

January 7, 2012

To: DDTCResponseTeam@state.gov  
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From: Bill Root, waroot23@gmail.com, tel. 301 987 6418

Subject: ITAR Amendments - Category XIX RIN 1400-AC98  
EAR Revisions - Gas Turbine Engines RIN 0694-AF41

General Comments:

The following observations apply not only to ITAR Category XIX and related EAR 600 series ECCNs but also to other Categories, including recent proposed rules for Categories VII, VIII, VI, and XX and related EAR 600 series ECCNs.

“Military Use”: Commendable progress has been made in substituting technical descriptions for “military use” and other similar words, such as “military applications”, “military mission”, or for “defense articles.” Such expressions are inherently ambiguous, whether or not modified by “specially designed” or other non-technical terms, such as “specifically designed or modified” or “directly related.” See below for specific recommendations to complete this process for Category XIX and ECCNs 9x619.

“Specially Designed”: The December 2010 and July 2011 proposed definitions of “specially designed” omit designer intent. The original intent of the designer is usually unknown and the designer’s intent could change over time. However, designer intent is the usual meaning of “specially designed” and of other similar words, such as “specifically designed”, “specially designed or modified”, “designed or modified”, “designed”, “special”, “specialized”, or “specific.” Moreover, no definition of “specially designed” (or of these other words) could cover all their diverse uses throughout the USML and CCL (*e.g.*, to identify the controlled portion of something or the uncontrolled portion of something; to limit controls to a stated end-use or end-user; or to identify which components of an end-item are controlled or which components of a component are controlled). It is, therefore, recommended that “specially designed” (and other similar words) be completely deleted from the USML, the CCL, and corresponding multilateral lists and, where applicable, be replaced with other more precise expressions.

Some USML end-items now proposed to be modified by “specially designed” are already otherwise sufficiently described that simple deletion of “specially designed” would be desirable. This would avoid unintended implications that there were non-specially designed versions which should not be controlled. If such an implication were intended, a few more technical words to exclude what should not be controlled would clarify that intention.

Specific recommendations below to replace “specially designed” with “required” assume that the EAR definition of “required” would be revised to cover commodities as well as technology and software and that the Wassenaar definition would be revised to cover

commodities and software in addition to technology. “Required” is more restrictive than the unique interpretation of “specially designed,” which appears in many U.S. and multilateral historical documents and in current missile technology controls. “Required” is a better term to describe the original purpose of “specially designed” components, namely, to avoid defeating the purpose of the embargo.

To control situations in which no components of a munitions production installation would be “required,” it is recommended that U.S. controls include the following from Wassenaar Munitions List (WML) 22.b.1, revised to include militarily significant WDUL or MTCR items:

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 Munitions List or by 9A001, 9A002, 9A011, 9A101, 9A102 (new, see below), 9A111, 9A619, 9B619, or 9D619, even if the components of such production installations are not specified.

Inclusion of trivial items in the list of “specially designed components” of USML end items in ECCN 9A619.y.1-8 indicates an intent that virtually all components of USML end items be controlled. Controlling individual components of little if any military significance would not be necessary to avoid defeating the purpose of the embargo. However, if there were no components “required” for a USML end-item, the purpose of the embargo could be defeated by exporting all the components and assembling them into the end-item. It is, therefore, recommended that only “required” components of USML and militarily significant CCL end-items be controlled individually but that U.S. and Wassenaar controls include technology “required” for the assembly of components into USML and militarily significant CCL end-items even if the components of such end-items are not specified.

“Defense services,” as defined in 22 CFR 120.9(a)(1), include assembly of defense articles. If all components of defense article end-items are construed also to be defense articles, this definition of defense services would cover assembly of components into USML end-items. In that case, and assuming applicability of defense service controls to the EAR administration of 600 series components, there would be no need for the above recommended control on technology to assemble uncontrolled components into end-items. However, there would be a major needless cost in terms of controls on countless individual insignificant components.

Parts: The July 2011 proposed definition of “specially designed” would exclude what ITAR 121.8(d) defines as a “part.” It is, therefore, recommended that all mention of parts in Category XIX or ECCNs 9x619 be deleted.

“Accessories and Attachments”: The ITAR 121.8(c) definition of these words notes that they are “not necessary” for the operation of an end-item, component, or system. The examples given are separately controlled (riflescopes in I.f and special paints in XIII.g). Therefore, it is recommended that all mention of accessories, attachments, and associated equipment in Category XIX and ECCNs 9x619 be deleted.

Components of components: Controlling components of components is generally questionable.

Materials: Structural materials in XIII.f and ablative materials in IV.f are ambiguously controlled because of their relationship to defense articles with no technical specifications. Existing ECCNs on the CCL control materials with technical detail based on potential military applications. It is, therefore, recommended that materials be controlled on the USML or in 600 series ECCNs only if manufactured to the point of being recognized as USML components (as described in proposed Note 1 to 9A619.x).

Technical data: Proposed Category XIX (and existing and proposed Categories VII, VIII, VI, and XX) ambiguously control technical data directly related to defense articles. Production software and technology should be controlled by the same agency which controls production equipment, *i.e.*, Commerce. The definitions of “development” and “production” overlap. “Development” includes all stages prior to serial production; but “production” includes all production stages. Both terms include assembly and testing.

