to deal with this challenge. This restriction could make it difficult and more costly to update our radar capability to mitigate wind turbine clutter. It's already hard; this just makes it harder.

- (xxi) The term “platform type” is unclear. Does platform type refer to Boeing 737 versus DC-10, or helicopter versus Boeing 767? The difference is important from both a mission and a radar capability point of view.

Paragraph (c) refers to “defense articles.” Does this mean articles that are intended for defense applications, thus excluding articles intended for civil applications? If so, the restriction to defense articles in the first three sub-paragraphs should apply to all the sub-paragraphs, or at least to those that could affect systems intended for civil applications.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Oceanic and Atmospheric Research
National Severe Storms Laboratory
120 David L. Boren Blvd.
Norman, OK 73072

9 September 2013

SUBJECT: RIN 1400-AD25
Amendment to the International Traffic in Arms Regulations (ITAR):
Revision of U.S. Munitions List (USML) Category XI

To Whom It May Concern:

The Department of Defense has always been at the forefront of technology development. Military technologies have found numerous ways to adapt to civilian applications that benefit public society. The weather radars that are in common use today at the National Weather Service and perhaps your local television station are the product of radar developments during and after World War II. Military developments secretly produced an advanced Phased Array Radar (PAR) technology in the 1970s that have been very useful for defense of ships at sea to identify and track aircraft and missiles that may be a threat. Until recently, PAR technology has been too expensive for civilian applications.

As the cost of electronic components/circuits and conductive materials have decreased, the capability for PAR technology to benefit civilian applications has increased. Today, there are numerous universities engaged in research developing and adapting PAR technology for civilian applications. And U.S. companies are developing and marketing phased array radars for commercial/civilian use. EWR Weather Radar (a Saint Louis, MO company) unveiled a multifunction X-band phased array radar at the Meteorological Technology World Expo, Brussels, in October 2011, which they intend to sell commercially.

The proposed changes to the ***U.S. Munitions List Category XI – Military Electronics*** documented in the Federal Register (Vol. 78, No. 143) on 25 July 2013 would categorize all PAR technology as being covered by the USML. Several paragraphs in the proposed changes could inadvertently place commercial radars under USML export control. Many of the proposed changes are generic radar capabilities rather than what would be of unique or special use for military applications.

Specifically, paragraph *"(a)(3)(xii) Radar incorporating pulsed operation with electronics steering of transmit beam in elevation and azimuth"* is by definition a capability of PAR technology and will place any/every phased array radar under ITAR/USML export controls. Furthermore, paragraph *"(a)(3)(ix) Air surveillance radar with multiple elevation beams, phase or amplitude monopulse estimation, or 3D height-finding"* is a broad statement as most any weather radar may be operated to provide 3-D height finding of targets. Additionally, paragraphs (a)(3)(vi-viii) identify specific detection ranges and radar cross section values that are consistent with the capabilities of aircraft tracking radars in use worldwide for commercial aviation.

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The paragraph *"(a)(3)(xvii) Radar having moving target indicator (MTI) or pulse-Doppler processing where any single Doppler filter provides a normalized clutter attenuation of greater than 50dB"* could also include many weather radars. Weather radars must be sensitive enough to detect collections of raindrops and therefore have stringent clutter filtering requirements covered by this paragraph and would place existing commercial/civilian radars under ITAR/USML export controls.

Paragraphs (c)(1-17) also describe many component capabilities within general use throughout the world rather than specifically describing components that are of unique or special use for military applications. Some of the paragraphs include the statement "specifically designed for defense articles in this subchapter" to include them on the USML only for those designed for military electronics. Other paragraphs such as *"(c)(4) Transmit/receive modules or transmit modules that have any two perpendicular sides, with either length d (in cm) equal to or less than 15 divided by the lowest operating frequency in GHz that incorporate a Monolithic Microwave Integrated Circuit (MMIC) or discrete RF power transistor and a phase shifter or phasers"* includes all such devices whether or not they are designed for military electronics. These components are an essential building block of PAR technology and could hinder adaptation for civilian applications. Perhaps a better restriction than size would be the power or other capabilities of the transmit/receive modules that would discriminate those for military use versus those for civilian applications. Transmit/receive modules of the specified size in paragraph (c)(4) may have other civilian or commercial uses that would be prevented by inclusion on the USML.

It is expected that the military should have access to the latest and greatest technology for national defense, but the proposed changes to the USML Category XI – Military Electronics could inadvertently include many current civilian radar systems and components. Of particular concern is the inclusion of all phased array radar technologies and essential components. The National Oceanic and Atmospheric Administration (NOAA) and the Federal Aviation Administration (FAA) are currently conducting research for a Multi-function Phased Array Radar (MPAR) that would combine several different national radar networks into a common platform based on PAR technology. The proposed changes to the USML Category XI – Military Electronics could significantly increase the cost of the MPAR program such that PAR technology will not be available for civilian radar applications.

One of those cost drivers will be the impact on the universities performing much of the basic research on PAR technologies. If PAR technology or the essential component technologies are subject to ITAR restrictions, the different universities that perform research directed towards civilian adaptations will incur additional costs. These universities (that don't currently specialize in military research) have students and faculty that are not U.S. citizens and will require separate facilities that may only be accessed by U.S. citizen students and faculty. This burden will result in either additional cost to the universities or potentially reducing the number of universities working to adapt these technologies for civilian application.

Another potential impact on the MPAR program will be the likely increase in cost for an operational civilian MPAR program. The increased costs would be due to limited production facilities (i.e. ITAR restrictions for U.S.-only personnel) capable of fabricating the component technologies and the inability to compete through open market business practices.

The NOAA National Weather Service (NWS) is tasked with providing weather forecasts and warnings for severe and hazardous weather and weather radar is one of the critical components that enable NOAA to perform its mission. The proposed changes and their impacts could potentially delay or put a joint-agency civilian MPAR program out of reach and prevent the use of PAR technology or enabling components for any civilian application. Phased array radar and its adaptive scanning capability may be required for the NWS to meet strategic goals in the improvement of forecasts and warnings.

NOAA is willing to participate in the review of comments regarding the proposed changes to ***U.S. Munitions List Category XI – Military Electronics***. Any questions, comments, or concerns to the content of this memo should be directed to NOAA's MPAR Program Manager Kurt Hondl (Kurt.Hondl@noaa.gov).

Sincerely,

Dr. Steven Koch
Director
NOAA / National Severe Storms Laboratory

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September 9, 2013

Ms. Candace Goforth
Director, Office of Defense Trade Controls Policy
Directorate of Defense Trade Controls
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VIA EMAIL: DDTCResponseTeam@state.gov

Re: Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI (Federal Register Docket ID. 2013–17556, RIN 1400–AD25)

Dear Ms. Goforth:

IPC — Association Connecting Electronics Industries® has a long history of cooperation with, and support of, the agencies that develop and implement national security policy. In this vein, IPC has offered its views to the Directorate of Defense Trade Controls (DDTC) regarding previously proposed U.S. Munitions List (USML) category revisions. IPC welcomes the opportunity to comment on DDTC's re-proposal on Category XI (Military Electronics).

I. Summary Position

IPC commends DDTC for retaining its proposal to enumerate printed circuit boards (PCBs) in the above referenced rulemaking. The explicit enumeration of PCBs is the most effective and appropriate method of addressing the widespread confusion within the defense community about ITAR's controls on PCBs and their designs. IPC, moreover, agrees with the level and scope of controls that the draft rule would establish for PCBs. PCBs must be controlled in the same manner as the defense articles for which they are designed because PCBs and their designs reveal valuable information about the workings of those defense articles.

IPC, however, continues to be concerned that DDTC's proposed reliance on *specially designed* as the principal means of controlling PCBs will perpetuate confusion within the defense industry. The confusion stems from the mistaken, but commonly held, view that PCBs can be commercial-off-the-shelf components (COTS). PCBs, in fact, are always custom designed for the electronics into which they are incorporated. The draft rule's use of *specially designed* to control PCBs may be interpreted by some in the defense supply chain to indicate that specially designed and non-specially designed PCBs exist. This confusion, IPC believes, will lead to continued inadvertent and preventable ITAR violations.

In addition, the reliance on the term *specially designed* introduces unnecessary complexity by requiring manufacturers to accurately apply the "catch-and-release" provisions of *specially designed*, despite the fact that only the "catch" paragraph of the definition is applicable to PCBs. Thus, the use of *specially designed* undermines the very clarity that the DDTC seeks to instill in the USML through the enumeration of PCBs.

IPC urges DDTC to enhance the clarity of ITAR controls on PCBs in a manner that is consistent with the principle that the applicability of ITAR to PCBs should generally follow the defense articles for which they are designed. Specifically, IPC recommends that DDTC modify paragraph XI(c)(2) to more clearly control PCBs by directly incorporating the relevant elements of *specially designed*. In the event that DDTC retains the use of *specially designed* in its enumeration, IPC urges DDTC to make clear in the final rule that the 120.41(b) "release" subparagraphs for "catch-all" and "technical data control" paragraphs do not apply to Category XI(c)(2). Regardless of the approach taken, IPC strongly encourages DDTC to: 1) affirm in the final rule that all PCBs are custom designed and, 2) reiterate that that PCB designs and digital data are controlled as technical data, per ITAR § 120.10.

II. About IPC

IPC is a U.S.-headquartered global trade association, representing all facets of the electronic interconnect industry, including printed circuit board design, manufacturing and assembly. IPC has more than 3,400 member companies of which 1,900 are located in the United States. IPC is the definitive authority on standards used by the global electronics industry and is the leading source for training, market research, public policy advocacy and other programs to meet the needs of an estimated $2.02 trillion global electronics industry.

III. IPC Concerns with the Proposed Rule

A. Printed Circuit Boards

IPC commends DDTC for its thoughtful and greatly improved approach to the regulation of PCBs in paragraph (c)(2) of the proposed rule for Category XI:

"Printed Circuit Boards (PCBs) and populated circuit card assemblies for which the layout is 'specially designed' for defense articles in this subchapter."

Consistent with IPC's January 28, 2013 comments on Category XI revisions, we agree with and support DDTC's decision to enumerate PCBs on the USML. The explicit enumeration of PCBs is the most effective and appropriate method of clarifying the regulation of PCBs and reducing the widespread confusion that has led to the unlicensed sharing of PCB design data with non-ITAR facilities. Moreover, the enumeration of printed boards is consistent with DDTC's own stated goal of establishing a "positive control list" to delineate clearly between ITAR and non-ITAR covered items. IPC also supports, in concept, the level and scope of export controls on PCBs that paragraph XI(c)(2) would put in place.

IPC, however, remains concerned that the rule's use of *specially designed* as the principal means of controlling PCBs will perpetuate confusion about ITAR's treatment of PCBs, resulting in the continued unlicensed sourcing of PCBs for defense articles. While IPC understands that *specially designed* is a legal term that is defined in ITAR, manufacturers and exporters are likely to misinterpret it as implying the existence of non-specially designed PCBs, especially given its placement in paragraph XI(c)(2) as a modifier to PCB layouts. COTS PCBs do not exist; all PCBs are custom designed. The mistaken belief that some PCBs are COTS or non-custom designed could lead a manufacturer or exporter to inadvertently disregard the proposed controls on PCBs.

In addition, the use of *specially designed* will unnecessarily require manufacturers and exporters to work through the application of *specially designed* to PCBs, a rather complex effort. As IPC understands the rule, paragraph XI(c)(2) does not constitute a "catch-all" paragraph, and therefore paragraph 120.41(a)(2) establishes releases from *specially designed* that are not applicable to PCBs. We are concerned that many manufacturers and exporters may mistakenly believe that PCBs are released from ITAR control under paragraph 120.41(b) of *specially designed* because they do not understand that Paragraph XI(c)(2) does not constitute a catch-all paragraph. The awkward use of *specially designed* in Paragraph XI(c)(2) will unnecessarily confuse exporters and manufacturers by failing to provide a clear and focused statement of ITAR controls.

The use of *specially designed* is additionally problematic because of its inconsistency with DDTC's intended scope of coverage for PCBs. In the preamble to the draft rule, DDTC states that the "jurisdiction of a printed circuit board…should follow the jurisdiction of the article for which it was designed, as opposed to the jurisdiction of the overall system into which it is incorporated." IPC supports this general approach, but believes that paragraph 120.41(a)(2) of the definition for *specially designed*, when applied to PCBs, may be much broader than intended by DDTC. Paragraph 120.41(a)(2) would broadly capture, "a part, component, accessory, attachment or software for use in or with a defense article." The broad reach of 120.41(a)(2) is not problematic in the context of a "catch-all" paragraph because captured items will be subject to the releases outlined in paragraph 120.41(b) of *specially designed*. Category XI(c)(2), however, is not a catch-all paragraph, and therefore 120.41(a)(2) may unintentionally regulate, under ITAR, every PCB "for use in" a defense article, even those PCBs, for example, that are designed for commercial computers on an ITAR-covered aircraft. The inconsistency between 120.41(a)(2) and DDTC's intended scope of coverage for PCBs will only added further confusion to the already problematic application of *specially designed* in paragraph XI(c)(2).

B. Printed Circuit Board Designs

IPC appreciates that the proposed rule controls technical data related to printed circuit boards for covered defense articles under paragraph XI(d):

Technical data (see§ 120.10 of this subchapter) and defense services (see§ 120.9 of this subchapter) directly related to the defense articles enumerated in paragraphs (a) through (c) of

this category and classified technical data directly related to items controlled in CCL ECCN 3A611, 3B611, 3C611, and 3D611 and defense services using the classified technical data. (See§ 125.4 of this subchapter for exemptions.) (MT for technical data and defense services related to articles designated as such.)

Although not specifically stated in the proposed rule, IPC understands that paragraph XI(d) would include the design and digital instructions necessary to manufacture a PCB for an ITAR item. IPC is concerned that the proposed rule does not clearly affirm that digital designs and instructions for PCBs constitute technical data under paragraph XI(d). Confusion on this point has led to unlicensed sourcing of PCBs for ITAR items from non-ITAR facilities under current law.

IV. Recommendations

IPC urges DDTC to take advantage of the opportunity afforded by export control reform to clarify controls on PCBs consistent with the principle that the applicability of ITAR to PCBs should follow the defense articles for which they are designed. Accordingly, IPC is proposing the following recommendations:

1. **Modify paragraph XI(c)(2) to replace *specially designed* with "Printed Circuit Boards (PCBs) and populated printed circuit board assemblies which, as a result of development, have properties peculiarly responsible for achieving or exceeding the controlled performance levels, characteristics, or functions of defense articles in this subchapter; or which are for use in or with a defense article in this subchapter."**

   Explicitly and clearly enumerating PCBs on the USML is both the most effective means of controlling PCBs and the most consistent with DDTC's own stated goal of establishing a "positive control list." For this reason, IPC strongly recommends that DDTC retain PCBs on the USML as an enumerated item and clarify paragraph XI(c)(2) by replacing the reference to *specially designed* with its applicable definitional elements, which are paragraphs 120.41(a)(1) and 120.41 (a)(2) of *specially designed.* Paragraphs 120.41(a)(1) and 120.41 (a)(2) capture a commodity if it:

   > *(a)(1) As a result of development, has properties peculiarly responsible for achieving or exceeding the controlled performance levels, characteristics, or functions described in the relevant U.S. Munitions List paragraph; or*
   > *(a)(2) Is a part (see § 121.8(d) of this subchapter), component (see § 121.8(b) of this subchapter), accessory (see § 121.8(c) of this subchapter), attachment (see § 121.8(c) of this subchapter), or software for use in or with a defense article.*

   These definitional elements should be integrated into Category XI(c)(2) in order to avoid confusion that would certainly result from the use of *specially designed.* IPC is concerned that the use of *specially designed* would require exporters to determine the applicability of paragraph 120.41(a) of *specially designed* and to conclude correctly that paragraph 120.41(b) is not applicable. As discussed earlier, Category XI(c)(2) does not constitute a "catch-all"

control paragraph, and therefore, none of the releases under paragraph 120.41(b) of *specially designed* apply to PCBs. For this reason, IPC is recommending an alternative enumeration that clearly articulates the provisions of *specially designed* that DDTC seeks to impose on PCBs.

IPC strongly believes that both 120.41(a)(1) and 120.41(a)(2) of the definition of *specially designed* need to be integrated into the enumeration of PCBs. Merely integrating paragraph 120.41(a)(1) would give exporters the perception of wide latitude to claim that any given PCB is not "peculiarly responsible for achieving or exceeding the controlled performance levels, characteristics, or functions" of the defense article into which it is incorporated. Additionally, IPC urges DDTC to provide a note explaining ITAR's coverage to eliminate any lingering industry confusion about the scope of paragraph XI(c)(2).

IPC's recommended language also replaces "populated circuit card assemblies" with "populated printed circuit board assemblies." "Populated circuit card assemblies" is not a term commonly used within the printed circuit board or electronics manufacturing industries

2. **If DDTC retains the use of *specially designed* to control PCBs, IPC recommends that DDTC include in the final rule a note clarifying that Category XI(c)(2) is not a catch-all and that therefore the 120.41(b) "release" subparagraphs for "catch-all" and "technical data control" do not apply.** It is not clearly stated or easily discernible that the 120.41(b) "release" subparagraphs for "catch-all" and "technical data control" do not apply to Category XI(c)(2). As a result, manufacturers and purchasers of PCBs may mistakenly apply 120.41(b) and inadvertently release PCBs designed for defense articles from ITAR coverage.

   DDTC's clarifying note, for example, could state: "Paragraph XI(c)(2) does not constitute a 'catch-all' or 'technical data control' paragraph and therefore 120.41(b) is not applicable to the enumeration of PCBs in paragraph XI(c)(2)."

   Furthermore, IPC recommends that the DDTC improve the clarity of the rule by including in Section 121.1 a list of all instances, including Category XI(c)(2), in which the term *specially designed* is used in the USML in a context other than as a "catch-all" paragraph. In addition, DDTC should consider revising Section 121.1(d) to provide guidance on the application of *specially designed* to distinguish between controls that are "catch-all" and controls (such as printed circuit boards) that are not.

3. **Reaffirm that PCB designs and digital data are controlled as technical data, per ITAR § 120.10.** DDTC provided this explanation in the preamble to its April 16, 2013 rule (Initial Implementation of Export Control Reform):

   "Printed circuit boards 'specially designed' (see definition of this term in this rule) for articles in USML Category XIX, as well as for articles in all other USML categories, are controlled in USML Category XI and their related designs or digital data are controlled as technical data, per ITAR § 120.10."