Wassenaar and MTCR: These proposed rules should not become final, or even interim final, until reviewed by related multilateral regimes to which the United States is committed. Historically, the United States has benefitted from considering differing allied technical views. The United States has also been reasonably criticized on those infrequent occasions when it has acted unilaterally in ways which others perceived to be benefitting U.S. exporters. Such might be the case by some substitutions of technical descriptions for specially designed.

#### Specific Recommendations to Revise Proposed Category XIX and ECCNs 9x619

The Wassenaar Munitions List (WML) does not include the words “gas turbine engines.” Wassenaar Dual Use List (WDUL) items 9.A.1 to 9.A.3, 9.A.11, 9.B.1 to 9.B.9, 9.D.1 to 9.D.4, and 9.E.1 to 9.E.3 (and corresponding CCL ECCNs 9A001 to 9A003, 9A011, 9B001 to 9B009, 9D001 to 9D004, and 9E001 to 9E003) control gas turbine engines for military use and related production equipment, software, and technology. These are now all subject to Commerce jurisdiction except the following are annotated in the CCL as being State jurisdiction: ramjet, scramjet, combined cycle engines 9A011 and related software and technology and 9E003 technology unless actually applied to a commercial aircraft engine program. However, neither the existing nor the proposed USML explicitly specifies such State jurisdiction. It is, therefore, recommended:

- State jurisdiction annotations for these ECCNs be removed
- CCL coverage be continued in these WDUL ECCNs rather than in 600 series ECCNs.

Missile Technology Control Regime (MTCR) 3.A.1 (9A101), 3.A.2 (9A111), 3.A.9 (no ECCN), 3.B.1 (9B116), 3.B.2 (9B115), 3.C.1 (no ECCN), 3.C.2 (no ECCN), 3.D.1 (9D101), 3.D.2 (9D104), and 3.E.1 (9E101) control gas turbine engines for UAVs and rockets (missiles) and related production equipment, materials, software, and technology. The following are annotated

on the CCL as being State jurisdiction: missile and military UAV portions of 9A101 and all of ramjet, scramjet, combined cycle engine 9A111 and related software and technology. Proposed XIX.c covers 3.A.1 and 3.A.9 except for 3.A.9 components but omits the MT technical specifications. Neither the existing nor the proposed USML specifies State jurisdiction for 3.A.2, 3.B.1, 3.B.2, 3.C.1, 3.C.2, or related software or technology. It is, therefore, recommended that

- proposed XIX.c be revised to cover only the missile and armed UAV portions of 3.A.1 and the armed UAV portion of 3.A.9, deleting designed or modified in 3.A.1.b, changing specially designed to “required” as a modifier for turboprop engine systems in 3.A.9, and deferring to 9A619.x to cover 3.A.9 components
- 9A101 Commerce jurisdiction be limited to the unarmed UAV portion of 3.A.1
- a new 9A102 be added for Commerce jurisdiction for the unarmed portion of 3.A.9, changing specially designed to “required” as a modifier for turboprop engine systems and also as a modifier for components
- new 9C101 and 9C102 be added for Commerce jurisdiction for 3.C.1 and 3.C.2, deleting specially designed in 3.C.1
- adding 9A102 to 9D104
- adding 9A102, 9C101, and 9C102 to 9B115, 9B116, and 9E101.

In XIX.a and b headings add “not controlled by USML Category VI.e or ECCNs 9A001, 9A002, 9A011, 9A101, 9A102 (new, see above), or 9A111”

In XIX.e delete FADEC (because FADEC already covered by incorporation of 9E003.h into 9A001.a and 9A003)

In XIX.f heading add “not controlled by 9A003”

Revise XIX.f.2 to remove portions already covered by 9A003 related to 9E003.a

Delete “specially designed” in  
 XIX.e, XIX.f.1 Note  
 740 Supp. 4.a.6 (twice), a.7,14, 15, b.2.vi,vii  
 9A619.a Note, 9A619.b

Change “specially designed” to “required” in  
 XIX.f.1,2,3  
 9A619.d,x  
 9B619 heading, 9B619.a (twice), 9B619.b  
 9D619 heading, 9D619.a

Delete parts in  
 XIX.f heading, XIX.f.1  
 740 Supp. 4 introductory paragraph, 740 Supp. 4 a intro (twice), a.7,8,9,10, b.1 (twice),  
 740 Supp. 4.b.1.ii, iii, iv,v,vi,vii, viii, b.2 intro (twice), b.2.i,ii,iii,iv,v  
 9A018, 9D018, 9E018

9A619 Unit, 9A619.x, 9A619.x Note 2 first sentence, 9B619.a

Delete accessories, attachments, or associated equipment in  
XIX.f heading, XIX.f.1  
9A619 Unit, 9A619.x, 9A619.x Note 2 first sentence, 9B619.a  
9E018

Revise XIX.g to read:  
Software “required” for installation, operation, maintenance, repair, overhaul, or  
refurbishing of XIX.a,b,c,d,e,f and software portion of .g; and  
Technology “required” for installation, operation, maintenance, repair, overhaul, or  
refurbishing of XIX.a,b,c,d,e,f, and software portion of .g.