This same explanation should be restated in Category XI as it is the USML category chiefly responsible for controlling PCBs. Such a clarification is necessary given that design information is necessarily shared whenever the designer provides manufacturing data to a manufacturer. Without this clarification, some manufacturers of defense articles may assume that export controls do not apply to items not destined for export, thereby perpetuating the unlicensed sourcing of PCBs from non-ITAR facilities.

4. **Clarify in the preamble or a note to the final rule that PCBs, by their very nature, are custom designed for each defense article into which they are incorporated**. DDTC should take steps, with this rule, to address the underlying confusion that has led to the misapplication of the current law. In order to correctly apply Category XI(c)(2), manufacturers and exporters must understand that all PCBs are uniquely designed. IPC encourages DDTC to provide additional and explicit clarification about the custom nature of PCBs in the preamble or as a note to the final rule.

V. Conclusion

IPC supports DDTC's goal of reforming the USML to clearly describe what items the list covers. In this vein, IPC endorses DDTC's decision to enumerate printed circuit boards in Category XI, but expresses concern that the use of *specially designed* in controlling printed boards could undermine DDTC's efforts to draw a bright line between what is and is not controlled. IPC recommends that DDTC clarify controls on PCBs by modifying paragraph XI(c)(2) of the rule to clearly enumerate PCBs, adding language to clarify the application of ITAR to PCB design data, and clearly stating that all PCBs are uniquely designed for the defense articles they will be part of. IPC believes these changes to the proposed rule will more clearly regulate PCBs and the sensitive information contained within them and their design files, thus reducing the sourcing of ITAR controlled PCBs from non-ITAR facilities and furthers the protection of our national security.

Thank you again for the opportunity to comment on the proposed amendments to USML Category XI. If IPC can offer additional information or assistance, please contact Fern Abrams at FAbrams@ipc.org or (703) 522-0225.

Sincerely,

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September 9, 2013

Ms. Sarah J. Heidema
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Subject: **Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI**

Reference: **RIN 1400-AD25**
Federal Register / Vol. 78, No. 143 / Thursday, July 25, 2013

Dear Ms. Heidema,

The Boeing Company ("Boeing") appreciates the opportunity to provide a second set of comments on the proposed revision to Category XI of the U.S. Munitions List ("USML"), Military Electronics, Part 121 of the International Traffic in Arms Regulations ("ITAR"), and the Directorate of Defense Trade Controls' (DDTC) continued engagement with industry during the export control reform process. We reiterate our commitment to assist DDTC and the U.S. Government in the reform process by providing comments to this and other proposed rules.

Boeing welcomes a simplified, more narrowly-defined, positive-list Category XI. The transfer of items from the USML to the Commerce Control List (CCL) will allow both government and industry to focus licensing and compliance resources on those products and technologies that are most critical to U.S. national security. These refocused controls will also strengthen the U.S. industrial base by facilitating and expanding legitimate overseas business opportunities for U.S. companies. More broadly, Boeing continues to support the Administration's ultimate goal of creating a single control list and single licensing agency.

Summary of Comments:

Category XI is one whose elements, unless carefully defined, have the potential to inadvertently reach into commercial technologies. Boeing believes that certain of the capabilities or items proposed to be retained on the USML would be more appropriately controlled on the Export Administration Regulations (EAR) in the new "600-series" Export Control Classification Numbers (ECCNs). Equally worrisome is that certain proposed controls will capture on the USML technologies currently in the commercial marketplace and listed positively on the CCL. We provide explanations below of current and future commercial applications of areas now proposed for ITAR control. Boeing believes the

additional revisions we propose are necessary to avoid capturing items and technologies that are currently EAR-controlled.

Boeing is particularly concerned with proposed imposition of new ITAR controls in the area of air and ground based radar, including bi-static radar, and on the use of digital beam steering techniques. These items, when developed for commercial applications, are not currently classified under the jurisdiction of the ITAR so their inclusion in the proposed rule represents a significant expansion of the scope of control of the USML in these areas. Further, these technologies are important to the safety of commercial flight as U.S. airspace becomes more congested with manned and UAV aircraft in the future. As further explained in our comments below, some proposed Category XI paragraphs capture significant commercial technology already classified under the EAR. We provide recommended text changes to address these issues. If not addressed, the requirements on industry to reclassify, remark, or seek commodity jurisdictions will be significant.

As requested by DDTC in the *Federal Register* Notice which published revised Category XI, we have referred to foreign supplier information or information published in open journals to illustrate the international availability of an item or technology. For control parameters that are already achieved by other international providers, we recommend that those restrictions be eliminated and control of such items be transferred to EAR jurisdiction. In the alternative to transferring such items to EAR jurisdiction, we recommend that DDTC utilize the description "'specially designed" throughout Category XI or impose peculiarly military control thresholds, in order to avoid the inadvertent capture of commercial items.

Within this framework, we provide the following comments to the second proposed revision to Category XI:

- **Paragraph (a)(2):** *Underwater acoustic countermeasures or counter-countermeasures systems or equipment.*

  While the systems proposed for control by paragraph (a)(2) are primarily military in nature, these products fall into a highly competitive foreign market, and as further explained below should be more appropriately controlled in the new 600-series ECCNs in order to grant U.S. business a more level playing field. Boeing agrees that classified software and/or components should be controlled on the USML; however, unclassified items are being unnecessarily restricted in a field where foreign competition is strong.

  There are at least five foreign companies currently competing in this market. Table 1 below lists the components comprising the systems associated with the international torpedo countermeasure competitors. Following the table, each system is compared to the technology offered by the AN/SLQ-25 Towed Torpedo Countermeasure System. As DDTC will see, the technology is readily available in the international market and should be more appropriately controlled on under the EAR.

System Components	AN/SLQ-25 System	Sea Sentor System	Sea Defender/ Captas 2	Rafael ATDS System	C303/S, C310 Systems	HIZIR System
Electronics Cabinet	✓	✓	✓	✓	✓	✓
Winch	✓	✓	✓	✓		✓
Remote Control Unit (Bridge)	✓	✓		✓		✓
Tow Cable	✓	✓	✓	✓		✓
Tow Body	✓	✓	✓	✓		✓
Deck Handling	✓	✓	✓	✓		✓
Array Tow Cable		✓	✓	✓		✓
Acoustic Array		✓	✓	✓		✓
Launchable Decoy				✓	✓	✓
Launching System				✓	✓	✓

Table 1. AN/SLQ-25 System Competitors

1. ULTRA Electronics, Greenford, Middlesex, UK Sea Sentor Torpedo Defence System: The Sea Sentor system is almost identical to the AN/SLQ-25 System in its system architecture and capability as can be seen in Table 1. Sea Sentor can also be expanded with its acoustic array to include a torpedo detection capability (see: http://www.ultra-sonar.com/resources/Surface%20Ship%20Torpedo%20Defence%20(3).pdf).

2. Thales Group, Rydalmere, NSW, Australia Sea Defender and CAPTAS-4: Thales has 2 systems that offer torpedo defence. The Thales group based in Rydalmere Australia developed the Sea Defender system which has been deployed in the Royal Australian Navy and offers torpedo countermeasure and detection capability. More recently, Thales France, through acquisition of the U.S. company, Advanced Acoustic Concepts, offers ASW capability with its CAPTAS family of systems. CAPTAS includes both a countermeasure and a torpedo detection capability. In comparison to the AN/SLQ-25 System, the CAPTAS system differs in that it requires 2 handling systems (winches), one for the countermeasure and one for detection (see: http://www.thalesgroup.com/Portfolio/Defence/Captas-4/).

3. Rafael, Haifa, Israel ATDS Torpedo Decoy System: The ATDS Torpedo Decoy System offers a countermeasure decoy much like the AN/SLQ-25 System with a command and control unit (electronics console), and a towed array countermeasure (ATC-2). It offers advanced detection capability with a mini towed array (TDTA), as well as a launchable decoy once the detection system identified an incoming torpedo. The launchable decoy emits the appropriate decoy signal for 10 minutes then self-destructs and sinks (see: http://www.rafael.co.il/Marketing/356-en/Marketing.aspx).

4. Whitehead Alenia Sistemi Subacquei (WASS) Livomo, Italy C303/S and C310 Anti-Torpedo Countermeasure: The C310 Anti-Torpedo Countermeasure for surface ships differs significantly from the AN/SLQ-25 in its countermeasure approach. The C310 system includes two types of effectors—stationary jammers and mobile target emulators—and a launching system. The system is comprised of a control computer, junction boxes, and two launchers. The C303-S system offer similar technology for submarines (see: http://www.naval-technology.com/contractors/missiles/whitehead).

5. Aselsan Electronic Industries, Ankara, Turkey HIZIR Torpedo Counter Measure System: The HIZIR Torpedo Counter Measure System is very similar to the Rafael ATDS System. As such, it offers similarities to the USML-controlled AN/SLQ-25 System, but the HIZIR system expands capability by offering detection with a separate launchable decoy (see: http://www.aselsan.com/content.aspx?mid= 375&oid=513).

As DDTC can see, the technology is widely available in the international market and, therefore, should be more appropriately controlled under the EAR.

However, should DDTC decide this type of system should remain on the USML, we suggest that paragraph (a)(2) be revised to read as follows: ***Classified software and hardware*** *for underwater acoustic countermeasures or counter-countermeasures systems*. The majority of the AN/SLQ-25 Torpedo Countermeasure System is unclassified mechanical and electrical equipment that functions to deploy and retrieve a towed body. It would work for any similar-sized tow body, regardless of the function or purpose. The classified software and hardware are what make it a uniquely military capability, and the system has no military utility without them. By revising the control to just the classified pieces, DDTC retains control on the distribution of the systems, once such items are installed. Controlling the unclassified hardware on the CCL would change the international market perception of a difficult acquisition path and grant U.S. business a more level playing field in a highly competitive market.

- **Paragraph (a)(3)(xxvii)**: *Bi-static/multi-static radar that exploits greater than 125 kHz bandwidth and is lower than 2 GHz center frequency to passively detect or track using radio frequency (RF) transmissions (e.g., commercial radio or television stations).*

The controls of this paragraph capture bi-static radar that is currently under existing, active development within Boeing as part of an initiative to develop capabilities to improve flight safety in the vicinity of UAV operations and airports not controlled by traditional air traffic management. The bi-static radar approach will be used as an airborne collision avoidance system for civil UAVs and for possible application to general aviation aircraft (see comments for (a)(3)(i), and (a)(3)(ix) below). Essentially the same system as those proposed to be captured by

this paragraph can be installed at ground based locations to provide air traffic information regarding aircraft not equipped with transponders to aircraft operating around uncontrolled airports.

Bi-static radar is a passive coherent locating system and has been controlled, to this point in time, under the EAR in ECCN 5A001.g for reasons of national security. Extensive data has been developed and is currently classified under the jurisdiction of the EAR.

The Boeing recommendation is to continue to control the civil equipment and technology under the EAR. Recognizing the potential military applications of bi-static radar, we recommend the USML listing be retained but amended to control only those capabilities beyond what is required for civil air traffic collision avoidance (TCAS II surveillance range) as shown below:

(xxvii) Bi-static/multi-static radar that exploits greater than 125 kHz bandwidth and is lower than 2 GHz center frequency to passively detect or track using radio frequency (RF) transmissions (e.g., commercial radio or television stations) ***and which is "specially designed" to detect a 0dBsm target at a range greater than 14 nm.***

Bi-static radar commodities and technologies falling below the proposed USML threshold will still be covered by the Commerce Control List as 5A001.g licensable items. If all bi-static radar applications are enveloped by the ITAR, the result will be the elimination of the best available option to enable anti-collision of civil aircraft not equipped with TCAS transponders.

- **Paragraph (A)(3)(i)**: *Airborne radar that maintains positional state of an object of interest in a received radar signal through time.*

Weather radar, now installed on the majority of operating civil transport aircraft, tracks specific weather cells over time. DDTC's proposed language could be interpreted by industry to cover weather radar because those systems "maintain the positional state of an object [weather cell] of interest in a received radar signal through time." Such radar systems in the future will also detect immobile objects on the ground to augment the pilot's positional awareness. Boeing does not believe it is the intent of this listing to cover weather radar applications for civil aircraft.

Further, airborne radar is currently under existing, active development within Boeing as part of a collision avoidance system for general aviation aircraft and for possible application to civil UAVs (see comment for Paragraph (a)(3)(xxvii) above). Airborne radar systems may be critical in enabling the safe operation of UAVs in the portion of the national airspace where transponders are not required on manned aircraft and may significantly improve the safety of commercial aircraft operating at uncontrolled airports. The existing ITAR listing addressing tracking radar only applies to tracking radar systems "specially designed, modified, or

configured for military application". Because of this, commercial radar systems under development by Boeing have been classified as 5A001, and significant technical data already exists under this classification.

As this technology will have an impact on the safety of flight, Boeing recommends providing exclusion for civil aircraft application or perhaps the imposition of military-specific performance parameters (e.g., allow airborne radars with range <=14 nm against a 0 dBsm target (TCAS II surveillance range)). The following proposed control text addresses both the weather radar and the developmental airborne radar issues.

Airborne radar that maintains positional state of ***a solid, moving*** *object of interest in a received radar signal through time* ***and which is "specially designed" to have a range greater than 14 nautical miles for a 0dBsm target***

- **Paragraph (a)(3)(ix)**: *Air surveillance radar with multiple elevation beams, phase or amplitude monopulse estimation, or 3D height-finding.*

  The rationale provided in our comment to paragraph (a)(3)(i) above also applies to this proposed control paragraph. Boeing technologists are currently developing bi-static radar for ground based radar applications. This project would meet the proposed control criteria for 3D height finding for Category XI (A)(3)(ix). Air surveillance radar systems will be critical in enabling the safe operation of UAVs in the portion of the national airspace where transponders are not required on manned aircraft and may significantly improve the safety of commercial aircraft operating at uncontrolled airports. Boeing recommends limiting the scope of this control to non-commercial products that have performance beyond the civil air traffic collision avoidance systems as follows:

  Air surveillance radar:

  (1) Has any of the following:

  a. ***multiple elevation beams,***

  b. ***phase or amplitude monopulse estimation, or***

  c. ***3D height-finding,***

  AND

  (2) Is "specially designed" to have a range greater than 14 nm for a 0dBsm target

- **Paragraph (c)(10)(i)**: *Antenna, and specially designed parts and components therefore, that: (i) Electronically steers both angular beams and nulls with four or more elements with faster than 50 milliseconds beam switching.*

  On commercial aircraft today are phased array SATCOM antennas for satellite communications. These SATCOM systems enable voice and data communications outside the aircraft during flight (aircraft position, telephone, and internet). There are L-band INMARSAT phased array antennas, and also Ku-band phased array

antennas. These phased array antennas electronically steer the beam to find and then track the satellite as the airplane moves in flight. There are many more than four elements on these SATCOM antennas. These antenna arrays actively steer the beam and have switching speeds greater than 50Ms. The nulls for these systems are not actively steered although they do move when the beam is steered.

In order to avoid confusion as to whether such antennae are captured by paragraph (c)(10)(i), we suggest the following revised control text:

(c)(10)(i), *Antenna, and specially designed parts and components therefor, that: (i)* ***Independently*** *steers both* ***the*** *angular beams and nulls* ***electronically using*** *four or more elements with faster than 50 milliseconds beam switching.*

Lacking further clarification it is expected commodity jurisdiction requests will be needed to resolve the classification of systems potentially satisfying the proposed text.

- **Paragraph (c)(11)(ii)**: *Radomes or electromagnetic antenna windows that: (ii) Operate in multiple nonadjacent radar bands.* Boeing understands that, while this control text has already been published in the final rule for Category VIII in paragraph (h)(22), this is a temporary control until USML Category XI publishes in final. Boeing technical experts have indicated that any radio frequency can theoretically be used for a radar application. Boeing finds this control text to be ambiguous because "radar bands" has not been defined, leading to confusion as to whether specific communications bands could be considered by the Department of State to be "radar bands". Failure to address this ambiguity will result in the capture of large amounts of technology currently considered to be controlled under the EAR. Therefore, we recommend DDTC revise the control parameters to provide the frequency ranges considered by the Department to be radar bands, provide exclusion for SATCOM radomes, or limit the control specifically to radome applications for radar as follows:

  Radomes or electromagnetic antenna windows that: (ii) Operate in multiple nonadjacent ***frequency bands for radar applications***

- **Paragraph (c)(5)**: *High-energy storage capacitors with a repetition rate of 6 discharges or more per minute and full energy life greater than or equal to 10,000 discharges, at greater than 0.2 Amps per Joule peak current, that have any of the following: (i) Volumetric energy density greater than or equal to 1.5 J/cc; or (ii) Mass energy density greater than or equal to 1.3 kJ/kg.*

  Boeing suppliers are currently developing electronics which contain high energy capacitors. Boeing believes that the current listing covers capacitors already on the commercial market and such control parameters would impact the export compliance requirements for any existing system designed to use those capacitors.

Examples of capacitors being marketed on-line and can be found at the following web addresses:

- http://www.maxwell.com/products/ultracapacitors/docs/datasheet_bc_series_1017105.pdf (part number BCAP0310); and
- http://www.maxwell.com/products/ultracapacitors/docs/03152013_ds_hc_series.pdf (part number BCAP0010

Because of the lack of inherent military functionality of a capacitor, the fact there is no current control on generic capacitors in the USML, and the availability of existing controls in the EAR, Boeing recommends that controls on these items are more appropriately imposed, as they currently are, in the EAR under ECCN 3A001.

In summary, we appreciate DDTC's and the U.S. Government's efforts in amending USML Category XI into a more positive control list. Category XI is one whose elements, unless carefully defined, have the potential to inadvertently reach into commercial technologies. We have sought above to explain the current and future commercial applications of areas now proposed for ITAR control. Boeing believes the additional revisions we propose are necessary to avoid capturing items and technologies that are currently EAR-controlled. We encourage DDTC to consider the wide international availability of many military electronic systems and technologies and define the control parameters of Category XI accordingly to provide a more level playing field in a highly competitive market area.

Thank you for the opportunity to provide comments. Please do not hesitate to contact me if you have any questions or need additional information. I can be reached at 314-232-9527 or via email at gregory.j.sloan@boeing.com. Alternatively, you can reach out to my colleague in our Arlington office, Chris Haave, at 703-465-3505 or via e-mail at christopher.e.haave@boeing.com.

Sincerely,

Gregory J. Sloan
Director, Global Trade Controls

September 9, 2013

Ms. Sarah Heidema
Acting Director
Office of Defense Trade Controls Policy
U.S. Department of State

RE: RIN 1400-AD25

Dear Ms. Heidema,

I am writing on behalf of the Association of University Export Control Officers (AUECO), a group of senior export practitioners at 29 accredited institutions of higher learning in the United States. AUECO members monitor proposed changes in laws and regulations affecting academic activities and advocate for policies and procedures that advance effective university compliance with applicable U.S. export controls and trade sanction regulations.

AUECO is specifically interested in contributing to the export reform effort in order to ensure that the resulting regulations do not have an adverse impact on academic pursuits. As a result, AUECO is providing the following comments in response to the U.S. Department of State's (Department) second request for public comments on its proposed revision of U.S. Munitions List (USML) Category XI Military Electronics and definition for "Equipment."

Category XI(a)(7) subjects all electronic devices, systems or equipment funded by the Department of Defense (DoD) to control as defense articles unless they have been declared subject to the Export Administration Regulations (EAR) via a formal commodity jurisdiction (CJ) or identified in the relevant contract as being developed for both civil and military applications, when such items are not defense articles enumerated on the USML. Academic research funded by the DoD is often in newly emerging technologies that appear neither on the USML nor the CCL, necessitating frequent CJ requests from the academic community.

The limited options set forth by this proposed rule — determination in the contract, CJ, or International Traffic in Arms Regulations (ITAR) jurisdiction based solely on DoD funding — will be an obstacle to contracting, as DoD contracts are generally of relatively short duration (1 year cycles or less) and the time to obtain a CJ ruling is on the order of two months. This would be particularly limiting for academic institutions where research activities are generally performed in open environments which may include high levels of foreign national participation.

AUECO believes that **Category XI(a)(7)** will negatively impact the ability of U.S. academic

institutions to conduct "fundamental research" funded by the DoD and may negatively impact the DoD's ability to fund "fundamental research" activities. There has long been recognition that basic and applied research in science and engineering at universities is critical to both U.S. national security and to securing economic competitiveness. In recognition of this role, both the ITAR and the EAR permit free sharing of information resulting from such "fundamental research," 22 CFR §120.11(a)(8), or "fundamental university based research," 15 C.F.R. §734.8(b). These carve-outs already include limitations that fundamental research would not apply if the university were to accept restrictions on the publication of the research results or on who might participate in the research activities. The proposed **Category XI(a)(7)** shifts the burden of determining whether fundamental research is applicable entirely to the DoD. We suggest that an additional note might be added to **Category XI(a)(7)** that (a)(7) does not apply to Fundamental Research under contract, grant or other funding authorization as defined in the DoD Memoranda of June 26, 2008 (John Young) and May 24th, 2010 (Ashton Carter).

AUECO previously noted[1] that the proposed Cat. XI creates confusion about what will be regulated as an item/technology under the EAR and what will be controlled by the ITAR. While we believe that the April 16, 2013 definition of "specially designed" is helpful, there is still potential for confusion and overlap in jurisdiction. In some instances, the proposed rule appears to assign ITAR jurisdiction over items that have been under EAR jurisdiction for decades. In the university environment, unique items are created for research purposes that will never be commercially manufactured, so providing specific make and model numbers is not feasible. As a result, we direct DDTC's attention to several provisions that appear to either expand ITAR jurisdiction and/or cause confusion about regulatory jurisdiction.

- **Category XI(a)(1)(ii)** appears to include commodities currently controlled on the CCL, namely 6A001.a.2.a-c (hydrophones, hydrophone arrays, and related processing equipment), related software in 6D003, and the commodities currently described in ECCN 6A991.

- **Category XI(a)(1)(iii)** is devoid of technical parameters that might be used to determine what articles are intended to be controlled; however, the note to the paragraph excludes commodities described in ECCN of Category XI(a)(1)(iii), which does include technical parameters. Items falling outside 5A001.b.1 are currently EAR99. The proposed rule and clarifying note leave open the possibility that EAR99 items, which would not be excluded from Category XI(a)(1)(iii) as 5A001.b.1, would become controlled by the ITAR. We suggest that DDTC clarify how the note to XI(a)(1)(iii) is to be used by exporters in determining what is subject to the control on the USML to avoid the inclusion of items that are currently or should be EAR99.

- **Category XI(a)(3)** includes systems that have historically been found on the CCL. Synthetic Aperture Radar (SAR), Inverse Synthetic Aperture Radar (ISAR), and radar systems with electronically steerable phased array antennae all appear on the CCL in ECCN 6A008 — and the latter has been on the CCL at least since 1981: *"Phased array antennae and sub-assemblies, designed to permit electronic control of beam shaping and pointing, and/or specialized parts*

[1] January 28, 2013 comments to DDTC

thereof (including but not limited to duplexers, phase shifters, and associated high speed diode switches. . .". In the 1992 CCL update, entries for SAR, ISAR and radar systems incorporating electronically steerable phased array antennae were placed in 6A08 (the predecessor to today's 6A008). These items remain on the CCL today, so it is puzzling and concerning that DDTC is now proposing to control these radars as "defense articles".

- **Category XI(a)(4)(i) Electronic support systems and equipment** appears to control detection and interception systems and equipment that have historically been found on the CCL in ECCNs 5A001.i and 5A980, and may also include emerging technologies with clear commercial applications, such as commercial cognitive radios controlling E911 emergency caller location systems that need to be able to geolocate cellular signals and other location specific services. Cognitive radio, especially when using spectrum sharing technologies, may need to rely on signal detection and classification techniques, to determine the existence of military radar signals and give priority access to the military. Unless clarified, this category may unintentionally subject a number of existing or emerging commercial wireless technologies to control under the ITAR.

- **Category XI(a)(4)(iii)** appears to include commodities currently controlled on the CCL, including 5A001.f.

- **Category XI(b)(1)**, like those proposed in (a)(4)(i), appear to result in the control of items found on the CCL in ECCN 5A001.i and 5A980.

- **Category XI(c)(9)(i)** appears to overlap existing commercial items including those in 5A001.f.

- **Category XI(c)(9)(ii)** applies specific performance parameters to control antennas and "specially designed" parts and components, which AUECO appreciates, but the specific standards could include items covered by the new CCL controls for commercial satellite systems, such as those common to antennae used in LTE commercial satellite communications..

- **Category XI(c)(16)** could easily be interpreted to include parts that are common to commercial security systems. A clearly established definition of what constitutes "military" electronics is needed, since many developments in electronics result from fundamental research or civil commercial development and are later adopted by the military; these should not then become "military" electronics simply due to their adoption by the military.

AUECO notes that a number of the proposed Cat. XI entries have common non-military applications. We are able to provide a large number of examples, but for the sake of brevity list only a few here.

- **Category XI(a)(1)(ii)** appears to cover CCL-listed items that are used by biologists and commercial vessels to locate and identify marine mammals.

- **Category XI(a)(3)** appears to cover items already controlled by Category 6 of the CCL that are used for a wide variety of applications, as noted below:

    - SAR used for earth science applications: http://www.nrcan.gc.ca/earth-sciences/geography-boundary/remote-sensing/radar-remote/2122
    - SAR used to monitor and detect forest fires: See int. j. remote sensing, 2002, vol. 23, no. 20, 4211–4234
    - SAR used for crop classification: http://www.intechopen.com/books/references/advances-in-geoscience-and-remote-sensing/application-of-multi-frequency-synthetic-aperture-radar-sar-in-crop-classification
    - SAR used for flood monitoring and alarm systems, environmental monitoring, and agricultural applications: http://www.nec.com/en/global/solutions/space/remote_sensing/index.html
    - SAR for oil spill detection, ship detection, sea ice monitoring, climate change, flood damage assessment, cartography, agriculture and forestry: http://www.pcigeomatics.com/pdfs/radar_focus_on.pdf

- **Category XI(a)(4)(iii)** appears to include commodities controlled on the CCL. For example, Long Term Evolution (LTE), marketed as 4G LTE advanced communications, a standard for wireless communication of high-speed data for mobile phones and data terminals is currently very susceptible to jamming. The proposed rule needs to be modified to ensure that features used in commercial 4G cellular LTE systems and equipment are not considered "electronic combat equipment." Category XI(c)(9)(i) appears to overlap with these same LTE commercial items. 4G LTE uses electronically steered angular beams and nulls that, based on the limited descriptors provided, would potentially fit the control criteria of Category XI(c)(9)(i).

- **Category XI(b)** appears to control existing law enforcement and emergency responder systems. Both E911 emergency response systems and security methods used by companies to determine network intrusions use the techniques identified in Category XI(b)(1).

The export control reform initiative aims to "Describ[e] items using objective criteria…rather than broad, open-ended, subjective, catch-all, or design intent-based criteria," creating a positive list that exporters can use to confidently determine the categorization of their items on the USML and the CCL. As noted above, the creation of these positive lists should not result in expansion of the ITAR such that previously CCL-listed items and technologies become ITAR-controlled.

The following subparagraphs are examples where the inclusion of technical specifications or performance parameters would improve the clarity of the description of controlled items and facilitate self-classifications by exporters:

- **Category XI(a)(1)(ii)** identifies "Underwater single acoustic sensor systems that distinguish tonals and locates the origin of the sound" without providing technical parameters to establish a reasonable threshold to warrant their inclusion on the USML. AUECO suggests that if there are no clear technical parameters or performance thresholds that differentiate between systems intended to be included on the USML, perhaps the unique characteristics of military "tonals" should be subject to control rather than the sensing technology.

- **Category XI(a)(3)** uses the term "target" throughout subparagraph (3) as a trigger for ITAR jurisdiction, without defining the term, resulting in vague controls that could sweep in a wide range of radar systems appropriate for USML control. AUECO would point out that "target" is used when discussing how radar systems send and receive signals to identify any unknown item, including non-military items such as flocks of birds, hailstones rain, etc., and recommends a definition or explanation recognizing non-military use.

  The phrase "radar that sends and receives communications" could encompass ALL radar systems that transmit and receive data including those controlled by ECCN 6A008 or even 6A998, since all radars send and receive some type of information. AUECO recommends that DDTC clarify this provision so that it does not sweep radars currently on the CCL into ITAR controls.

- **Category XI(a)(4)** simply states "Electronic combat equipment," without specific features or performance parameters making the enumerated items "combat" equipment. For example, neither subparagraph (i) nor (iii) includes language which differentiates between military and non-military systems and equipment. In contrast, subparagraph (ii) contains delimiters that are more clearly related to "combat," as that term is commonly used. Absent clarification from DDTC "electronic combat equipment" seems far too open to differences in interpretation and application and likely to sweep in items currently on the CCL.

Many proposed Category XI entries rely heavily on the category descriptor of "military" electronics to determine what items are included in the Category, not upon the current regulations in which defense items are "designed, developed… for a military application." Each area of overlap identified above, and others we may have failed to identify, will create significant uncertainty for exporters in determining the regulatory jurisdiction of their items. This uncertainty could lead to an increase in the number of commodity jurisdiction requests and inadvertent violations.

AUECO suggests additional technical review and discussion to identify such potential overlaps and add appropriate clarifying language, such as technical parameters and/or notes like the one to Category XI(a)(1)(iii) which excludes 5A001.b.1 items before a final rule is issued, to prevent items and technologies currently on the CCL from being swept into the expansion of Category XI.

We thank DDTC for the opportunity to provide this comment.

Sincerely,

Elizabeth Peloso
Chair
Association of University Export Control Officers
Email: auecogroup@gmail.com
Website: http://aueco.org

September 9, 2013

Ms. Sarah J. Heidema
Acting Director, Office of Defense Trade Controls Policy
U.S. Department of State
Directorate of Defense Controls
2410 E. Street, NW
Washington, D.C. 20037

Dear Ms. Heidema:

We are writing on behalf of the Council on Governmental Relations (COGR) and the Association of American Universities (AAU) in response to the proposed rule to transfer military electronics from the United States Munitions List (USML) to the Commerce Control List (CCL). COGR is an association of 189 U.S. research universities and their affiliated academic medical centers and research institutes that concerns itself with the impact of federal regulations, policies, and practices on the performance of research and other sponsored activities conducted at its member institutions. AAU is an association of 60 U.S. and two Canadian preeminent research universities organized to develop and implement effective national and institutional policies supporting research and scholarship, graduate and undergraduate education, and public service in research universities.

COGR and AAU support the concerns expressed by the Association of University Export Control Officers (AUECO) with regard to category XI(a)(7) of the proposed U.S. Munitions List (USML) revision, and wish to align our associations with their comments. Like AUECO, we are concerned that this revision may have a chilling effect on the ability of our member institutions to conduct Department of Defense (DoD) funded fundamental research. It contradicts the intent of national policy as expressed in National Security Decision Directive (NSDD) 189, and may have an adverse effect on U.S. national security and economic competitiveness. We also question whether DoD contracting officers are the appropriate entities to make determinations that may have such severe negative impacts.

Again, we strongly support AUECO comments and encourage the U.S. State Department to give careful consideration to their thoughtful and well-reasoned arguments before making changes to the export control system that would inadvertently impact the conduct of academic research.

Sincerely,

Anthony P. DeCrappeo
President
Council on Governmental Relations

Hunter R. Rawlings III
President
Association of American Universities

NORTHROP GRUMMAN

Northrop Grumman Corporation
Corporate Office

Global Trade Management
2980 Fairview Park Drive
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September 9, 2013

Department of State
Bureau of Political-Military Affairs
Department of Defense Trade Controls
2401 E Street, N.W.
12th Floor, SA-1
Washington, D.C. 20522

ATTN: Ms. Sarah Heidema
Acting Director, Defense Trade Controls Policy

SUBJECT: RIN 1400-AD25 Proposed Revisions USML Category XI

Dear Ms. Heidema:

Northrop Grumman Corporation supports the Department's objective of a positive United States Munitions List (USML), so that exporters can ascertain with a larger degree of certainty those items that are controlled on the list. We appreciate the opportunity to comment on the proposed changes identified in RIN 1400-AD25, USML Category XI and offer the following:

1) We recommend that an additional guidance note be published pertinent to Category XI (a) (3) radars: "Technical parameters identified are designed capability thresholds. Since advertised system performance is within a set of defined conditions, such a system may perform higher when the environmental conditions are altered." We believe further definition or clarifying notes will assure the standards are being applied consistently when evaluating the technical parameters for specific radar systems within Category XI(a)(3).

2) It is recommended that the Department confirm via publication of licensing guidance that future export license applications should identify the radar as XI(a)(3) without having to identify the radar to the lowest sub-category level as many radars perform more than one of the functions included in the sub-paragraphs.

3) We recommend a separate sub-paragraph be identified for software and software source code for the development, operation, test and repair of articles enumerated in Category XI. While ideally a separate sub-paragraph would be added to each of the USML Categories, to align more closely with the CCL, this is particularly critical for Category XI given the extensive use of software in electronics. Many of the functions identified in Category XI sub-paragraphs are currently performed by software that may be running on commercial hardware. Therefore, specific identification of software is necessary to

support the Department's objective of creating a positive list and to avoid jurisdictional uncertainty.

4) Recommend the Department review and revise the Category XI(a)(10) parameters to de-conflict with the parameters included in the CCL 2A984. As written, Category XI(a)(10) identifies electronic sensor systems or equipment for detection of concealed weapons having a standoff detection range of greater than 45 meters this conflicts with the CCL 2A984 entry for concealed object detection equipment which includes a standoff distance of 100 meters.

5) Category XI(a)(11) identifies test sets specially designed for testing counter radio controlled improvised explosive device (C-RCIED) electronic warfare (CREW). As the C-RCIED and CREW test sets would appear to be covered under the reference to systems and equipment included in Category XI(a)(4)(iii), recommend this entry be deleted. If the intent was to cover only the identified C-RCIED and CREW test sets and no other test sets then recommend the Department add language clarifying that test sets are not captured under the reference to "equipment".

6) We recommend a separate sub-paragraph be identified for offensive and defensive cyber operations and services. The language currently included in Category XIII (b) should be incorporated into Category XI and expanded to encompass offensive and defensive cyber operations and services.

Should clarification or subsequent technical discussions be necessary, please contact me at beth.mersch@ngc.com, or 703-280-4056, and we will engage the appropriate individuals.

Sincerely,

Mary Elizabeth Mersch

Mary Elizabeth (Beth) Mersch
Director, Export/Import Management
Global Trade Management

Lockheed Martin Corporation
2121 Crystal Drive #100 Arlington, VA 22202
Telephone 703-413-5951 Facsimile 703-413-5908

LOCKHEED MARTIN

Mark J. Webber
Director, Government & Regulatory Affairs

September 9, 2013

Submitted Via E-Mail (DDTCResponseTeam@state.gov)

Attn: DDTC Response Team
Directorate of Defense Trade Controls
U.S. Department of State

Re: ITAR Amendment – Category XI: Comments on Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI (RIN 1400-AD25)

Lockheed Martin Corporation (Lockheed Martin) is pleased to submit comments on the proposed rule published in the Federal Register on Thursday, July 25, 2013 (78 Fed Reg. 143) to amend the International Traffic in Arms Regulations (ITAR) by modifying Category XI (military electronics) of the U.S. Munitions List (USML). The proposed rule continues the significant effort undertaken by the Departments of State and Commerce to create an export control system that strengthens U.S. national security and focuses export license requirements on the items of greatest sensitivity.

One of the guiding principles of the effort to identify a "positive" list of controlled items on the USML has been to ensure that the proposed controls do not inadvertently capture items that are currently controlled as "dual use" items on the Commerce Control List (CCL), which is administered by the U.S. Department of Commerce. With this principle in mind, Lockheed Martin offers the following comment:

The proposed Category XI paragraph (a)(8) controls: "Unattended ground sensor (UGS) systems or equipment having all of the following:

(i) Automatic target detection;
(ii) Automatic target tracking, classification, recognition, or identification;
(iii) Self-forming or self-healing networks; and
(iv) Self-localization for geo-locating targets."

Systems designed to monitor an environment by using a network of ground sensors support a variety of missions and applications, such as border protection, area surveillance and even bridge, pipeline, aircraft and other structural monitoring requirements. As written, the criteria for control on the USML will likely capture existing UGS systems that are currently controlled on the CCL. Moreover, there may be other widely available commercial products that have these capabilities – or could be modified to add such capabilities – resulting in control on the USML.