Delete and components “specially designed” therefor in  
740 Supp.4 a.7,8,10

In 9A619 heading delete Military and add excluding those certified for civil use

In 9A619 Related Controls delete “Military” and change “technical data (including software)  
directly related thereto” to “software and technology ”required” for installation, operation,  
maintenance, repair, overhaul, or refurbishing of such aircraft and related articles or for such  
software”

Revise 9A619.a to read:  
‘Gas turbine engines’ excluding those certified for civil use not controlled by USML Category  
XIX.a,b,c,d or VI.e or by ECCNs 9A001, 9A002, 9A011, 9A101, 9A102 (new, see above), or  
9A111

In 9A619.a Note delete military

In 9A619.b delete FADEC

Delete 9A619.c (already covered by 9A003)

In 9A619.x change “not specified elsewhere in the CCL or on the USML” to “not controlled by  
USML XIX.f or ECCNs 9A002, 9A003, or 9A102 (new, see above)”

Delete 9A619,y, 9B619.y, 9C619, 9D619.y, 9E619.y and references elsewhere to these ECCNs

Revise ECCN 9A991 heading to read:  
“Aircraft,” gas turbine engines, and components, as follows (see List of Items controlled)

Revise 9A991.c to read:  
Aero gas turbine engines not controlled by USML Category XIX.a,b,c,d or ECCNs  
9A001, 9A002, 9A011, 9A101, 9A102 (new, see above), or 9A619.a and components

“required” therefor not controlled by USML Category XIX.e,f or ECCNs 9A002, 9A003, 9A102, 9A619.b,d,x

In 9B619 heading add not controlled by 9B001 through 9B009, 9B115, or 9B116

Revise 9B991 heading to read:

Equipment, tooling, or fixtures “required” for manufacturing or measuring gas turbine blades, vanes, or tip shroud castings, not controlled by 9B001 through 9B009, 9B115, 9B116, or 9B619, as follows (see List of Items controlled)

In 9D619 heading:

add not controlled by USML XIX.g or ECCNs 9D001 through 9D004, 9D101, or 9D104  
add installation, repair, overhaul, refurbishing

In 9D619 Related Controls (1) change “directly related to” to “required” for installation, operation, maintenance, repair, overhaul, or refurbishing of

Revise 9D619.a to read:

Software “required” for development or production of XIX.a,b,c,d,e,f, and software portion of .g; and software “required” for development, production, installation, operation, maintenance, repair, overhaul, or refurbishing of 9A619, 9B619, or 9D619.

Revise 9D991 to read:

Software “required” for the “development” or “production” of 9A991 or 9B991 not controlled by USML Category XIX.g or ECCNs 9D001 through 9D004, 9D101, 9D104, or 9D619

Revise 9E619 heading to read:

“Technology” for ‘gas turbine engines’ and related commodities and software, not controlled by USML Category XIX.g or ECCNs 9E001, 9E002, 9E003, 9E101, or 9E104, as follows (see List of Items controlled):

Revise 9E619.a,b,c,d to read::

- a. Technology “required” for development or production of XIX.a,b,c,d,e,f, and software portion of .g;
- b. Technology “required” for development, production, installation, operation, maintenance, repair, overhaul, or refurbishing of 9A619, 9B619, or 9D619;
- c. Technology “required” for the design of, the assembly of components into, and the operation, maintenance and repair of, complete production installations for XIX.a,b,c,d,e,f and software portion of .g, 9A001, 9A002, 9A011, 9A101, 9A102 (new, see above), 9A111, 9A619, 9B619, or 9D619, even if the components of such production installations are not specified; and
- d. Technology “required” for the assembly of components into XIX.a,b,c,d,e,f and software portion of .g, 9A001, 9A002, 9A011, 9A101, 9A102 (new, see below), 9A111, 9A619,

9B619, or 9D619 end-items, even if the components of such end-items are not specified.

Revise 9E991 to read:

Technology “required” for the “development,” “production,” or “use” of 9A991 or 9B991, not controlled by USML Category XIX.g or ECCNs 9E001, 9E002, 9E003, 9E101, 9E104, or 9E619

#### Recommended Category XIX portion of Wassenaar Proposal

Revise WML 10.d to conform with proposed Category XIX plus 9A619.x revised as recommended above (this assumes the improbability of multilateral agreement on 9A619.a,b,d, given that no examples of aero or marine gas turbine engines not otherwise covered and no examples of any gas turbine engines for ground vehicles have been identified)

Revise WML 16 to conform with Note 1 to 9A619.x

In WML 18.a change “specially designed or modified” to “required” and change “specially designed” to “required”

In WML 18.b change “specially designed” to “required” (twice)

In WML 21.a change “specially designed or modified” to “required”

Revise WML 22.b.1 to add “or by 9.A.1, 9.A.2, or 9.A.11”

Add to WML 22.b:

6. Technology “required” for the assembly of components into WML end-items or 9.A.1, 9.A.2, or 9.A.11, even if the components of such end-items are not specified.

Revise Wassenaar definition of “required” to include commodities and software as well as technology

#### Recommended Category XIX portion of MTCR proposal

In 3.A.1.b change designed or modified to “required”

In 3.A.9 delete specially designed modifying ‘Turboprop engine systems’ and change specially designed components to components “required”

In 3.B.1 and 3.B.2 change specially designed to “required”

In the definition of “Production facilities” change specially designed to “required”

In 3.C.1 delete specially designed

In 3.D.1 and 3.D.2 change specially designed or modified to “required”

Add to MTCR definitions the recommended revised Wassenaar definition of “required”

Add MTCR technology controls comparable to recommended WML 22.b.1 and b.6.