Accordingly, while paragraph (a)(8) could be modified with a more narrow list of capabilities that are of particular value to military end-uses, we recommend that the Department of State consider limiting the scope of the proposed control with the inclusion of the defined term "specially designed" for military applications. This would ensure that only military systems are controlled on the USML and other "dual-use" UGS systems remain on the CCL.

Thank you for the opportunity to provide comments on the proposed rule. Lockheed Martin remains committed to supporting the ongoing efforts to clarify and update the current export control lists. We look forward to the expeditious completion of this effort and the substantial, positive impact the proposed changes with have on our ability to support U.S. national security programs and international defense trade priorities.

Sincerely,

Mark J. Webber
Director
Government and Regulatory Affairs

September 9, 2013

Sent via email to: DDTCResponseTeam@state.gov

Directorate of Defense Trade Controls
Office of Defense Trade Controls Policy
ATTN: Regulatory Change, USML Category XI
U.S. Department of State
Washington, DC 20522-0112

RE: **RIN 1400-AD25** (Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI)

Dear Sir or Madam:

National Instruments Corporation ("NI") is pleased to have the opportunity to provide additional feedback on the Administration's proposed rule, Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI (military electronics).

NI designs, manufactures and sells commercial off-the-shelf (COTS), modular, computer-based hardware and software tools, which are used by engineers and scientists in a wide range of applications. Several of the proposed changes to USML Cat XI could inadvertently have an adverse impact to NI's business so we would appreciate your consideration of our comments before publishing the final rule.

I. Comments on Proposal for USML Category XI(b)(1)

The proposed rule provides the following control language for USML Category XI(b)(1):

> XI(b)(1) Direction finding systems for noncooperative objects that have an angle of arrival (AOA) accuracy better than (less than) two degrees root mean square (RMS) and ''specially designed'' for applications other than navigation

The proposed USML Category XI(b)(1) seems to directly correlate to equipment subject to the control under ECCN 5A001.e of the Commerce Control List (CCL) in US Export Administration Regulations (EAR). According to the "Related Controls" under the CLL heading to 5A001, the DDTC has jurisdictional control over equipment subject to ECCN 5A001.e, which provides for the following:

> 5A001.e – Radio direction finding equipment operating at frequencies above 30 MHz and having all of the following, and specially designed components therefor:
>
> 1. "Instantaneous bandwidth" of 10 MHz or more; and
> 2. Capable of finding a Line Of Bearing (LOB) to non-cooperating radio transmitters with a signal duration of less than 1 ms

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NI requests the DDTC to clarify how the parameters in the proposed USML and existing control parameters in ECCN 5A001.e relate to each other. Assuming that the proposed USML parameters and the existing control parameters in ECCN 5A001.e are both intended to cover direction finding equipment and specially designed components therefor, we believe the parameters of ECCN 5A001.e should be combined with the new parameters in the proposed Category XI(b)(1) in a single control with two clarifying notes as follows:

XI(b)(1) Direction finding equipment or systems and "specially designed" components therefor, having all of the following:

(i) Capable of operating at frequencies above 30 MHz;
(ii) Capable of an "Instantaneous bandwidth" of 10 MHz or more;
(iii) Capable of finding a Line Of Bearing (LOB) to non-cooperating radio transmitters with a signal duration of less than 1 ms; and
(iv) Capable of angle of arrival (AOA) accuracy better than (less than) two degrees root mean square (RMS)

Note 1: The definition of "Instantaneous bandwidth" is defined in 15 CFR 772 (US EAR).
Note 2: Category XI(b)(1)does not apply to direction finding equipment or systems ''specially designed'' for navigation applications.

II. Comments on Proposal for USML Cat XI(b)(3)

NI, Aeroflex Inc., Agilent Technologies Inc., Anritsu Company, Research Electronics International, LLC, and Tektronix Inc. cooperated in the review of the proposed control language in Category XI(b)(3). As we share similar concerns, we concur on the proposed changes presented in this section.

The proposed rule provides the following control language for USML Category XI(b)(3):

(XI)(b) Electronic systems or equipment specially designed for intelligence purposes that collects, surveys, monitors, or exploits the electromagnetic spectrum (regardless of transmission medium), or for counteracting such activities.

(XI)(b)(3) Technical surveillance countermeasure (TSCM) or electronic surveillance equipment and counter electronic surveillance equipment (including spectrum analyzers) for the RF/microwave spectrum having all of the following:

(i) A sweep or scan speed exceeding 250 MHz per second;
(ii) A built-in signal analysis capability;
(iii) A volume of less than 1 cubic foot;

(iv) Record time-domain or frequency domain digital signals other than single trace spectral snapshots; and

(v) Display time-vs-frequency domain (e.g., waterfall or rising raster).

This second proposed rule is improved by having clarified that XI(b)(3) applies to instruments "…having all of the following". Nevertheless, NI remains concerned that this rule still depends largely on subjective and potentially confusing terms, which increase regulatory uncertainty. We recognize that some USML Categories will retain a catch-all structure. However, when a control entry contains and is limited by technical parameters, these parameters should be clearly and objectively defined.

Specifically, NI remains concerned about two aspects of the proposed Category XI(b)(3).

- First, the parenthetical phrase "(including spectrum analyzers)" in the XI(b)(3) header may be broadly and generally interpreted as superseding any limitation of XI and XI(b).
- Second, the control criterion "built-in signal analysis capability" in XI(b)(3)(ii) is all-encompassing and could be broadly and generally interpreted as superseding any limitation of XI and XI(b). Meaning, there could be widespread concern that any spectrum analyzer is captured by the ITAR which would have an adverse impact to the industry.

Proposed revisions to Categoy XI(b)(3):

To address these concerns, NI recommends the following revisions to the proposed rule (proposed additions are indicated in boldface text and underlined). Following our proposal, we have listed comments regarding the bases for these recommendations.

XI(b): Electronic systems or equipment **"**specially designed**"** for intelligence purposes that collects, surveys, monitors, or exploits the electromagnetic spectrum (regardless of transmission medium), or for counteracting such activities.

XI(b)(3) Technical surveillance countermeasure (TSCM) or electronic surveillance equipment and counter electronic surveillance equipment ~~(including spectrum analyzers)~~ for the RF/microwave spectrum having all of the following:

(i) A built-in **TSCM** signal analysis **with signal identification and classification capabilities for modulation techniques other than standardized commercial formats**;

(ii) Record time-domain or frequency domain digital signals other than single trace spectral snapshots **where the gap-free recording time exceeds 250 ms**;

(iii) Display time-vs-frequency domain (e.g., waterfall or rising raster) **whereby the trace capture rate exceeds 250 traces per second, regardless of the rate at which the raster is then sent to the display**;

(iv) A sweep or scan speed exceeding 250 MHz per second; and

(v) A volume of less than ~~1~~ **one-half (0.5)** cubic foot **and weight less than 25 lbs**.

Note: We recommend reordering technical parameters (i) through (v) in decreasing order of importance.

Comment [XI(b) header]: Add quotes around specially designed to designate use of an approved definition (see 78 FR 22740) of the term.

Comment [XI(b)(3) sub-header]: The inclusion of the generic term "spectrum analyzer" presents a significant commercial problem for the spectrum analyzer community. First, there is a longstanding U.S. and multinational understanding that spectrum analyzers are dual use instruments. Spectrum analyzers (signal analyzers) have been controlled on the Wassenaar Dual-Use List for many years. This was reconfirmed on June 20, 2013 (78 FR 37372) when entries 3A002.c.4 and 3A002.c.5 of the US Commerce Control List were updated to align with the December 2012 version of the Wassenaar Dual Use List.

Even experienced industry trade compliance professionals have varying opinions on the intent and interpretation of the included parenthetical phrase. While it can be argued that the limitation "specially designed for intelligence purposes" in XI(b) applies to the spectrum analyzers of XI(b)(3), it is nevertheless likely that specifically calling out spectrum analyzers will lead readers, especially customers, to believe that all spectrum analyzers that meet the criteria of (i)-(v) are controlled by XI(b)(3), whether or not they are have TSCM functionality.

This regulatory confusion will lead to commercial problems for the domestic spectrum analyzer industry. This is especially true with respect to European Union sales, where buyers are now specifically designing out ITAR-controlled products in their equipment and integrated systems. Uncertainty surrounding the possibility that all spectrum analyzers are potentially subject to the ITAR will likely cause EU-based customers to demand documentation (CJ) to substantiate the export-control status of each and every instrument.

Finally, USML controlled spectrum analyzers should be inherently included in the equipment described in XI(b) and in XI(b)(3); specifically calling them out in the parenthetical of XI(b)(3) is duplicative and unnecessary. Therefore, we request that the parenthetical reference to spectrum analyzers be completely removed to ensure that the potential for confusion and adverse impact to the industry is eliminated.

Comment [XI(b)(3)(ii) sub-entry, "built-in signal analysis capability"]: If USML Category XI(b) is to remain a catch-all classification for "Electronic systems or equipment specially designed for intelligence purposes," subsections (i)-(v) should provide for the release mechanism. However, as proposed, the release section is another catch-all. Signal analysis capabilities are inherent in all spectrum analyzers, and this proposed regulation provides neither a definition for nor insight into what "signal analysis capability" DDTC seeks to control.

We are confident that this entry is not intended to capture parameter measurements for standard communications signals and subcarriers, such as 'modulation depth', 'modulation error ratio', 'error vector magnitude', 'I/Q imbalance', 'signal-to-noise ratio', 'carrier frequency error', 'Eb/No', 'BER', 'Eye Diagram', 'Phase Noise', and the like. Rather, we believe that DDTC's intent is to control only equipment that is able to characterize digital transmission modulation types that may be used in secure intelligence transmission.

As an approach to address this concern, we look to the current proposed XI(b)(1) as a model. This entry explicitly limits the scope of control by means of the following exclusion: … "specially designed" for applications other than navigation. Thus, we recommend similarly limiting XI(b)(3)(ii) "signal analysis capability" by limiting the scope of control to TSCM signal analysis. We believe this is accomplished by including the following phrase: "other than signal identification and classification capabilities for modulation techniques other than standardized commercial formats."

Furthermore, it is unclear that TSCM activity is uniquely for military/intelligence purposes; there is a strong demand for counter-surveillance equipment in the private sector as business entities want to protect their trade secrets and intellectual property from industrial espionage. General purpose spectrum analyzers provide the functionality needed by industry, but may not rise to the level of sophistication contemplated by the proposed by XI(b)(3). But if XI(b)(3)(i) is not more tightly defined/limited, such as we recommend here, this ambiguity will perpetuate the need for spectrum analyzer manufacturers to seek CJ determinations.

Comment [XI(b)(3)(iv) and (b)(3)(v) sub-entries, "record…" and "display…"]: For these two entries, the existing controls are qualitative. We recommend that they be further defined by addition of quantitative numerical parameters. This change serves two purposes. First, it adds elaborates on the meaning and intent of the qualitative parameter, thereby clarifying to readers what items are potentially within the scope of control. Second, it adds a numerical control threshold, thereby simultaneously establishing an objective "bright-line" and eliminating ambiguity surrounding the amount of recording and speed of displaying that is needed to be controlled.

Comment [XI(b)(3)(ii) sub-entry, "volume of less than 1 cubic foot"]: We believe that the intent of XI(b)(3)(iii), "volume of less than 1 cubic foot" is to differentiate portable/handheld from rack-mount and bench-top instruments and to limit control to portable handheld instruments. If so, then the one cubic foot threshold is problematic because many rack-mount instruments have volume slightly less than that. If the intent is to control only those instruments that are "handheld/portable", then 0.5 cubic feet would be a better threshold. Alternately, a combination of size and weight (perhaps less than 25 lbs), or size and "battery-powered" (which connotes portability), or size and weight and "battery-powered" would be effective differentiators.

Summary

As previously mentioned, NI is concerned that the parenthetical phrase "(including spectrum analyzers)" that appears in the XI(b)(3) sub-header and the over-encompassing control "built-in signal analysis capability" of XI(b)(3)(ii) will result in confusion. NI is also concerned that XI(b)(3) contains broad and subjective terms that are susceptible to multiple interpretations or prone to misinterpretation.

The practical impact of XI(b)(3) is that manufacturers of signal/spectrum analyzers will be forced to submit Commodity Jurisdiction requests for nearly all instruments (both existing and new/future); we respectfully suggest that this outcome is neither rational nor practical. We also note that submitting CJ requests would have an adverse effect on competition as the publication of multiple CJs pertaining to new/future products would tend to reveal internal developments that most companies would consider proprietary. In addition, it is probable that customers will request CJs for existing spectrum analyzers so that they will have definitive guidance as to whether a specific product is or is not subject to the ITAR. Obtaining CJs for existing products poses a very real practical challenge because it is customary to treat products as being subject to the ITAR while a CJ is pending with the DDTC. Altering a company's business processes to treat a product temporarily subject to the ITAR would have an adverse business impact.

In conclusion, we believe that the proposed Category XI(b)(3) fails to differentiate between those spectrum analyzers that are useful for sensitive TSCM activities and those that are not. As written, it could cause confusion and unnecessarily result in many spectrum analyzers becoming controlled on the USML. At minimum, it will result in significant and ongoing CJ activity as manufacturers attempt to determine which spectrum analyzers are controlled by XI(b)(3) and which ones are not. Additionally, if spectrum analyzers hitherto treated as dual-use items were to become captured by the ITAR, this would have a adverse impact on the competitive position of US signal analyzer manufacturers relative to our foreign competitors.

III. Comments on Proposal for USML Cat XI(c)(8)

The proposed rule provides the following control language for USML Category XI(c)(8):

> XI(c)(8) Digital radio frequency memory (DRFM) with RF instantaneous input bandwidth greater than 400 MHz, and 4 bit or higher resolution and specially designed parts and components therefor

The control language listed in USML Category XI(c)(8) appears to be missing a critical parameter for DRFM systems used in electronic warfare – latency time. We request the DDTC to consider including a latency time parameter in USML Category XI(c)(8).

In addition, the resolution and bandwidth parameters listed in Category XI(c)(8) are found in mainstream analog to digital and digital to analog converters. By way of example, the resolution and bandwidth values of analog to digital converters with a resolution of 8 bits and sample rate of 400 mega-samples per

second can be found in the EAR under ECCN 3A991.c. We believe the USML should control state-of-the-art technology and systems; not technology and systems readily available on the market. Therefore, we request the DDTC to raise the parameters listed in USML Category XI(c)(8) to those found in state-of-the-art DRFM systems.

Finally, we believe the DDTC is attempting to control DRFM systems for military aircraft and not DRFM systems commercial test and measurement systems for broadband communications signals. We request the DDTC to modify the language to include a "specially designed" or not "specially designed" requirement to decontrol test and measurement systems commonly used in the civil/commercial market.

Based on the comments above, NI offers the following proposal:

XI(c)(8) Digital radio frequency memory (DRFM) equipment or systems and "specially designed" components therefor, having all of the following:

(i) Resolution of 12 bit or more and capable of an "Instantaneous bandwidth" of 1 GHz or more; and

(iii) Total latency time (signal acquisition time, signal processing, and signal generation) of less than 1 microsecond.

Note 1: The definition of "Instantaneous bandwidth" is defined in 15 CFR 772 (US EAR).
Note 2: Category XI(c)(7)does not apply to digital radio frequency memory (DRFM) equipment or systems ''specially designed'' for civil or commercial test and measurement applications.

III. Comments on Proposal for USML Cat XI(c)(14)

The proposed rule provides the following control language for USML Category XI(c)(14):

XI(c)(14) Tuners having all of the following:

(i) An instantaneous bandwidth of 30MHz or greater; and

(ii) A tuning speed of 300 microseconds or less to within 10 KHz of desired frequency

The control language listed in USML Category XI(c)(14) uses the following undefined terms: *tuners*, *instantaneous bandwidth*, and *tuning speed*. We request DDTC to provide definitions of each of these terms and, to the extent possible, reuse terms and definitions that exist in the EAR.

In addition, the proposed entry does not provide an operating frequency range nor a tuning time based on frequency step size. The absence of these criteria broadens the scope of items controlled in Category

XI(c)(14). We request DDTC to add these parameters to clarify the type of tuner component intended to be controlled in Category XI(c)(14).

IV. General Comments on the Proposal of USML Category XI and Others

The Wassenaar Arrangement and the US Export Administration Regulations have taken great care to define broad or ambiguous terms and use phases, such as "having all of the following", to ensure the goods and technologies requiring control are properly and uniformly controlled by all exporters. We request the DDTC to take the same care in revising the USML.

With regard to the source of definitions for the USML, we request the DDTC to consider reusing definitions found in the US EAR, to the extent possible, to reduce the burden on exporters. We feel this is possible by simply referring exporters to 15 CFR 772 (US EAR) in Notes to each heading. Alternatively, the DDTC can republish these definitions in the USML.

Most of the entries in USML Category XI(b) and XI(c) contain technical parameters which should be reviewed periodically to ensure the most critical munitions goods and technologies are controlled. We request the DDTC to consider creating a committee of industry representatives, similar to the Department of Commerce's Technical Advisory Committees, or utilizing existing members of the Technical Advisory Committees for this periodic review.

IV. Conclusion

Thank you once again for the opportunity to provide comments on this proposed rule. Please contact me by e-mail at paul.ledet@ni.com or call 512-683-8123 should the DDTC have any additional questions concerning this letter.

Respectfully submitted,

Paul Ledet
Trade Compliance Technology and Classification Manager

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September 9, 2013

Ms. Sarah J. Heidema,
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Office of Defense Trade Controls Policy, Department of State,
DDTCResponseTeam@state.gov

Publiccomments@bis.doc.gov
Regulatory Policy Division
Bureau of Industry and Security, U.S. Department of Commerce
Room 2099B, 14th Street and Pennsylvania Avenue NW, Washington, DC 20230

VIA: www.Regulations.gov

RE: Comments on Proposed Amendment to the International Traffic in Arms Regulations:
Revision of U.S. Munitions List (USML) Category XI RIN [1400-AD25] And Revision to the Export Administration Regulations (EAR) RIN [0694-AF64]

Dear DDTC Response Team and Regulatory Policy Division:

The University of California San Diego (UCSD) is pleased to respond to the July 25th, 2013 Federal Register notice seeking comments on Revisions to the US Munitions List Category XI and Revisions to the Export Administration Regulations.

UC San Diego and Scripps Institution of Oceanography
UC San Diego is an academic powerhouse and economic engine, recognized as one of the top 10 public universities by *U.S. News & World Report* and ranked number one in the nation for public service by the *Washington Monthly*. UC San Diego's FY 2012 revenues were $3.4 billion; 29 percent of this total is revenue from contracts and grants, most of which is from the federal government for research. The funding supports fundamental research in medicine, the sciences, the arts, oceanography, engineering and other fields.

A department of UC San Diego, Scripps Institution of Oceanography (SIO) is one of the oldest, largest, and most important centers for ocean and earth science research, education, and public service in the world. Research at SIO encompasses physical, chemical, biological, geological, and geophysical studies of the oceans and earth. With more than a century of exploration and discovery in global sciences, Scripps Oceanography is the world's preeminent center for ocean and earth research, teaching, and public education.

I have polled our SIO research scientists for comments on the Category XI and EAR revisions impacting their fundamental research activities. I am providing the following comments on their behalf for consideration to Department of State and Department of Commerce in revising the proposed export control regulations.

Research in International Waters-Difficulties with ITAR Licensing
SIO researchers use a number of ITAR and EAR controlled tools and technologies for fundamental research like basic ocean science and climate change, acoustic monitoring of marine mammal research, or electromagnetic ocean floor research associated with oil and gas exploration or seismic studies. The research equipment are commonly used by the University within fundamental research programs conducted in International Waters funded by National Science Foundation (NSF), National Oceanic and Atmospheric Administration (NOAA), and the Office of Naval Research (ONR). The conduct of research in International Waters performed by SIO requires the time consuming process of obtaining ITAR licenses for Category XI electronics used in support of fundamental research. Under the present regulatory regime, ITAR considers research brought by US Nationals into International Waters 12 nautical miles off the coast of the United States as an export, while the EAR rules do not, unless another country is involved or the items are brought into a foreign destination. The current ITAR licensing regime places an undue burden on fundamental scientific research missions funded by US agencies and add costly delays.

Under the EAR, a simple day long voyage just twelve miles off the coast from our facilities in La Jolla, California into International Waters for the purpose of data collection would not require an export license. A day's trip out to observe marine mammals involve first going through the ITAR application process, consuming time and resources for both the non-profit university as well as all federal reviewing agencies obtaining an export license which may take 3 months to obtain from Department of State. Harmonizing the definition of "Export" between the ITAR and EAR should also be considered insofar as research efforts conducted in International Waters are concerned or allowing such voyages to claim a license exception like the EAR temporary export (TMP), would support important University research, while achieving the aims of export control reform.

Request for Wording Changes to ITAR Category XI
SIO would like to point out three areas in the proposed revisions to Category XI that could be improved by rewording and providing more specificity on controlled items. Acoustics and bioacoustics research have dual use purposes. ITAR controls on military acoustics systems should be specific enough that they do not inadvertently encompass dual use equipment. SIO requests that the following items be considered for revision to Category XI:

1. Category XI (a) (i) page 45022:
   Active or passive acoustic array sensing systems or acoustic array equipment capable of real-time processing that survey or detect, and also track, localize (i.e., determine range and bearing), classify, or identify surface vessels, submarines, other undersea vehicles, torpedoes, or mines, having any of the following:
   (A) Multi-static capability;
   (B) Operating frequency less than 20 kHz; or
   (C) Operating bandwidth greater than 10 kHz;

- We request this be revised from "capable of real-time" to be replaced by "intended for real-time".
  - Passive towed array systems exist for tracking and classifying marine mammals in real time that operate under 20 kHz with greater than 10 kHz bandwidth. These systems are "capable" of tracking vessels (and do).

2. Category XI (a) (ii) page 45022:
   Underwater single acoustic sensor system that distinguishes tonals and locates the origin of the sound;

- We request this be revised to be more specific (.e.g.) "Underwater single acoustic sensor systems that distinguishes tonals and classifies the type of vessel making the sound".
  - "Origin" is confusing: it can mean "classify" (as in the origin of the sound is a submarine) or "localize" (the sound originates from 10 km away and 100 m depth).
  - Many researchers would like to use acoustic vector sensors to locate and identify natural acoustic activity. These sensors can locate sounds, but not necessarily classify them. So if the regulatory intent is to classify (e.g. identify particular tonals as submarines) the regulations could state that "classification" is the goal.

3. Category XI (12) (i) page 45024:
   (12) Underwater sensors (acoustic vector sensors, hydrophones, or transducers) or projectors specially designed for systems controlled by paragraphs (a) (1) and (a) (2) of this category, having any of the following:
   (i) a transmitting frequency below 10 kHz;

- We request this be revised to: (i) a transmitting frequency below 10 kHz for active sonar systems.
  - This avoids situations were underwater projectors are used to observe responses of marine animals to underwater sound.

Request for ITAR Category XI (a(1)) Items to be Transferred to the CCL
We request that certain technologies listed under XI (a(1)) be considered for migration to the EAR's Commerce Control List (CCL).

- Q-Tech 2002 Microcomputer Compensated Crystal Oscillator is controlled under ITAR XI(c) and we request that it be removed from the USML and transitioned to CCL. This component is no longer being manufacturer and being replaced by the higher performance Symmetricom Chip Scale Atomic Clock (CSAC), which is not ITAR controlled and has the same function and classified as EAR99.

- Geometrics GeoEel 1250, digital towed hydrophone system, is controlled under ITAR XI(c) and we request that it be removed from the USML and transitioned to CCL to ECCN of 6A006. These were originally designed as dual use items for oil and gas, engineering surveys and sub-bottom profiling. SIO uses these for conducting low-energy seismic and sediment coring surveys for climate variability for fundamental research under NSF funding.

Underwater electronic hardware, including acoustic arrays may have a dual-use purpose and should be vetted for consideration for control under the EAR when serving a non-military purpose in support of research performed at the academic level for such diverse uses as ocean floor surveys and the study of marine life.

We appreciate the opportunity to provide input regarding export control regulations to enable the government to understand how the technologies we are developing and using are being impacted by export controls. The research enterprise in the United States is critical to the economic advancement of our country and having export regulations that enable researchers through the movement of items and technologies to the Commerce Control List ensure that innovation is not stifled in performing fundamental research.

Any further questions on these comments should be directed to me, Brittany Whiting, UC San Diego Export Control Officer at (858) 534-4175 or brwhiting@ucsd.edu .

Sincerely,

Brittany Whiting
Export Control Officer

Cc:
Marianne Generales, UC San Diego Assistant Vice Chancellor for Research
Brian Warshawsky, University of California Office of the President Systemwide Export Control Officer

From: De D Diep [mailto:De_D_Diep@raytheon.com]
Sent: Monday, September 09, 2013 7:43 PM
To: DDTC Response Team
Subject: ITAR Amendment - Category XI

Dear DDTC Response Team:

The following are comments regarding the proposed Category XI published on July 25, 2013:

Comment #1
Category XI(a) Electronic equipment and systems not included in Category XII of the U.S. Munitions List, as follows:
(3) Radar systems and equipment, as follows:
(vii) Air surveillance radar with free space detection of 1 square meter RCS target at 85 nmi or greater range, scaled to RCS values as RCS to the 1⁄4 power;

Comment: We have radars supporting en-route air traffic control that are capable of detecting 1m2 RCS targets at ranges exceeding 85nm, and are designated with the appropriate ECCN in CCATS G019734.

Recommendation: Change requirement to 0.5m2, or increase range to 150nm

Comment #2
XI(a)(3)(ix) Air surveillance radar with multiple elevation beams, phase or amplitude monopulse estimation, or 3D height-finding;
Comment: We have radar which supports terminal air traffic control has been modified in this manner to mitigate the effects of wind turbines, and to help support Ground Based Sense and Avoid UAS in the NAS operations – we currently have CJ which designates this as being under Dept of Commerce control

Recommendation: Add revisit rate requirement similar to that in 3.x, ie "….with a revisit rate greater than or equal to 1/3 Hz"

Comment #3
XI(a)(3)(xii) Radar incorporating pulsed operation with electronics steering of transmit beam in elevation and azimuth;

Comment: We have radars that can be adapted via software to support meteorology, wind turbine mitigation, wake vortex detection, maritime and border surveillance, and terminal air traffic control. We currently have CCATS G400845 which designates the radar with several ECCN's for various applications.

Recommendation: Add revisit rate requirement similar to that in 3.x, ie "….with a revisit rate greater than or equal to 1/3 Hz"

Comment #4
(xvii) Radar having moving target indicator (MTI) or pulse-Doppler processing where any single Doppler filter provides a normalized clutter attenuation of greater than 50dB;

Comment: We have Radars which support air traffic control operations have clutter attenuation levels >50dB in order to meet Sub Clutter Visibility requirements of >55dB and are designated with appropriate ECCN in CCATS G019734.

Recommendation: Change requirement to 60dB
If you require additional information, please contact me at the numbers and email below.

Regards,

De Diep
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Directorate of Defense Trade Controls
Office of Defense Trade Controls Policy
ATTN: Regulatory Change, USML Category XI
U.S. Department of State
Washington, DC 20522-0112

September 9, 2013

RE: **RIN 1400-AD25** (ITAR Amendment—Category XI)

Dear Sir or Madam:

Agilent Technologies is pleased to have the opportunity to provide additional feedback on the Administration's proposed rule, Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI (military electronics), RIN 1400-AD25, dated July 25, 2013, which item appears at 78FR45018. Agilent cooperated with several other manufacturers of spectrum analyzers to review and respond to the first (November 28, 2012) version of this proposed rule; we have cooperated again to the review the present version of this proposed rule. Collectively Agilent and the other manufacturers represent the vast majority of domestic production capability for signal analyzers ("Domestic Spectrum Analyzer Industry"); we share similar concerns, and concur on the proposed changes presented in this letter.

These comments are limited to the proposed control for USML Cat XI(b) generally and to entry XI(b)(3) in particular, as follows:

> (XI)(b) Electronic systems or equipment specially designed for intelligence purposes that collects, surveys, monitors, or exploits the electromagnetic spectrum (regardless of transmission medium), or for counteracting such activities.
>
> (XI)(b)(3) technical surveillance countermeasure (TSCM) or electronic surveillance equipment and counter electronic surveillance equipment (including spectrum analyzers) for the RF/microwave spectrum having all of the following:
>
> (i) A sweep or scan speed exceeding 250 MHz per second;
> (ii) A built-in signal analysis capability;
> (iii) A volume of less than 1 cubic foot;

(iv) Record time-domain or frequency domain digital signals other than single trace spectral snapshots; and
(v) Display time-vs-frequency domain (e.g., waterfall or rising raster).

To begin, this second proposed rule is greatly improved relative to the November 28, 2012 version, by having clarified that XI(b)(3) applies to instruments "…having all of the following".

Nevertheless, Agilent and the Domestic Spectrum Analyzer Industry remain concerned that this rule still depends largely on subjective and potentially confusing terms, which increase regulatory uncertainty. We recognize that some USML Categories will necessarily retain a catch-all structure. However, when a control entry contains and is limited by technical parameters, these parameters should be clearly and objectively defined.

Specifically to this point, Agilent remains extremely concerned about two aspects of the proposed XI(b)(3).

- First, inclusion the parenthetical phrase "(including spectrum analyzers)" in the XI(b)(3) header will be broadly and generally be interpreted by industry and by customers and potential customers as superseding any limitation of XI and XI(b).
- Second, the control criterion "built-in signal analysis capability" in XI(b)(3)(ii) is all-encompassing: it, too, will be broadly and generally be interpreted by industry and by customers and potential customers as superseding any limitation of XI and XI(b). That is, there will be widespread concern that any spectrum analyzer could be captured by the ITAR, with devastating impact to the industry.

Proposed revisions to XI(b)(3):
To address these concerns, Agilent and the Domestic Spectrum Analyzer Industry recommend the following revisions to the proposed rule (proposed additions are indicated in boldface text and underlined). Following that are comments and discussion regarding the bases for these recommendations. Finally, there is an analysis of the probable impact of the current proposed rule to Agilent's spectrum analyzers.

XI(b): Electronic systems or equipment **"**specially designed**"** for intelligence purposes that collects, surveys, monitors, or exploits the electromagnetic spectrum (regardless of transmission medium), or for counteracting such activities.

XI(b)(3): Technical surveillance countermeasure (TSCM) or electronic surveillance equipment and counter electronic surveillance equipment ~~(including spectrum analyzers)~~ for the RF/microwave spectrum having all of the following:

(i) A built-in **TSCM** signal analysis **with signal identification and classification capabilities for modulation techniques other than standardized commercial formats**;

(ii) Record time-domain or frequency domain digital signals other than single trace spectral snapshots **where the gap-free recording time exceeds 250 ms**;

(iii) Display time-vs-frequency domain (e.g., waterfall or rising raster) **whereby the trace capture rate exceeds 250 traces per second, regardless of the rate at which the raster is then sent to the display**;

(iv) A sweep or scan speed exceeding 250 MHz per second; and

(v) A volume of less than ~~1~~ **one-half (0.5)** cubic foot **and weight less than 25 lbs**.

Note: We recommend reordering technical parameters (i) through (v) in decreasing order of importance.

Comment [XI(b) header]: Add quotes around specially designed to designate use of an approved definition (*see* 78 FR 22740) of the term.

Comment [XI(b)(3) sub-header]: The inclusion of the generic term "spectrum analyzer" presents a significant commercial problem for the spectrum analyzer community. First, there is a longstanding U.S. and multinational understanding that spectrum analyzers are dual use instruments. Spectrum analyzers (signal analyzers) have been controlled on the Wassenaar Dual-Use List for many years. Indeed, this was reconfirmed as recently as June 20, 2013 (78 FR 37372), when entries 3A002.c.4 and 3A002.c.5 of the US Commerce Control List were updated to align with the December 2012 version of the Wassenaar Dual Use List.

Even experienced industry trade compliance professionals have varying opinions on the intent and interpretation of the included parenthetical. While it can be argued that the limitation "specially designed for intelligence purposes" in XI(b) applies to the spectrum analyzers of XI(b)(3), it is nevertheless likely that specifically and uniquely calling out spectrum analyzers will lead readers, especially customers, to believe that all spectrum analyzers that meet the criteria of (i)-(v) are controlled by XI(b)(3), whether or not they are specially designed for intelligence purposes, whether or not they are have TSCM functionality, and whether or not they are even useful for TSCM.

This regulatory confusion will lead to commercial problems for the domestic spectrum analyzer industry, especially with respect to sales into the European Union , where buyers are now specifically designing out ITAR-controlled products in their equipment and integrated systems. Uncertainty surrounding the possibility that all spectrum analyzers are potentially subject to the ITAR will likely cause EU-based customers to demand documentation (Commodity Jurisdictions) to substantiate the export-control status of each and every instrument.

Finally, spectrum analyzers are inherently included in the equipment described in XI(b) and in XI(b)(3); specifically calling them out in the parenthetical of XI(b)(3) is duplicative and unnecessary. We therefore urge that the parenthetical reference to spectrum analyzers be completely removed, to ensure that the potential for confusion and for adverse impact to the industry is eliminated.

Comment [XI(b)(3)(ii) sub-entry, "built-in signal analysis capability"]: If USML Category XI(b) is to remain a catch-all classification for "Electronic systems or equipment specially designed for intelligence

purposes," subsections (i)-(v) should provide for the release mechanism. However, as proposed, what should be the mechanism for release section is just another catch-all, because "built-in signal analysis capability" is inherent in all spectrum analyzers, and this proposed regulation provides neither a definition for nor insight into what "signal analysis capability" DDTC seeks to control.

We are confident that this entry is not intended to capture parameter measurement for standard communications signals and subcarriers, such as 'modulation depth', 'modulation error ratio'; 'error vector magnitude' 'I/Q imbalance', 'signal-to-noise ratio', 'carrier frequency error', 'Eb/No', 'BER', 'Eye Diagram', 'Phase Noise', and the like. Rather, we believe that DDTC's intent is to control only equipment that is able to characterize digital transmission modulation types that may be used in secure intelligence transmission.

As an approach to address this concern, we look to the current proposed XI(b)(1) as a model: With regard to direction-finding systems, this entry explicitly limits the scope of control by means of an exclusion: control is limited to systems ' "specially designed" for applications ***other than navigation***'. Thus, we recommend similarly limiting XI(b)(3)(ii) "signal analysis capability" by limiting the scope of control to TSCM signal analysis "***other than*** *signal identification and classification capabilities for modulation techniques other than standardized commercial formats"*.

Furthermore, it is unclear that TSCM activity is uniquely for military/intelligence purposes; there is a strong demand for counter-surveillance equipment in the private sector, because business entities want to protect their trade secrets and intellectual property from industrial espionage. General purpose spectrum analyzers provide functionality needed by industry, but may not rise to the level of sophistication contemplated by the proposed by XI(b)(3). But if XI(b)(3)(i) is not more tightly defined/limited, such as we recommend here, this ambiguity will perpetuate the need for spectrum analyzer manufacturers to seek CJ determinations.

Comment [XI(b)(3)(iv) and (b)(3)(v) sub-entries, "record…" and "display…"]: For these two entries, the existing controls are qualitative. We recommend that they be further defined by addition of quantitative numerical parameters. This change serves two purposes. First, it adds elaborates on the meaning and intent of the qualitative parameter, thereby clarifying to readers what items are potentially within the scope of control. Second, it simultaneously establishes an objective "bright-line" and eliminates ambiguity surrounding the amount of recording and speed of displaying that is needed to be controlled by this entry.

Comment [XI(b)(3)(ii) sub-entry, "volume of less than 1 cubic foot"]: We believe that the intent of XI(b)(3)(iii), "volume of less than 1 cubic foot" is to differentiate portable/handheld from rack-mount and bench-top instruments and to limit control to bona fide portable handheld instruments. If so, then the one cubic foot threshold is problematic because many rack-mount instruments have volume slightly less than that. If the intent is to control only those instruments that are bona fide "handheld/portable", then 0.5 cubic feet would be a better threshold. Alternately, a combination of size and weight (perhaps less than 25 lbs), or size and "battery-powered" (which connotes portability), or size and weight and "battery-powered" would be effective differentiators.

Impact of the proposed XI(b)(3) to Agilent spectrum analyzers
The Appendix to this letter contains two Tables, the first of which lists Agilent spectrum analyzers that are potentially captured by XI(b)(3) as per July 25, 2013 proposal, and the second of which lists Agilent spectrum analyzers that are probably not captured by the July 25, 2013 proposal.