January 20, 2012

Charles B. Shotwell  
Director, Office of Defense Trade Controls Policy  
Directorate of Defense Trade Controls  
PM/DDTC, SA-1, 12<sup>th</sup> Floor  
Bureau of Political Military Affairs  
U.S. Department of State  
Washington, D.C. 20522-0112

Attn: ITAR Amendments—Category XIX, Gas Turbine Engines

Re: Amendment to the International Traffic in Arms Regulations: Establishment of U.S. Munitions List Category XIX for Gas Turbine Engines (76 Fed. Reg. 76097, December 6, 2011)

Dear Mr. Shotwell:

United Technologies Corporation (“UTC”)<sup>1</sup> appreciates the opportunity to submit these comments on the U.S. Department of State’s proposed rule to amend the International Traffic in Arms Regulations (“ITAR”) to establish U.S. Munitions List (“USML”) Category XIX for Gas Turbine Engines and Associated Equipment. The notice seeks input on the proposed new Category XIX, which would control gas turbine engines and parts and components therefore, presently controlled under Category VIII and several other categories.

UTC strongly endorses the Administration’s Export Control Reform Initiative, and its stated goal of strengthening national security and the competitiveness of key U.S. manufacturing and technology sectors by focusing on current threats and the changing technological landscape. Of paramount importance in achieving this goal is reforming both the USML and the CCL, and aligning associated export licensing policies, to achieve a more positive, transparent and predictable structure that concentrates munitions and dual-use export controls on the most sensitive items. The reform and alignment of the control lists, and the transfer of militarily less significant items to CCL control, will facilitate UTC’s ability to compete more effectively in the international marketplace while maintaining and enhancing U.S. national security and foreign policy objectives.

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<sup>1</sup> UTC is a global, diversified corporation based in Hartford, Connecticut, supplying a broad range of high technology products and services to the aerospace, power generation, security, transportation, and building systems industries. UTC’s companies are industry leaders, among them Hamilton Sundstrand aerospace and industrial systems; Pratt & Whitney aircraft engines, space propulsion systems and industrial turbines; Sikorsky helicopters; Carrier heating, air conditioning and refrigeration systems; Otis elevators and escalators; UTC Fire & Security electronic security and fire safety systems; and UTC Power fuel cell and power systems.

As the Administration's reform initiative recognizes, the current USML jurisdictional structure is exceedingly broad, imposing controls on countless parts, components, assemblies, attachments and accessories of military products and their associated technologies that have little or no military significance and are indistinguishable from commercial counterparts that are widely available globally. The vast majority of such parts or components are not subject to the USML based on a national security judgment of their military significance, but solely because the items were specifically designed or modified in form or fit for an end-item on the USML. Further, such parts and components generally make insignificant and insubstantial contributions to the indigenous development, production, use, or enhancement of USML end-items. This is especially acute in the area of Category VIII aircraft and aircraft systems which presently also controls gas turbine engines and components. The over-control of a vast array of parts and components puts enormous pressure on the defense trade licensing and compliance systems, requiring exporters and their global suppliers, partners and customers to manage life-cycle controls under the rigorous requirements of the International Traffic in Arms Regulations ("ITAR"). Managing these requirements demands significant licensing and compliance resources, and hinders the speed, efficiency and effectiveness of international programs with NATO allies and multilateral regime partners. As such, the present system imposes excessive costs on U.S. exporters and recipients of controlled goods and services, constrains competitiveness of the U.S. industrial base, and impedes collaboration with U.S. friends and allies with no commensurate benefit from the standpoint of protecting U.S. national security interests.

For UTC companies, the large majority of defense trade licensing activity relates to defense articles and defense services falling under the present USML Category VIII. UTC's products span a broad spectrum of aerospace products from helicopters and associated equipment, aircraft engines and engine controls, and a wide range of rotor and fixed wing aircraft systems including auxiliary power units, propeller systems, electric power, actuation, air management, fire protection and detection, among others. In calendar year 2011, approximately 85 percent of our more than 1000 ITAR license applications included items falling under Category VIII. Of that volume, roughly 78 percent involved defense articles – parts, components, accessories, attachments and associated equipment – currently captured in subcategory VIII(h). Given the widespread significance of the present Category VIII and the proposed Category XIX to UTC and the aerospace industry as a whole, we encourage prompt consideration of the public comments and subsequent steps to finalize and implement these reform proposals for aircraft, gas turbine engines and related articles.

In order to avoid either duplicate jurisdiction, or the possibility of inadvertent de-control of items, any changes to USML Category XIX must be closely coordinated with the proposed Export Administration Regulations (EAR) Commerce Control List (CCL) addition of 9x619.<sup>2</sup>

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<sup>2</sup> UTC is submitting comments on the U.S. Department of Commerce's parallel proposed rule to amend the CCL to implement Category 9x619 (Military Gas Turbine Engines and related commodities) for items the President determines no longer warrant control under the U.S. Munitions List.

**I. GENERAL COMMENTS ON THE MOVEMENT OF GAS TURBINE ENGINES FROM USML CATEGORY VIII TO XIX AND CCL 9X619**

**A. Movement of engines and related components from Category VIII to Category XIX and from Category VIII to the CCL**

**1. Transition period**

UTC believes that the transfer of items of lesser military significance from the USML to the CCL will result in reduced cost and improved business flexibility. However, the transition of potentially tens of thousands of parts and components, each with a multiplicity of associated technical documents, will require a very substantial effort requiring a transition period to train staff, determine new jurisdictions and classifications, adjust ERP systems and other automated jurisdictional and classification tools, change document markings, and coordinate with suppliers, distributors and customers. The philosophy of the phase-in should be to avoid unnecessary costs and schedule delays. To ease concern and possible confusion over this transition, the rule should explicitly address the phase-in of changes, as follows:

- Permit a phase-in of changes through interim and final rules. The EAR underwent a similar change in 1996, and the transition was implemented with an interim rule effective April 24, 1996, with compliance not compelled until November 1 of the same year. A similar extended implementation time frame would allow companies to change computer systems, update marking procedures, and start the process of reviewing the jurisdiction and classification of a large number of items. Due to the size and complexity of the effort, we recommend a nine month phase-in period.
- Permit 'grandfathering' of existing and in-process licenses and agreements. There may be cases where amending a Department of State authorization may be faster than applying for a new BIS license. In this case, the item(s) would necessarily retain the jurisdiction stated in the authorization. Continuing to license an item under the original jurisdiction should not preclude transitioning the item to the CCL without agency agreement in alignment with the proposed changes.

**2. Mis-classification risk**

UTC is particularly concerned about the potential mis-classification risk associated with the transfer of items within the USML from Category VIII to XIX, specifically engine parts, components, and related technical data . Tens of thousands of parts and components and technical documents that were previously classified as Category VIII(b), (h) or (i) would move to Category XIX(e), (f) or (g). Until those items had been reviewed, re-classified, and re-marked, they would reference an existing but incorrect Classification.

**3. Engine-Airframe differentiation**

UTC is also concerned about the potential difficulty of differentiating between parts and components for engines versus those for aircraft. Parts and components for both aircraft

and engines currently are classified under the existing Category VIII. By creating separate Categories for Aircraft and Engines, and the parts and components therefore, it becomes necessary to determine if a part or component belongs to the aircraft or the engine. From a technical standpoint, this is not necessarily an easy determination. For example, the engine nacelle is typically assumed to be part of the aircraft, but it contains many systems that interface seamlessly with the engine. There are systems, such as for ducted thrust, which are part of both the engine and airframe. Coolers and ducts mounted in the bypass are shared by the engine and airframe. The 'ownership' of an item between the airframe and the engine may come down to the design authority (airframer or engine OEM).

We request that DDTC re-examine the impact of moving gas turbine engines and associated equipment, parts, and components from Category VIII to Category XIX, as it will require the re-classification and re-marking of large numbers of items.

**B. Control of items on the CCL in 9x619**

UTC strongly supports the intent of Export Reform, where items of lesser military concern transition from the USML to the CCL. Gas turbine engines and their associated parts, components and technology are closely controlled on the USML and CCL today. Although the CCL in some cases provides additional export authorization options (e.g., License Exception Strategic Trade Authorization (STA)), with the exception of non-military significant items moved to 9A619.y, gas turbine engines, parts, components, and the software and technology to develop or produce them, will continue to be rigorously controlled on the CCL. And while certain commodities on 9A619 through 9C619 will be STA-eligible, the eligibility of the software and technology (9D619 and 9E619) to develop, manufacture and operate the items is significantly limited.

In the comments that follow are some recommendations that, if adopted, would move additional items to the CCL. Based on the proposals for USML Category XIX and CCL 9x619, these items will continue to be closely controlled.

**II. USML CATEGORY XIX – GAS TURBINE ENGINES AND ASSOCIATED EQUIPMENT**

**A. Category XIX (f)(2) “Hot Section components”**

The proposed definition of 'hot section components' in Category XIX(f)(2) would represent a substantial increase in control over the present VIII(b). The existing language in VIII(b) identifies the combustor, high pressure turbine (HPT) components regardless of cooling, and *cooled* low pressure turbine (LPT), augmentor, and nozzle components. The proposed definition appears to cover all components in LPT and exhaust, regardless of cooling status. Because XIX(f)(2) is categorized as Significant Military Equipment (SME), this would reclassify a large number of formerly Category VIII(h) non-SME components as SME.

Present Control	Proposed XIX(f)(2)	
VIII(b) SME	Combustion chamber	
	Combustor liner	
	Combustor diffuser	
	HPT Blades & Vanes	
	HPT Disk	
	HPT tip shrouds (cooled structure)	
	Cooled LPT Blades & Vanes	
	Cooled LPT Disks	
	LPT cooled tip shrouds	
	Cooled Augmentors	
	Cooled Nozzles	
VIII(h) Non-SME	Combustor shell	Added to the list of SME components
	Combustor dome	
	Uncooled LPT Blades & Vanes	
	LPT uncooled tip shrouds	
	Uncooled LPT Disks	
	Uncooled augmenters	
	Uncooled nozzles	

Moving items now categorized in non-SME subcategory VIII(h), such as a military engine uncooled LPT blade or a combustor shell, to the proposed SME subcategory XIX(f)(2) is both unnecessary and inadvisable. These ‘warm section’ parts and components (items directly exposed to combustion gas but not captured in Category VIII(b) ‘hot section’) are not part of the present ‘hot section’ definition precisely because they do not contain the same level of technology as ‘hot section’ items. As examples, non-cooled ‘warm section’ components do not have cooling holes and passages, do not utilize advanced Thermal Barrier Coatings (TBCs), and typically utilize less sophisticated materials than the high stress-life materials necessary in ‘hot section’ components. In most cases, the technology for these ‘warm section’ parts and components is identical to that of commercial gas turbine parts and components. As such, there is no technological or performance rationale to expand the scope of ‘hot section’ to include these items.