In particular, most Agilent spectrum analyzers contain the "PowerSuite" measurement package. PowerSuite measurements include Channel Power, Occupied Bandwidth, Adjacent Channel Power, Multi-Carrier Adjacent Channel Power, Power Statistics, Harmonic Distortion, Burst Power, Spurious Emissions and Spurious Emissions Mask. These are all fundamental spectrum analysis measurements, but can be interpreted as a type of "signal analysis capability" and so are potentially controlled under XI(b)(3)(ii). Agilent is confident that it is not DDTC's intent to control PowerSuite and similar basic measurements as "built-in signal analysis capability", but Agilent also believes that the phrase "built-in signal analysis capability" is sufficiently broad and sufficiently vague that knowledgeable persons could plausibly be confused. We cite this as an important example of the need for regulatory clarity.

In addition, many Agilent spectrum analyzers have digital demodulation capability, with varying analysis bandwidths. Agilent believes that it is not DDTCs intent to control this capability as "built-in signal analysis", but again there could plausibly be confusion. This is a second example of the important need for regulatory clarity.

Summary
As previously mentioned, Agilent is extremely concerned that the parenthetical phrase "(including spectrum analyzers)" that appears in the XI(b)(3) sub-header and the over-encompassing control "built-in signal analysis capability" of XI(b)(3)(ii) will result in confusion, not clarity. Agilent is also extremely concerned that XI(b)(3) contains broad and subjective terms that are susceptible to multiple interpretations and are prone to misinterpretation.

The practical impact of XI(b)(3) is that manufacturers of signal/spectrum analyzers will be forced to submit Commodity Jurisdiction requests for nearly all instruments (both existing and new/future); we respectfully suggest that this outcome is neither rational nor practical. We also note that such outcome would have a significant adverse effect on competition: publication of multiple CJs pertaining to new/future products would tend to reveal internal developments that most companies would consider proprietary. It is probable that customers will demand CJs for existing spectrum analyzers as well, so that they will have definitive guidance as to whether a specific product is or is not subject to the ITAR. Obtaining CJs for existing products poses a very real practical difficulty, because it is customary to treat products as being subject to the ITAR which a CJ is in progress. Altering one's business strategy to treat temporarily as ITAR a product that for years was treated as being subject to the EAR would have a devastating adverse business impact.

In conclusion, we believe that the proposed Category XI(b)(3) fails to differentiate between those spectrum analyzers that are useful for sensitive TSCM activities and those that are not. As written, it would cause confusion, not clarity; and it could unnecessarily and inappropriately result in many spectrum analyzers becoming controlled on the USML. At minimum it will result in significant and

ongoing CJ activity as manufacturers attempt to determine which spectrum analyzers are controlled by XI(b)(3) and which are not. Additionally, if spectrum analyzers hitherto treated as dual-use items were to become captured by the ITAR, this would have a significant adverse impact on the competitive position of US signal analyzer manufacturers relative to our foreign competitors. Finally, we believe that our suggested modifications would result in a control that accomplishes what DDTC seeks to achieve and we urge DDTC to consider them seriously.

Thank you once again for the opportunity to provide comments on this proposed rule. I would be pleased to discuss any of this with DDTC. I can be reached at jonathan_wise@agilent.com or 719-531-4799.

Sincerely yours,

Jonathan Wise
Global Trade Compliance
Agilent Technologies

Appendix: Summary of Impact of Proposed XI(b)(3) to Agilent Spectrum Analyzers

Table 1 (part 1 of 2): Agilent spectrum analyzers potentially captured by XI(b)(3) as per July 25, 2013 proposal.

Model Numbers	Product Family	(i)		(ii)				(iii)			
		Sweep Rate >250 MHz/s (*)	Max Span (effectively max freq in GHz)	Built in SA Capability (#)	Power Suite	Digital Demodulation (Analysis Bandwidth)	Signal ID	Volume (cu ft)	Nominal Weight (lbs)	Power (Watts)	Battery
N9020A	**MXA**	**Yes**	26.5	**Yes**	Yes	160 MHz	No	**0.99**	35	465	No
N9010A	**EXA**	**Yes**	44	**Yes**	Yes	40 MHz	No	**0.99**	35	350	No
N9000A	**CXA**	**Yes**	26.5	**Yes**	Yes	25 MHz	No	**0.99**	34	270	No
N9343C **N9344C**	**HSA**	**Yes**	13.6 20	**Yes**	Yes	No	No	**0.16**	7	16	Yes
N9340B	**HSA**	**Yes**	3	**Yes**	Yes	No	No	**0.16**	7	13	Yes
N9935A **N9936A** **N9937A** **N9938A**	**FieldFox**	**Yes**	9 14 18 26.5	**Yes**	Yes	No	No	**0.14**	6.6	14	Yes
N9912A	**FieldFox**	**Yes**	6	**Yes, optional**	Yes	No	No	**0.14**	6.6	14	Yes
N9913A **N9914A** **N9915A** **N9916A** **N9917A** **N9918A**	**FieldFox**	**Yes**	4 6.5 9 14 18 26.5	**Yes**	Yes	No	No	**0.14**	6.6	14	Yes
N6841A	**RF Sensor**	**4 GHz/s**	6	**Note (1)**	Note (2)	Note (3)	Note (4)	**0.14**	7.7	30	Yes

(*) Agilent generally does not specify sweep rate, but effective sweep rates of Agilent spectrum analyzers greatly exceed 250 MHz/s. The effective sweep rate for X-platform instruments is at least several tens of GHz/sec.

(#) Lacking clarity on what constitutes "built-in signal analysis capability," Agilent bases this analysis on the assumption that capabilities such as Power Suite are a type of "built-in signal analysis capability".

N6841A Note (1): This instrument is not a complete spectrum analyzer; it lacks the necessary computer control that provides user interface for display and control. When the computer is present, the combined N6841A/computer system inherently has "built-in signal analysis capability".

N6841A Note (2): Does not have Power Suite, but does provide AM/FM demodulation, which is a type of "built-in signal analysis".

N6841A Note (3): When the computer is present, the combined N6841A/computer system inherently has 20 MHz analysis bandwidth.

N6841A Note (4): Could have signal identification, depending upon what software is on the computer.

Table 1 (part 2 of 2): Agilent spectrum analyzers potentially captured by XI(b)(3) as per July 25, 2013 proposal.

Model Numbers	(iv)					(v)
	Recording	**Traces (Qty)**	**Trace math**	**Display (hold/max/min/etc)**	**Averaging**	**Spectrogram**
N9020A	**Yes**	6	Yes	Yes	Yes	**Yes**
N9010A	**Yes**	6	Yes	Yes	Yes	**Yes**
N9000A	**Yes**	6	Yes	Yes	Yes	**Yes**
N9343C **N9344C**	**Yes**	4	Yes	Yes	Yes	**Yes**
N9340B	**Yes**	4	Yes	Yes	Yes	**Yes**
N9935A **N9936A** **N9937A** **N9938A**	**Yes**	4	Yes	Yes	Yes	**Yes**
N9912A	**Yes**	4	Yes	Yes	Yes	**Yes**
N9913A **N9914A** **N9915A** **N9916A** **N9917A** **N9918A**	**Yes**	4	Yes	Yes	Yes	**Yes**
N6841A	**Yes**	4 to 20	Yes	Yes	Yes	**Note (5)**

N6841A Note (5): When the computer is present, the combined N6841A/computer system inherently has “Spectrogram” capability.

Table 2 (Part 1 of 2): Agilent spectrum analyzers probably not captured by XI(b)(3) as per July 25, 2013 proposal.

Model Numbers	Product Family	XI(b)(3)(i)		XI(b)(3)(ii)				XI(b)(3)(iii)			
		Sweep Rate >250 MHz/s (*)	**Max Span (max freq, GHz)**	**Built in SA Capability (#)**	**Power Suite**	**Digital Demodulation (Analysis Bandwidth)**	**Signal ID**	**Volume (cu ft)**	**Nominal Weight (lbs)**	**Power (Watts)**	**Battery**
N9030A	**PXA**	**Yes**	50	**Yes**	Yes	160 MHz	No	**1.49**	48	630	No
N9038A	**MXE**	**Yes**	26.5	**Yes**	Yes	40 MHz	No	**1.43**	52	450	No
E4440A **E4443A** **E4445A** **E4446A** **E4447A** **E4448A**	**PSA**	**Yes**	26.5 6.7 13.2 44 42.98 50	**Yes**	Yes	80 MHz	No	**1.29**	50	450	No
N9342C	**HSA**	**Yes**	7	**Yes**	Yes	No	No	**0.16**	7	15	Yes
E4402B **E4404B** **E4405B** **E4407B**	**ESA-E**	**Yes**	3 6.7 13.2 26.5	**Yes**	Yes	10 MHz	No	**1.34**	34.2	300	Yes (E1779B)
E4403B-BAS **E4408B-BAS** **E4411B**	**ESA-L**	**Yes**	3 26.5 1.5	**Yes**	Yes	No	No	**1.34**	37.7	300	Yes (E1779B)
N9322C	**BSA**	**Yes**	7	**Yes**	Yes	No	No	**0.60**	17.4	25	No
N9320B	**BSA**	**Yes**	3	**Yes**	Yes	No	No	**0.60**	18	65	No

(*) Agilent generally does not specify sweep rate, but effective sweep rates of Agilent spectrum analyzers greatly exceed 250 MHz/s. The effective sweep rate for X-platform instruments is at least several tens of GHz/sec.

(#) Lacking clarity on what constitutes "built-in signal analysis capability," Agilent bases this analysis on the assumption that capabilities such as Power Suite are a type of "built-in signal analysis capability".

Table 2 (Part 2 of 2): Agilent spectrum analyzers probably not captured by XI(b)(3) as per July 25, 2013 proposal.

Model Numbers	XI(b)(3)(iv)					XI(b)(3)(v)	
	Recording	**Traces (Qty)**	**Trace math**	**Display (hold/max/min/etc)**	**Averaging**	**Spectrogram**	**Why uncontrolled per XI(b)(3)**
N9030A	**Yes**	6	Yes	Yes	Yes	**Yes**	Volume >1 cu ft
N9038A	**Yes**	6	Yes	Yes	Yes	**Yes**	Volume >1 cu ft
E4440A **E4443A** **E4445A** **E4446A** **E4447A** **E4448A**	**No**	4	Yes	Yes	Yes	**No**	No recording; No display; Volume >1 cu ft
N9342C	**No**	4	Yes	Yes	Yes	**Yes**	No recording
E4402B **E4404B** **E4405B** **E4407B**	**No**	1	No	Yes	Yes	**No**	No recording; No display; Volume >1 cu ft
E4403B-BAS **E4408B-BAS** **E4411B**	**No**	1	No	Yes	Yes	**No**	No recording; No display; Volume >1 cu ft
N9322C	**No**	4	Yes	Yes	Yes	**Yes**	No recording
N9320B	**No**	4	Yes	Yes	Yes	**No**	No recording; No display.

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Agilent Technologies

Office of Defense Trade Controls Policy
U.S. Department of State
Washington, DC

September 9, 2013

Re: RIN 1400-AD25 (ITAR Amendment—Category XI)

Dear Sir or Madam:

On July 25, 2013, the Bureau of Political-Military Affairs published a Proposed Rule entitled "Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI," (RIN 1400-AD25) which item appeared at 78 FR 45018.

Agilent Technologies appreciates the opportunity to comment on this proposed rule; as a major manufacture of electronic test and measurement equipment, we would potentially be impacted by several of the proposed changes. These comments pertain to XI(c)(8) "DRFM" and XI(c)(14) "tuners", and are separate from and in addition to comments that Agilent submitted pertaining to the proposed control entry XI(b)(3).

Entry XI(c)(8): Digital radio frequency memory (DRFM) with RF instantaneous input bandwidth greater than 400 MHz, and 4 bit or higher resolution and specially designed parts and components therefor;

As we stated in our comments to the November 28, 2012, version of this proposed rule, Agilent understands that many DRFM are essential to various electronic warfare applications, and concurs that a DRFM entry is appropriate within a USML positive list. However, then and still now, Agilent is concerned that the proposed language is too encompassing and could unnecessarily and inappropriately capture DRFM that are designed for commercial/civil use in the testing of broadband communications signals and (more worrisome) also capture systems that are merely DRFM-like.

We believe that the term "DRFM" as it is used in XI(c)(8) connotes an ability an ability to process signals (with low latency) to produce false radar targets (i.e., to spoof). We are less certain whether open programmability to implement the signal processing is sufficient or whether a DRFM intended to be controlled by XI(c)(8) must provide programming tools "specially designed" for electronic countermeasures or for deception.

There is ambiguity as to whether or how the proposed entry would differentiate true DRFMs from systems that are merely DRFM-like. The block-diagram of a DRFM is relatively simple: analog-to-digital conversion, memory, signal processing, and digital-to-analog conversion. We have no doubt that the proposed entry intends to capture fully-integrated DRFMs, but we are unsure whether it also intends to capture a system comprised of multiple modules within a rack, which system has a DRFM block diagram, but which does not provide programming tools for electronic countermeasures or for deception.

To that end, the proposed XI(c)(8) would benefit from either a definition of DRFM or from addition of technical parameters to more clearly articulate the intended scope of control. Recognizing that defining the software and/or signal processing capabilities of concern may be difficult, we thus make the same suggestion that we did before (in response to the November 28, 2012 version of this regulation): We continue to believe that latency between the input and output stages of a DRFM may be a pertinent control parameter, and thus suggest modified language as follows:

> XI(c)(8). Digital radio frequency memory (DRFM) with RF instantaneous input bandwidth greater than 400 MHz~~, and~~ 4 bit or higher resolution **<u>and latency less than 200 µs</u>**, and ''specially designed'' parts and components therefor;

The additional control parameter of 200 µs latency would provide a mechanism to release from control those systems that are merely DRFM-like.

Entry XI(c)(14): Tuners having an instantaneous bandwidth of 30 MHz or greater and a tuning speed of 300 microseconds or less to within 10 kHz of desired frequency;

The following comments pertain to the proposed USML entry Cat XI(c)(14) regarding "Tuners." The current proposed rule reads:

> *XI (c) (14) Tuners having all of the following:*
> *(i) An instantaneous bandwidth of 30 MHz or greater; and*
> *(ii) A tuning speed of 300 µsec or less to within 10 KHz of desired frequency;*

Agilent understands that fast tuners are commonly used in various electronic warfare applications. However, Agilent continues to be concerned that the proposed language is too encompassing and would unnecessarily and inappropriately capture tuners that are designed for

commercial/civil use in the manufacturing (acceptance testing) of components and devices for wireless communications.

Test time is the single biggest factor that handset power amplifier manufacturers consider when buying test equipment for production test, and tuning speed of the test equipment is the single most important factor that affects overall test time. To reduce cost and increase volume throughput, manufactures apply great pressure on vendors of test and measurement equipment to drive down test times; accordingly, vendors of test and measurement are developing test equipment that has faster tuning speeds. Additionally, the number of frequency bands in which wireless equipment operates is increasing along with bandwidth. The current generation of WLAN (802.11n) has 40 MHz bandwidth, which exceeds the proposed XI(c)(14) control threshold of 30 MHz. The next generation (802.11ac) will have 160 MHz bandwidth. The latest generation of cellular radio technology (LTE) has fundamental 20 MHz bandwidth channels, but can aggregate them up to 100 MHz, thereby often requiring the test equipment to have 100 MHz measurement bandwidth.

Because the ITAR contains no de minimis provision, it follows that equipment containing a tuner controlled by XI(c)(14) would itself be controlled. This is problematic because many bona fide commercial/civilian products such as spectrum, signal, and network analyzers; radios and receivers contain tuners. The matter is all the more problematic because the control thresholds proposed for XI(c)(14) are substantially more restrictive than corresponding control thresholds on Wassenaar Dual-Use List, which are implemented in the EAR's Commerce Control List. Specifically, the 30 MHz control threshold for instantaneous bandwidth in the proposed XI(c)(14)(i) is analogous to but more restrictive than the 85 MHz control threshold for "real-time bandwidth" in ECCN 3A002.c.4.a:

> *c.4. "Signal analyzers" having all of the following:*
> *c.4.a. "Real-time bandwidth" exceeding 85 MHz; and*
> *c.4.b. 100% probability of discovery with less than a 3 dB reduction from full amplitude due to gaps or windowing effects of signals having a duration of 15 µsec or less;*

Similarly, the 300 µsec control threshold for "tuning speed" in the proposed XI(c)(14)(ii) is analogous to but more restrictive than the 156 ps, 100 µsec and 250 µsec "frequency switching time" thresholds in ECCN 3A001.b.11a, b.11.b and b.11.c, respectively:

> *b.11. "Frequency synthesizer" "electronic assemblies" having a "frequency switching time" as specified by any of the following:*
> *b.11.a. Less than 156 ps;*
> *b.11.b. Less than 100 µsec for any frequency change exceeding 1.6 GHz within the synthesized frequency range exceeding 4.8 GHz but not exceeding 10.6 GHz;*
> *b.11.c Less than 250 µsec for any frequency change exceeding 550 MHz within the synthesized frequency range exceeding 10.6 GHz but not exceeding 31.8 GHz;*

Agilent believes that the national security concern related to tuners pertain not to tuning speed but rather to the capability to extract data content. Thus, Agilent recommends that the proposed entry XI(c)(14) should be deleted and that DDTC may wish to consider replacing it with an entry that speaks to equipment and functionality capable of extracting data content. Failing that, Agilent recommends that XI(c)(14) should be limited to tuners that are *"specially designed for defense articles in this chapter [XI]"*, as follows:

> *XI(c)(14) Tuners **"specially designed" for defense articles in this chapter and** having all of the following:*
> *(i) An instantaneous bandwidth of 85 MHz or greater; and*
> *(ii) A tuning speed of 300 µsec or less to within 10 KHz of desired frequency.*

Treatment of Test, Inspection and Production Equipment for Military Electronics.

Finally, Agilent continues to fully support the proposal (as implied in the present Proposed Rule and elaborated in the companion BIS rule RIN 0694-AF64, which appeared at 78 FR 45026) to transfer to the CCL under ECCN 3B611 all of that "Test, Inspection and Production Equipment for Military Electronics" which is not explicitly enumerated in the revised USML Category XI. We believe that this recognizes and implements a useful differentiation between test equipment, which has at most only ancillary military function, and operational equipment, which we agree generally belongs on the USML.