The change is inadvisable as it would have a severe, adverse impact on both U.S. industry and the supply of engine parts to the U.S. and partner militaries. Changing the “hot section” definition will require wholesale changes to classification processes and electronic databases already developed and used by U.S. industry, requiring significant investment in employee retraining and modifications to various software applications. The change also would impose significant new and unwarranted licensing burdens on exporters. Agreements for the manufacture abroad of these parts and components also would require Congressional Notification, and the lesser technology associated with uncooled turbine components would be subject to the same heightened requirements as for the more sensitive ‘hot section’(e.g., nontransfer and use certificates, ‘build-to-print’ restrictions, fewer available exemptions).

The proposed section XIX(f)(2) itself has several composition issues. The first part of the first sentence calls out generic parts (*e.g.*, ‘turbine blades’ or ‘nozzles’) “specially designed” for engines in the category, and then calls out a subset of the same parts (*e.g.*, ‘cooled low pressure turbine blades’ and ‘cooled nozzles’). Cooled low pressure turbine blades are assumed to be included in ‘turbine blades,’ rendering portions of the rest of the sentence redundant. The regulation also adds four items (cowl, diffuser, dome, and shells) to the existing two controlled combustor components (chambers and liners). The combustor chamber and liner are directly exposed to the combustion gas temperatures and pressures, and often utilize advanced cooling technology. The combustor cowl (aka ‘hood’), diffuser, dome, and shells are simple components that are not exposed to combustion temperatures or pressures; they operate under similar conditions as the high compressor. The combustor chamber and liner should be controlled at the same level as the high pressure turbine. The combustor cowl, diffuser, dome, and shells should be controlled at the same level as other compressor components.

The proposed Category XIX regulation breaks military engines into two groups – those defined in XIX(a) through XIX(d), and a subset of engines defined in XIX(f)(1). Because non-‘hot section’ parts and components for the Category XIX(f)(1) engines are controlled on the USML, but non-‘hot section’ parts and components for other XIX(a)-(d) engines move to the CCL, it is assumed that the XIX(f)(1) engines are more critical.

Figure 1 shows how parts and components are controlled on the USML today. The present USML does not differentiate between the critical XIX(f)(1) engines and other military engines. ‘Cold section’ components would be those not of the combustor, turbine or exhaust; examples of ‘cold section’ components are the fan, compressor, and gearbox.

Engine	Examples	Parts & Components:	Today USML	
			SME	non-SME
Critical USML engines - listed in XIX(f)(1)	F135	VIII(b) 'hot section' Combustor, HPT, cooled LPT	*VIII(b)	
		VIII(h) 'warm section' - e.g. uncooled LPT		VIII(h)
		Cold section'		VIII(h)
All other USML engines	F100/F110	VIII(b) 'hot section' Combustor, HPT, cooled LPT	*VIII(b)	
		VIII(h) 'warm section' - e.g. uncooled LPT		VIII(h)
		Cold section'		VIII(h)
	F117	VIII(b) 'hot section' Combustor, HPT, cooled LPT	*VIII(b)	
		VIII(h) 'warm section' - e.g. uncooled LPT		VIII(h)
		Cold section'		VIII(h)

Figure 1 – Present Category VIII control

Figure 2 shows how parts and components would be treated under the proposed Category XIX and 9A619 rules.

Engine	Examples	Parts & Components:	Today USML		Proposed Rules			
			SME	non-SME	USML SME	USML non-SME	9A619 .c	9A619 .x
Critical USML engines - listed in XIX(f)(1)	F135	VIII(b) 'hot section' Combustor, HPT, cooled LPT	*VIII(b)		*(f)(2)			
		VIII(h) 'warm section' - e.g. uncooled LPT		VIII(h)	*(f)(2) ← VIII(h)			
		Cold section'		VIII(h)		(f)(1)		
All other USML engines XIX(a)-(d)	F100/F110	VIII(b) 'hot section' Combustor, HPT, cooled LPT	*VIII(b)		*(f)(2)			
		VIII(h) 'warm section' - e.g. uncooled LPT		VIII(h)	*(f)(2) ← VIII(h)			
		Cold section'		VIII(h)		VIII(h)	→	.x
9A619.a 'military' engines	F117	VIII(b) 'hot section' Combustor, HPT, cooled LPT	*VIII(b)		*VIII(b)	→	.c	
		VIII(h) 'warm section' - e.g. uncooled LPT		VIII(h)		VIII(h)	→	.c
		Cold section'		VIII(h)		VIII(h)	→	.x

Figure 2 – Engine parts and components under the Proposed Rules

For engines of low military significance, such as the F117 transport engine, the parts and components would transition to 9A619.c or .x. However, for all other USML engines, 'warm section' parts and components presently controlled under VIII(h) would move to XIX(f)(2), which is SME.

In order to prevent a roll-back of regulations, we strongly recommend that Category XIX(f)(2) use the same 'hot section' wording as the present Category VIII(b):

*\*(f)(2) hot section parts and components (i.e., combustion chambers and liners; high pressure turbine blades, vanes, disks and related cooled structure; cooled low pressure turbine blades, vanes, disks and related cooled structure; cooled augmenters; and cooled nozzles) "specially designed" for gas turbine engines controlled in this category;*

The term 'parts' should be added to the paragraph in anticipation of the proposed July 15, 2011 rule that included common definitions of 'parts' and 'components.' Many of the listed items, such as blades, vanes, and disks, are single, inseparable items, and are therefore 'parts' and not 'components.'

Figure 3 shows how parts and components would be treated with the suggested changes:

Engine	Examples	Parts & Components:	Today USML		With Suggested Changes			
			SME	non-SME	SME	non-SME	9A619 .c	9A619 .x
Critical USML engines - listed in XIX(f)(1)	F135	VIII(b) 'hot section' Combustor, HPT, cooled LPT	*VIII(b)		*(f)(2)			
		VIII(h) 'warm section' - e.g. uncooled LPT		VIII(h)		(f)(1)		
		Cold section'		VIII(h)		(f)(1)		
All other USML engines XIX(a)-(d)	F100/F110	VIII(b) 'hot section' Combustor, HPT, cooled LPT	*VIII(b)		*(f)(2)			
		VIII(h) 'warm section' - e.g. uncooled LPT		VIII(h)		VIII(h) →	.c.2	
		Cold section'		VIII(h)		VIII(h) →		.x
9A619.a 'military' engines	F117	VIII(b) 'hot section' Combustor, HPT, cooled LPT	*VIII(b)		*VIII(b)	→	.c.1	
		VIII(h) 'warm section' - e.g. uncooled LPT		VIII(h)		VIII(h) →	.c.2	
		Cold section'		VIII(h)		VIII(h) →		.x

Figure 3 – Engine parts and components with the suggested changes.

Because items that leave the USML must be properly controlled under the CCL, it is important that any changes to USML Category XIX(f)(2) be reflected in CCL Category 9A619.c. In its comments on the proposed 9x619 Commerce rule, UTC proposes splitting the proposed ECCN 9A619.c into two subparagraphs: 9A619.c.1 that mirrors the wording of the suggested XIX(f)(2), and a 9A619.c.2 that will enumerate ‘warm section’ components. Exactly reflecting the XIX(f)(2) wording in ECCN 9A619.c.1 is important, as it will provide both a consistent definition and simplify re-classification of parts as engines move from the USML to the CCL in the future.

## **B. General Comments on Category XIX (a)-(d)**

### **1. Use of the term ‘inventory’**

The term ‘engines in ...inventory’ is used in XIX (a), (b), and (c). Although this is assumed to mean engines in service (as opposed to development or production), it is not clear what is meant by inventory, as it could mean, at a minimum, operational, reserve, or mothballed. It is also not clear if the inventory is that of the United States military or other militaries. As detailed in our specific recommendations below, we propose removing the word ‘inventory’ in XIX (a), (b) and (c).

### **2. Use of the term ‘capable of.’**

The term ‘capable of’ is used in several entries to indicate the capacity of an item to support a particular feature. The difficulty with using ‘capable of’ is that it is a subjective, open-ended term and can be interpreted in different ways, including equating ‘capable of’ to ‘possible.’ It may be possible for an engine to meet a criterion, but if it is beyond the design intent of the engine then the engine may not sustain that criterion for any length of time. We make specific recommendations below to replace the term ‘capable of’ with more precise, objective terms.

## **C. Category XIX (a) Turbofan and Turbojet Engines**

### **1. Thrust threshold.**

Proposed XIX (a) specifies ‘engines...capable of 15,000 lbf (66.7 kN) of thrust or greater...’ We recommend replacing ‘capable of’ with the more precise term ‘rated for.’ An engine may be ‘capable of’ 15,000 lbf of thrust, but at the expense of greatly reduced life or reliability. ‘Rated for’ is more indicative of an engine that can achieve and sustain the performance threshold for a useful period of time. Additionally, the point the thrust is measured needs to be defined. We suggest ‘maximum take-off continuous’ as that is typically the highest thrust condition. Accordingly, we recommend the following revised language:

*\*(a) Turbofan and turbojet engines, including those in development, production, operation, or technology demonstrators, rated for 15,000 lbf (66.7kN) maximum take-off continuous thrust or greater that have any of the following:*

It is recognized that a vendor could substantially de-rate an engine in order to avoid capture on the USML. Such actions would result in an engine that is over-designed for the rating, and therefore cause the engine to be economically non-competitive. If there is a concern about de-rating to avoid control, the 15,000 lbf threshold could be lowered. It is primarily the criteria in (a)(1) through (a)(5) that provide the 'military' differentiation.