If you wish any clarification or would like to discuss any of the above comments, please contact me at jonathan_wise@agilent.com or 719-531-4799.

Sincerely yours,

Jonathan Wise
Global Trade Compliance
Agilent Technologies

PUBLIC SUBMISSION

Docket: DOS-2013-0016
Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI

Comment On: DOS-2013-0016-0001
International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XI

Document: DOS-2013-0016-DRAFT-0004
Comment on DOS-2013-0016-0001

Submitter Information

Name: Anonymous
Address: United States

General Comment

XI(a)(5) contains specific and very generic listings. For (i), the listings should have amplifying data. While specially designed helps, there are many generic capabilities here whose military characteristics should be expounded on.

We need an answer to how we handle products where we have a prior CJ which does not discuss a parameter now on the revised USML. We should have clear guidance as to whether that product will go back under USML controls because new parameters were added to the USML for that item, which were not discussed as a part of the CJ. Examples are the new parameters for radomes and antennas under XI(c)(10) and (11).

XI(x) Entries on a License
Wouldn’t it be more appropriate to require the actual ECCN on the license instead of “XI(x)”? When State staffs the license to Commerce how will Commerce know what ECCN that product is under? At time of export, when we are required to present a license that cites XI(x) and we are required to cite the actual ECCN on the AES Record, how will CBP correlate those entries?

XI(a)(5)--XI(c) Circular Reasoning Issue
The relationship between XI(a) and XI(c) should be clarified. XI(a)(5)(i) refers to items "that are specially designed to integrate, incorporate, network, or employ defense articles that are controlled in this subchapter". XI(c) lists components that are specially designed for defense articles. This dual reference to "specially designed" in both places creates unclarity. A system could possibly fall under XI(a)(5) because it is specially designed to integrate, incorporate,

network or employ "defense articles" controlled under XI(c)(1), (2) and (3). For the XI(c)(1), (2), and (3) parts to be ITAR controlled, each subcategory requires the part to be “designed for defense articles in this subchapter”, looping back to the XI(a)(5) classification. We suggest that XI(c) be treated independently of other USML Category XI sub-paragraphs in line with the concept of creating a positive list, and that the circular reference to "specially designed" in both XI(a)(5) and XI(c) be resolved.

September 9, 2013

U.S. Department of State
Bureau of Political-Military Affairs
Department of Defense Trade Controls
2401 E Street, N.W.
12th Floor, SA-1
Washington, D.C. 20522

ATTN: Ed Peartree, Director, Office of Defense Trade Controls Policy, Department of State

RE: Notice of Proposed Rulemaking, ITAR Amendment – Category XI and 'Equipment'

Dear Mr. Peartree:

The Aerospace Industries Association (AIA) and our member companies appreciate the opportunity to comment on the Department of State's proposed amendments to the International Traffic in Arms Regulations (ITAR). Revising Category XI (Military Electronics) of the U.S. Munitions List (USML) to describe more precisely which military electronics and related defense articles warrant control on the USML will create a "positive" list that will result in a more predictable, efficient, and transparent export control system. AIA has long been a champion of export control reform, and we are encouraged the Administration shares this priority. To further progress on sensible export controls, AIA would like to highlight the below issues for further consideration.

USML Category XI

DDTC Response to January 2013 Category XI Submissions:
Page 3, Column 2, First Full Paragraph:

State Comment: The Department notes that ''dual licensing'' is not a matter arising from export control reform, as it has always been the case that systems may contain items with different export control jurisdictions. A feature of ECR, though, does address this issue. As described in ''Amendment to the International Traffic in Arms Regulations: Initial Implementation of Export Control Reform'' (78 FR 22740), USML categories will have a new (x) paragraph, the purpose of which is to allow for ITAR licensing for commodities, software, and technical data subject to the EAR, provided those commodities, software, and technical data are to be used in or with defense articles controlled on the USML that are identified on the same

license application and are described in the purchase documentation submitted with the license application.

Industry Comment/Question: The new (x) paragraph in the USML categories seems to apply to ITAR items that contain or are used with CCL 600 series items. Does the new (x) paragraph also apply to a CCL 600 series (higher-assembly) item that contains an ITAR item? i.e., is the (x) paragraph supposed to cover this latter situation as well? In other words, does the ITAR-see-through-rule still apply to the 600 series item containing the ITAR item, if so, then would the ITAR item contained therein require ITAR licensing despite the fact that the higher-level assembly became 600 series for which a BIS license is required for the latter, resulting in dual-licensing that the new (x) paragraph is supposed to address.

Page 3, Column 2, Last Paragraph:

State Comment: Generally, a defense service entails the furnishing of assistance regarding a defense article. Items that have traversed the USML–CCL divide are no longer ''defense articles,'' but are part of the ''600 series'' on the CCL. Servicing these items will not require an authorization from the Department. As part of ECR, the Department has published a proposed revision of the defense services definition in April 2011 (*see* 76 FR 20590), and again in May 2013 (*see* 78 FR 31444)."

Industry Comment/Question: This paragraph indicates that the servicing of 600 series items will not require an authorization from the Department of State because servicing a 600 series item is not considered a defense service. However, would the servicing of a 600 series higher-level assembly item (or any CCL item for that matter), which contains an ITAR item, be considered a defense service to the 600 series item if no servicing will be done to the ITAR item contained therein?

Technical Data and Defense Services:

XI(d): Technical data (see § 120.10 of this subchapter) and defense services (see § 120.9 of this subchapter) directly related to the defense articles enumerated in paragraphs (a) through (c) of this category and classified technical data directly related to items controlled in CCL ECCNs 3A611, 3B611, 3C611, and 3D611 and defense services using the classified technical data.

Question: AIA seeks clarification of the phrase "directly related." Specifically, would the phrase "directly related" include software applications previously controlled under USML Category XI(d) that were developed to store, disseminate, and manage imagery and other data collected by sensor systems controlled by other categories of the USML as well as the CCL? The phrase "directly related" implies that such software applications are not controlled herein, even though they are utilized with XI(b) collection systems, they are not exclusive to that paragraph and can perform storage, dissemination, and management of data from multiple ground, airborne, or space sensors, including commercially controlled sensors on the CCL. It appears that such software applications would in fact be "dual-use" under this new definition.

AIA noted in its 2013 report "Unmanned Aircraft Systems: Perceptions & Potential," the Unmanned Aerial Systems (UAS) market over the next decade is expected to double, with a good amount of that growth in the civil and commercial sectors. A major concern would be that if the software used to store, disseminate and mange data collected from electronic sensing systems onboard civil or commercial UAS' were to be inadvertently controlled on the USML, this could unnecessarily impede the development of civil and commercial UAS markets. The

civil/commercial UAS market is one that is rapidly evolving, thus AIA encourages a controls regime that has the flexibility to keep up with swift changes in technology in new and emerging markets.

Department of Defense Funding:

XI (7) Developmental electronic equipment or systems funded by the Department of Defense via contract or other funding authorization;

Note 1 to paragraph (a)(7): This paragraph does not control developmental electronic systems or equipment (a) in production, (b) determined to be subject to the EAR via a commodity jurisdiction determination (*see* § 120.4 of this subchapter), or (c) identified in the relevant Department of Defense contract or other funding authorization as being developed for both civil and military applications.

Note 2 to paragraph (a)(7): Note 1 does not apply to defense articles enumerated on the USML, whether in production or development.

Note 3 to paragraph (a)(7): This paragraph is applicable only to those contracts and funding authorizations that are dated one year or later following the publication of [insert name of final rule incorporating revision of USML Category XI].

Question/Issue: AIA members are concerned with the principle that a developmental system - any system – would be controlled as ITAR if (1) the Department of Defense funds it, and (2) the Department of Defense contracting officer does not proactively elect to specify it as civil in the contract.

There are a number of "developmental electronic systems or equipment" that receive Department of Defense funding that are clearly civil (or at least have both civil and military applications). Subjecting these systems to ITAR control simply based on funding is a flawed methodology. Examples of Department of Defense funding for commercial or dual-use technologies are below.

1. High Performance Computing - Both Department of Defense and Department of Energy provide funding for civil research and development of next generation computing technologies.
2. Brain Research through Advancing Innovative Neurotechnologies - DARPA provides funding for this White House initiative. There are clear civil applications for this type of cognitive computing and beyond technology, e.g., detecting bank fraud patterns in transactions, etc.

   See this article: http://venturebeat.com/2013/04/02/white-house-drops-100m-to-help-scientist-map-the-human-brain/

   See this entry from the WH blog: http://www.whitehouse.gov/blog/2013/04/02/brain-initiative-challenges-researchers-unlock-mysteries-human-mind
3. Battery Technology – The Department of Defense and others are very interested in better performing batteries, which clearly has civil applications as well.

Additionally, contracting officers should not have to proactively designate a given technology as being civil in nature. If a contracting officer had to proactively elect a developmental system to be ITAR controlled that would provide some relief to our concerns (that is, flip the presumption and deem items funded by the DOD not to be ITAR controlled unless specific ITAR-controlling language is invoked in the contract). That would at the very least protect against accidental or unnecessary ITAR control. However, a given technology might be

subject to various defense contracts. Different contracting officers could come to different conclusions about a military vs civil classification. What happens when funding simply runs out under one contracting vehicle, and the work continues under another (not uncommon)?

Printed Circuit Boards (PCBs):

XI(c)(2): Note to Paragraph (c)(2) currently reads, "PCBs and populated circuit card assemblies for which the layout is specially designed for 600 series items are controlled in ECCN 3A611.g."

AIA suggests revised language to Note (c)(2) below:

"A PCB or populated circuit card assembly is specially designed for a defense article in this subchapter if its layout includes functional active device interconnections for an operating circuit that performs a system function described in this subchapter, or integral features for the suppression of compromising emanations as described in USML entry XI(c)(5)(iv). PCBs and populated circuit card assemblies for which the layout is specially designed for 600 series are themselves controlled under the 600 series."

XI(c)(3): Note to Paragraph (c)(3) currently reads, "Multichip modules for which the pattern or layout is specially designed for 600 series items are controlled in ECCN 3A611.h.

AIA suggests revised language to Note (c)(3) below:

"A multichip module is specially designed for a defense article in this subchapter if its layout includes functional active device interconnections for an operating circuit that performs a system function described in this subchapter, or integral features for the suppression of compromising emanations as described in USML entry XI(c)(5)(iv). Multichip modules for which the pattern or layout is specially designed for 600 series items are themselves controlled under the 600 series."

The suggested revised notes above avoid referencing specific ECCNs on the Commerce Control List to allow for future ECCN reorganization should the Department of Commerce choose to do so.

Additionally, in response to recommendations and concerns filed in January 2013 during the original Category XI comment period, the State Department revised controls for printed circuit boards and patterned multichip modules. In the current July 25th FRN State notes that "jurisdiction of a printed circuit board or patterned multichip module should follow the jurisdiction of the article for which it is designed, as opposed to the jurisdiction of the overall system into which it is incorporated." This text is understood to mean the immediate higher assembly for the printed circuit board or patterned multichip module; i.e., "one level up" the "indented where used" hierarchical structure of items in a system or end item.

The notes to Paragraphs (c)(2) and (c)(3) do not reference the above explanation. The information is necessary to prevent overcontrol of PCBs and multichip modules, and should be included in these two notes so that it is directly available in the regulation, and there is no future need to search for this information in an old Federal Register notice.

Parts and components the Department clearly intends for transition to the Commerce Control List frequently contain PCBs and may contain multichip modules. For example, manually operated rotary switches may contain small, non-significant interconnection PCBs that meet the test for being

specially designed. Absent the explanation in the supplementary information, the "see-through rule" of the ITAR would prevent these items from transition to the CCL because the PCBs may ultimately be used in USML articles.

At the same time, State should be aware of possible undercontrol of PCBs and multi chip modules. Critical PCBs and multichip modules directly perform system functions with capabilities described on the USML when installed. In system design hierarchy, several assembly levels are commonly found between a PCB or a multichip module and a system or equipment enumerated on the USML. Normally these levels are introduced for production or logistics reasons, but could also be artificially introduced for the purpose of decontrolling an item.

(a) Electronic equipment and systems

Paragraph (a)(2): The majority of torpedo countermeasure systems are unclassified mechanical and electrical equipment that function to deploy and retrieve a towed body and would work for any similar-sized tow body, regardless of the function or purpose. The classified software and hardware are what provide a uniquely military capability; a system has no military utility without them. Paragraph (a)(2) should be revised to read as follows: ***Classified software and hardware for underwater acoustic countermeasures or counter-countermeasures systems.***

Paragraph (a)(3)(xxvii): Essentially the same system as those proposed to be captured by this paragraph can be installed at ground based locations to provide commercial air traffic information regarding aircraft not equipped with transponders to commercial aircraft operating around uncontrolled airports. This listing should be revised to control only those capabilities beyond what is required for civil air traffic collision avoidance as follows: ***(xxvii) Bi-static/multi-static radar that exploits greater than 125 kHz bandwidth and is lower than 2 GHz center frequency to passively detect or track using radio frequency (RF) transmissions (e.g., commercial radio or television stations) and which is "specially designed" to detect a 0dBsm target at a range greater than 14 nm.***

Paragraph (A)(3)(i): The proposed language could be interpreted to cover weather radar because those systems "maintain the positional state of an object [weather cell] of interest in a received radar signal through time." As this technology will impact safety of flight, we recommend providing an exclusion for civil aircraft application or imposing military-specific performance parameters as follows: ***Airborne radar that maintains positional state of a solid, moving object of interest in a received radar signal through time and which is "specially designed" to have a range greater than 14 nautical miles for a 0dBsm target.***

Paragraph (a)(3)(ix): The rationale provided in paragraph (a)(3)(i) above also applies to this proposed control. Air surveillance radar systems will be critical in enabling the safe operation of UAVs in the portion of the national airspace where transponders are not required on manned aircraft and may significantly improve the safety of commercial aircraft operating at uncontrolled airports. This listing should be revised as follows:

Paragraph (a)(3)(xxv): The proposed language covering radar that sends and receives "communications" is potentially overbroad. Without a clear definition of what constitutes "communications," (e.g., voice and radio) the proposed rule could unintentionally capture systems that send data to a point external to the radar that may not warrant control on the USML.

Air surveillance radar that:

(1) Has any of the following:
- ***a. multiple elevation beams,***
- ***b. phase or amplitude monopulse estimation, or***
- ***c. 3D height-finding,***

AND

(2) ***Is "specially designed" to have a range greater than 14 nm for a 0dBsm target***

Paragraph (c)(10)(i): Phased array SATCOM antennas are present on commercial aircraft today for satellite communications. In order to avoid confusion as to whether such antennae are captured by this paragraph, we suggest the following revised control text: ***Antenna, and specially designed parts and components therefor, that: (i) independently steers both the angular beams and nulls electronically using four or more elements with faster than 50 milliseconds beam switching.***

Paragraph (c)(11)(ii): Any radio frequency can theoretically be used for a radar application and this control does not define "radar bands". We recommend revising the control to provide the frequency ranges considered by the Department to be radar bands, provide exclusion for SATCOM radomes, or limit the control specifically to radome applications for radar as follows: Radomes or electromagnetic antenna windows that: ***(ii) Operate in multiple nonadjacent frequency bands for radar applications.***

Paragraph (c)(5): The current listing covers capacitors already on the commercial market and the proposed control parameters would impact export compliance requirements for any existing system designed to use those capacitors. We recommend that controls on these items are more appropriately imposed, as they currently are, in the EAR.

Overlap of USML Categories:

Category XI is closely related to Categories VIII (aircraft and associated equipment), XII (fire control, range finder, optical and guidance and control equipment), and XIX (gas turbine engines). A successful export control reform effort will address the symbiotic relationship of USML categories. In this regard, the U.S. Government should recognize the importance of finalizing related categories in timely manner. As these other categories are completed and published in final form, the licensing jurisdiction for affiliated electronics may be vague. To avoid unnecessary confusion, the Departments as of State and Commerce should seek to minimize the delay between the publication of Category XI and these related categories in final form.

Departments as of State and Commerce should seek to minimize the delay between the publication of Category XI and these related categories in final form.

Specially Designed Language:

Category XI, like many other categories, contains extensive use of the phrase "specially designed." Final industry recommendations and comments are dependent on the full understanding of "specially designed." While the final revision to USML Category XI, published on July 25, 2013, represents significant progress towards creating a positive list, there are several instances in which the inclusion of "specially designed" in the control parameters will create vague "catch all" commodity descriptions that run counter to the objective of creating an enumerated list of the most-sensitive commodities that warrant the stringent controls of the International Traffic in Arms Regulations (ITAR). Including specific parameters may not be possible for all items in Category XI. However, where possible, parameters should be included, for example in XI(a)(1)(v) "low frequency/very low frequency "; XI(a)(1)(vi) "cooperative sensing"; or AESA radars in XI(a)(3)(xii).

In those instances where inclusion of specific parameters is not possible, AIA recommends integrating the concept of "specifically designed for articles controlled in this subchapter" to avoid the inadvertent capture of commercial systems – this will reduce confusion and questions relating to systems currently in use in the civil sector. For example, C3, C4, and C4ISR systems (XI(a)(5)(i)) "specially designed" to integrate, incorporate, network, or employ defense articles may unintentionally capture command and control systems built using predominantly commercial components; autonomous processing/control systems and equipment that enable cooperative sensing (XI(a)(1)(vi)) is likely to capture commercial Autonomous Underwater Vehicles (AUVs) that use non-military cooperative sensing; and XI(a)(3)(xii) will likely capture commercial AESA radars using electronic steering.

When future category revisions are done, including revisions to Category XI, we hope that we will have the opportunity to provide our input on how "specially designed" language will be implemented.

Foreign Availability:

Additionally, we believe the Administration should recognize the commercial availability of foreign electronics when creating the bright line between USML and CCL. Many proposed control parameters are already achieved by products available from various international providers. Items available internationally offer no critical military or intelligence advantage to the United States. Further, as such items are not exclusively available from the United States they do not meet the new criteria the Administration has articulated for maintaining control under the ITAR. If U.S. partner and ally countries make equivalent systems, parts, or components commercially available, and not subject to 'munitions list' level control, the U.S. should apply a comparable level of control. To do so otherwise would encourage the designing-out (ITAR-free) of U.S. electronic parts and components.

Civil/Commercial Products:

Particular attention should be given to avoid capturing civil technologies related to traffic collision avoidance systems, phased arrayed satellite communications antennas, automatic direction finder antennas, air surveillance radars and the commercial wireless security sector.

AIA has long been a champion for sensible export control reform and we commend the Administration for their tireless efforts to achieve meaningful reform. Please know that AIA is a willing and committed partner to reform efforts going forward.

Best regards,

Remy Nathan
Vice President, International Affairs
Aerospace Industries Association

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September 9, 2013
13-C-RRB-021

Sarah J. Heidema, Acting Director
Office of Defense Trade Controls Policy
Bureau of Political-Military Affairs
U.S. Department of State
2401 E Street N.W.
Washington, D.C.

Subject: RIN 1400-AD25 (77 FR 70958) Amendment to USML Category XI

Dear Ms. Heidema:

Esterline Technologies Corporation supports the goals and objectives of the Export Control Reform (ECR) Initiative, and submits the following recommendations to simplify and make the reforms more efficient. Esterline is a manufacturer of a wide variety of parts and components for the aerospace and defense sector. We appreciate the opportunity to comment on the U.S. Department of State's proposed amendment for USML Category XI.

Summary of Comments and Recommendations

This section outlines our main comments, each of which is explained more fully in the remainder of this letter.

1. Clarify when a printed circuit board or multichip module is specially designed for an item listed on the USML vs. an intermediate item listed on the 600-series.
2. Clarify the meaning of "used in or with" within the definition of "specially designed" to aid in classifying parts for military electronics and other categories.
3. Clarify the effective date for items moving between USML categories and their associated parts, components, etc.
4. Clarify treatment of chaff and flares used in or with electronic combat systems.

Detailed Comments and Recommendations

1. Printed Circuit Boards and Multichip Modules

Esterline suggests that USML control of printed circuit boards and multichip modules should depend on their function or capability, as they relate to performance parameters, characteristics, or functions described in systems or equipment enumerated on the

USML. This is equivalent in principle to the language in 22 CFR 120.41(a)(1), the "specially designed" definition. The function or performance of a printed circuit board or multichip module is far more important than its structural or assembly-build relationship to an equipment or system.

Minor interconnection printed circuit boards and assemblies are suitable for control under the 600-series, whereas critical circuits for which USML control is desirable may be separated by several layers of design hierarchy from the enumerated system or equipment.

Similar considerations apply to programmable logic devices and application-specific integrated circuits

Esterline suggests revising the notes to paragraphs (c)(1), (c)(2), and (c)(3) to reflect control on the basis of function or performance.

2. Used In or With

The order of review and the definition of "specially designed" add clarity in some areas. DDTC could improve the clarity of classifying parts for military electronics (and other categories) by explaining the meaning of "used in or with". BIS and DDTC personnel have recently described this as meaning "one level up" in a hierarchical design structure for an end item, system, or equipment,

The "one level up" explanation is not found either within the definition of "specially designed" at 22 CFR 120.41, order of review at 22 CFR 121.1(b)(1), or in other published agency guidance. The meaning of "used in or with" is therefore subject to interpretation.

Esterline suggests that "one level up" as an explanation for "used in or with" would allow inappropriate decontrol of sensitive items, particularly in the area of military electronics.

A lower-level item in a hierarchical design structure (typically an indented bill of material) may have properties peculiarly responsible for achieving or exceeding the performance levels of an enumerated item higher in the hierarchy. Several intermediate levels may be found between these two items. The intermediate levels are usually not enumerated because they are implemented for ease of production or to support logistics. Using "one level up" as a criterion could decontrol critical lower-level items because the relationship with the higher-level enumerated item is not considered. Instead, the lower-level item is used in or with an item that is not enumerated and may be released by paragraph (b)(3)(ii) of the specially designed definition.

Importantly, if control of a lower-level item is determined by the classification of the item "one level up", unscrupulous manufacturers could insert artificial non-enumerated levels in a hierarchical design for the express purpose of decontrolling a sensitive item.

Esterline suggests an analysis of "used in or with" should follow up the design hierarchy for product build across supply chain boundaries until an enumerated item or the top of

the hierarchy is reached, whichever is first. The lower item will then be "used in or with" the higher item found (or multiple higher items, if there are multiple applications).

In end items the lower-level components often branch up through multiple paths of system design hierarchy. The same component can be part of more than one equipment or system (even at "one level up" the product build hierarchy). Classifying these items depends on determining which of the higher-level equipment or system classifications prevail when they are all USML or 600-series.

The order of review provides precedence to the USML, 600-series ECCNs, the rest of the CCL, and EAR99. It does not help in determining which of several USML entries will prevail when any might apply.

Crewstation control panels, displays, and other human-machine interface devices in end items such as aircraft, land vehicles, and naval vessels are typically multi-function components. They often incorporate controls and indicators for several systems, enumerated under both the military electronics and end item categories. Wire harness, databus, and data concentrator components have similar considerations.

Esterline suggests amending the order of review to allow for distinguishing between USML entries when a component is used in or with multiple systems. Esterline suggests that where a non-enumerated component is used in systems described in both a vehicle category and in Categories XI and XII, the vehicle category should prevail when assessing for specially-designed catch-alls.

3. Effective date for items moving between USML categories

Under ECR, DDTC is apparently moving most military computers to the end item categories. In RIN 1400 AD37 (78 FR 22740, April 16, 2013) DDTC will move several computers to USML entries VIII(h)(16) and VIII(h)(17) effective October 15, 2013. USML entries XIX(e) and XIX(f)(5) will include inherently computerized electronic systems. At 78 FR 22742 DDTC indicates that it "believes it is sensible to control as aircraft components computer systems specially designed for aircraft." Esterline agrees that this is logical, since computers for aircraft tend to be highly customized for that class of end item and unusable for other types of end item.

Similarly, in RIN 1400-AD40 (78 FR 40921, July 8, 2013) DDTC will move several computerized systems to USML entries VI(f)(4), VI(f)(6), VI(f)(7), VII(g)(2), VII(g)(7), VII(g)(11), and VII(g)(12) effective January 6, 2014.

Further, in RIN 1400-AD25 (78 FR 45017, July 25, 2013) DDTC proposes to change USML entry XI(a)(6) from military computers to "[Reserved]" after which computers will no longer be controlled as a general description under USML Category XI.

While not explicitly stated, this appears to result in moving on October 15, 2013 parts, components, accessories, and attachments for aircraft computers currently found in USML entries XI(a)(6) and XII(a), in addition to all military aircraft computers and

systems currently found in USML entry XI(a)(6) and specific aircraft computers and systems currently found in USML entry XII(a) to either new enumerated paragraphs in USML Categories VIII and XIX, or to the corresponding ECCNs 9Y610 and 9Y616. A similar transition appears to be scheduled for USML Categories VI and VII on January 6, 2014. In effect, the new language in RIN 1400-AD37 and RIN 1400-AD40 will supersede conflicting language remaining in USML Categories XI and XII until they can be revised.

Esterline suggests a positive statement as early as possible that this is in fact DDTC policy. Such a statement would be consistent with the supplemental information already published in RIN 1400-AD37, and would simply clarify what DDTC has already published as final rules. It would resolve the conflict between new language in RIN 1400-AD37 and RIN 1400-AD40, and old language in existing USML categories XI and XII. The new language would supersede. Receiving 600-series ECCNs will already exist to appropriately control these items.

4. Chaff and Flares

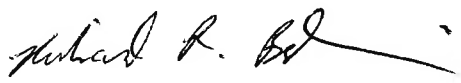
DDTC has been controlling chaff and flare rounds produced by Esterline subsidiaries under USML Category XI. Since this may not seem intuitive, Esterline believes it is appropriate that these items be positively listed. Listing on the USML would clarify jurisdiction for items containing USML Category V materials. Inclusion of chaff and flare rounds under USML entry XI(a)(4)(iii) is not appropriate because they should not be considered SME. Esterline suggests DDTC add a new non-SME entry under USML subcategory XI(c) to control chaff and flare rounds specially designed for the systems and equipment described in USML entry XI(a)(4)(iii), and parts and components thereof containing materials controlled under USML Category V.

Esterline is separately recommending that BIS add a positive subparagraph under 3A611 to control parts and components that do not contain materials controlled by USML Category V and that are specially designed for chaff and flares rounds described in USML Category XI; or alternately, a note could be added to explain that such specially designed parts and components are controlled under 3A611.x.

Summary

Esterline appreciates that DDTC has already made substantial revisions to its proposed rules based on public comment. Esterline believes that these changes would improve clarity, would support the goals and objectives of ECR, and would eliminate a potential area of undercontrol.

Regards,



Richard R. Baldwin
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OFFICE OF THE VICE PRESIDENT FOR RESEARCH AND GRADUATE STUDIES

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September 9, 2013

Ms. Sarah J. Heidema,
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DDTCREspnseTeam@state.vov

Publiccomments@bis.doc.gov
Regulatory Policy Division
Bureau of Industry and Security
U.S. Department of Commerce
Room 2099B, 14th Street and
Pennsylvania Avenue NW
Washington, DC 20230

VIA: www.Regulations.gov

RE: Comments on Proposed Amendment to the International Traffic in Arms Regulations:
Revision of U.S. Munitions List (USML) Category XI RIN [1400-AD25]– -And –
Revision to the Export Administration Regulations (EAR) RIN [0694-AF64]

Dear DDTC Response Team and Regulatory Policy Division:

The University of California appreciates the opportunity to respond to the July 25th, 2013 Federal Register notice seeking comments on Revisions to the US Munitions List Category XI and Revisions to the Export Administration Regulations.

The University of California (UC) the University of California system, comprising research universities at Berkeley, Davis, Irvine, Los Angeles, Merced, Riverside, San Diego, San Francisco, Santa Barbara, and Santa Cruz), and the University of California-managed Department of Energy-funded Lawrence Berkeley National Laboratory, encourages and supports the export reform effort initiated by the administration to align U.S. export control policy while improving efficiency in licensing and reducing unintended consequences.

From the outset of the Export Control Reform (ECR) process, the intent has been to establish "higher walls around fewer items." Steps taken toward the single control list, the objective of making lists "positive," "aligned," and "tiered" are to be encouraged. Also encouraged is the Defense Department-led review of the USML, which concluded that multiple types of items no longer warrant control on the USML and that their jurisdictional status should be changed so that they become subject to the EAR and its controls. To

this end, we wish to wholeheartedly support the revisions which move in this direction and comment in the following areas:

1. Harmonizing the definition of "Export" should be considered insofar as academic research efforts conducted in International Waters are concerned. Under ITAR an export is currently triggered when ITAR items are temporarily carried by US Nationals into International Waters off the coast of the United States. In contrast, in the same situation under the EAR, an export is not triggered unless another country is involved or the items are brought into a foreign destination. The conduct of academic research in International Waters performed by the University of California often requires the time consuming and costly process of obtaining ITAR licenses for Category XI electronics used in support of fundamental research. For example, under the ITAR, even a simple day long voyage from our facilities into International Waters to study marine life using ITAR controlled equipment cannot be made without first going through the ITAR application process. Harmonizing the ITAR definition of exports into international waters with the EAR or allowing such voyages to claim an exemption would support important University research, while achieving the aims of export control reform.

2. We also wish to point out that technologies listed under CAT XI (a(1)) include those often used by universities in support of fundamental research programs conducted in International Waters. Such studies range from acoustic monitoring on the ocean floor to the study of marine life, and are frequently funded by the US National Science Foundation or the US Office of Naval Research. Underwater electronic hardware, such as acoustic arrays, may have a dual-use purpose and should be vetted for consideration for control under the EAR when serving a non-military purpose in support of fundamental research.

Thank you for this opportunity to comment. Our San Diego campus performs many oceanographic studies and is providing further detail on specific items that should be considered for control under the EAR via separate letter. We greatly appreciate your efforts to seek stakeholder input regarding export control regulations, especially where there is a stated goal of avoiding unintended consequences such as those which may affect the academic community in performing fundamental research.

Sincerely yours,

Steven Beckwith

Steven V.W. Beckwith
Vice President for Research and Graduate Studies

The University of Oklahoma®

OFFICE OF THE PRESIDENT

September 9, 2013

Office of Defense Trade Controls Policy
U.S. Department of State
RE: RIN 1400-AD25

To Whom It May Concern,

The University of Oklahoma (OU) is providing the following comments in support of the President's Export Control Reform effort, and appreciates the Department of State's request for input. As a university, our mission is to provide the best possible educational experience for our students through excellence in teaching, research and creative activity, and service to the state and society.

A common focal point of OU research involves meteorological and weather radar systems, and consequently we have followed with interest the proposed revisions to Category XI (Military Electronics) of the United States Munitions List (USML). We remain concerned that radar systems that have been on the Commerce Control List (CCL) since the early 1990's are now facing regulation under the International Traffic in Arms Regulations (ITAR). As explained in our comments submitted on January 28, 2013, this appears to create an 'ITAR-rollback' (i.e., an EAR-controlled item becoming ITAR controlled through the creation of a 'positive list'), which the public has been expressly assured should not result from Export Control Reform.

It is also notable that OU was not the only commenting party drawing this to DDTC's attention; however, there was no response to these comments in Public Notice 8388. We are hopeful that DDTC is evaluating 6A008 and the regulatory history behind radar systems capable of operating in synthetic aperture (SAR) mode, inverse synthetic aperture mode (ISAR), and/or incorporating electronically steerable phased array antennae. For convenience, we have again included an attachment that identifies 6A008 radar systems that appear to be swept under the authority of the proposed USML Category XI.

Additionally, the University remains concerned that the non-military/civil/commercial applications involving these radars will be detrimentally impacted if they are precipitously regulated as "defense articles" on the USML. In particular, the radars identified above have been available on the commercial market as a dual use item for over two decades. Particularly when considering the rapid pace with which technology and the international marketplace evolves, this is a significant amount of time. A wide variety of non-military applications, including many important areas of university research, has developed. OU has attached a non-exhaustive list of these applications for DDTC's perusal.

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There also appears to be ready availability on the international market, which could create unintended consequences if the U.S. proceeds with regulating these radars as "defense articles". Some countries may elect to invest in production of "ITAR-free" radars since they would not be subject to the same regulations as U.S. manufacturers. A similar situation played out after DDTC regulated all satellites as "defense articles". OU strongly encourages DDTC to consider foreign availability before proceeding with adding dual use items and technologies to the USML. For convenience, we have attached a non-exhaustive list of foreign availability for these radars.

In closing, OU hopes that these comments will help reduce jurisdictional uncertainty and prevent any inadvertent sweeping of dual-use items onto the USML. We appreciate DDTC's due consideration to these important issues.

Sincerely,

David L. Boren
President

Current CCL control	Proposed USML overlap	'[N]ormal commercial use' and/or research use for a wide variety of non-military applications
6A008 [Radar systems] (d) Capable of operating in synthetic aperture radar (SAR) mode* *This provision appears to have been on the CCL since 1992	XI(a)(3)(ii) synthetic aperture radar (SAR)	See: http://www.imsar.com/ (SAR for search and rescue, fire line monitoring) http://www.pcigeomatics.com/resources/case-studies-a-articles (earth observations, vegetation monitoring, and soil moisture monitoring) http://artemisinc.net (a compact, modular, multi-frequency band, multimode, multi-channel SAR) http://www.gtnp.org/ghost_e.html (climate change and permafrost monitoring) http://uavsar.jpl.nasa.gov/education/what-is-uavsar.html (NASA's SAR research and educational program for earth science applications (earthquakes, volcanoes, vegetation, hydrology, etc.)) http://www.satimagingcorp.com/satellite-sensors/alos.html (cartography, disaster monitoring, natural resource surveys and technology development) http://www.intechopen.com/books/references/advances-in-geoscience-and-remote-sensing/application-of-multi-frequency-synthetic-aperture-radar-sar-in-crop-classification (crop classification using SAR) http://www.sandia.gov/RADAR/images/oilslick.jpg (monitoring oil slick from an oil spill) http://www.tandfonline.com/doi/pdf/10.1080/01431160110109589 (mapping damage from forest fires) http://folk.uio.no/kaeaeb/publications/strozzi.pdf (monitoring permafrost) Sarvision (Netherlands) www.sarvision.nl (crop and forest monitoring) NEC (Japan) http://www.nec.com/en/global/solutions/space/remote_sensing/index.html (monitoring river levels in real time to predict flood risk) iRadar (Malaysia) http://www.iradar.com.my/products.php (terrain mapping and disaster monitoring) Metasensing (Netherlands) http://www.metasensing.com/ms/sensors.html (observation of natural hazards and critical artificial structures (i.e. slopes, dikes, bridges) with a sub-millimeter accuracy in real time)

		2013 Asia Pacific Conference on SAR "Overcoming the Hardships: Responding to Disasters with SAR" http://www.apsar2013.org/
6A008 [Radar systems] (d) Capable of operating in inverse synthetic aperture (ISAR) radar mode* *This provision appears to have been on the CCL since 1992	XI(a)(3)(iii) inverse synthetic aperture radar (ISAR)	
6A008 [Radar systems. . .having any of the following] (e) Incorporating electronically steerable array antennae* *Phased array antennae appear on the CCL as early as 1981. Radar systems incorporating them were added to the CCL in 1992	XI(a)(3)(xii) Radar incorporating pulsed operation with electronic steering of transmit beam in elevation and azimuth	See: http://www.ewradar.com (multifunction X-band phased array radar for weather prediction) http://www.nssl.noaa.gov/projects/parise/ (National Severe Storm Laboratory's weather research) http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=05494483 (multi-function phased array radar for weather and aircraft surveillance)
6A008 [Radar systems]* *Provision appears to have been on the CCL since 1992	XI(a)(3)(xvii) Radar having. . . pulse Doppler filter provides a normalized clutter attenuation of greater than 50db	See: http://www.radartutorial.eu/19.kartei/pubs/DWSR-8501SK.pdf (DRS Weather Systems (with a minimum clutter attenuation of 50dB)). http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.163.623&rep=rep1&type=pdf (radar technology (including clutter attenuation of greater than 50 dB) deployed in radar-based weather information systems at major airports throughout the United States) Gematronik (Germany) Weather Radar System http://www.radartutorial.eu/19.kartei/pubs/Datasheet_METEOR_1600C.pdf Vaisala (Finland) Weather Radar WRM200 http://www.vaisala.com/Vaisala%20Documents/Brochures%20and%20Datasheets/WRM200-Datasheet-B210698EN-D-LOW-v2.pdf