## **2. Use of the term 'capable of thrust augmentation.'**

Category XIX(a)(1) specifies engines 'with or capable of thrust augmentation.' Utilizing the same argument above, theoretically any turbofan or turbojet engine could be retrofitted with some afterburner capability. We recommend 'capable of' be replaced with 'designed for' as follows:

*\*(a) . . .  
(1) with or designed for thrust augmentation (afterburner);*

## **3. Use of the term 'capable of inverted flight.'**

Category XIX(a)(4) specifies engines 'capable of inverted flight'. Both civil and military gas turbine engines are capable of inverted flight, even if it is only momentarily (e.g., sport aircraft or commercial aircraft recovering from emergency flight conditions). This capability alone does not differentiate between military and commercial engines, and the control as proposed would unintentionally capture all commercial engines above a certain thrust class on the USML. We recommend the deletion of 'capable of,' to be replaced with 'designed for sustained', and the addition of a quantitative threshold for sustained flight, as follows:

*\*(a) ...  
(4) designed for sustained inverted flight of 30 seconds or more without engine damage.*

There is concern that this entry may inadvertently capture some commercial engines, even with a 30 second threshold. Several commercial engines today and in development have extended negative G requirements. Any negative G maneuvers, whether a slight negative 0.1 G, or full inverted (1.0 G) causes oil to move to the top of the engine. Because of downdrafts and wind-shear, commercial aircraft are designed for periods of negative G operation, and this parameter is often an airframe requirement. An aircraft manufacturer concerned about engine operation during an extended downdraft condition may institute a design requirement that would put a commercial engine onto the USML.

## **4. The use of the term 'capable of high power extraction.'**

Category XIX(a)(5) specifies engines 'capable of high power extraction (greater than 50 percent of engine thrust) at altitudes greater than 40,000 feet.' This wording is problematic in that the engine thrust measurement point requires clarification, and the altitude range falls within normal civil aircraft operating conditions.

In terms of operating point, it is not clear what engine thrust level should be used when calculating the 50 percent threshold. The intent of the criterion is assumed to capture high altitude operation where significant power extraction is required to operate large amounts of electrical equipment (e.g., surveillance) or possibly directed energy weapons. For civil aircraft operation, engine thrust to maintain high altitude cruise conditions is quite low; aircraft operate at this altitude because low thrust requirements result in best fuel economy. With the advent of all-electric civil aircraft, the power extraction required for passenger use (lighting, environmental control, meal preparation, entertainment) may very well exceed 50 percent of the thrust required to maintain altitude. To support the assumed intent of the criterion, the thrust threshold should be calculated based on the engine's maximum thrust capability, which is normally realized at take-off. The term 'capable of' should be changed to 'rated for' utilizing the same rationale expressed above.

To further differentiate between military and civil mission profiles, the altitude threshold should be increased to at least 50,000 feet, as 40,000 feet is well within the operating envelope of commercial aircraft. We recommend the following changes:

*\*(a)...*

*(5) rated for high power extraction (greater than 50 percent of maximum rated take-off thrust) at altitudes greater than 50,000 feet; or*

## **5. Thrust reversing.**

Paragraph XIX(a)(6) specifies engines 'capable of directed flow thrust reversing using bypass/fan and core flow air and also capable of being deployed in flight.' The proposed wording inadvertently would capture many engines operating on civil aircraft today. The problems with this proposed criterion is described below.

First, the thrust reversing system is usually associated with the nacelle, which is an aircraft component and not an engine component. This is one reflection of the issue with the aircraft/engine demarcation noted above in Section I. Technically, very few engines have thrust reversers.

Second, most civil aircraft utilize reverse thrust in order to reduce stopping distances. The regulation specifies "... using bypass/fan and core flow air..." Requiring both flows reduces the number of aircraft impacted, but still includes many commercial and business jets. Building on the discussion of the term 'capable of', all aircraft are 'capable of' deploying the thrust reverser in flight. It typically is a feature locked out for safety reasons. However, depending on the aircraft, the lockouts can be over-ridden by pulling specific circuit breakers and disabling lockout switches. The 'capability' to deploy the reverse thrust in flight is always present.

Lastly, the ability to deploy reverse thrust in flight is not an appropriate differentiator between military and civil gas turbine engines. The assumed intent of the criterion is to identify engines suitable for military mission requirements, such as rapid descent-steep

approach in order to avoid hostile fire. However, the technology is ubiquitous to civil applications, which indicates it does not warrant control on the USML. Accordingly, we recommend that paragraph XIX(a)(6) be deleted.

**D. Category XIX(b) Turboshaft and Turboprop engines**

Proposed Category XIX(b) specifies criteria for turboshaft and turboprop gas turbine engines and, as written, will broadly control many engines in commercial use today and inhibit development of future commercial engines. Turbofan and turbojet engines are primarily for aircraft applications, and therefore can be identified by military-specific capabilities (e.g. afterburners, high-altitude operation, etc.) 'Military' turboprop engines are not suitable for combat in the modern battlefield, and are useful primarily for reconnaissance, trainers, and transport. These applications have much in common with commercial/civil applications (including the high-G and negative-G loading and vertical position of aerobatic aircraft) so trying to identify 'military' criteria based on equipment or mission capability is difficult. 'Military' turboshaft engines have even fewer distinguishing characteristics from commercial/civil versions. Other than engines incorporating classified items (proposed subparagraph XIX(f)(4)), any performance criteria for turboshaft and turboprop gas turbine engines will inadvertently capture existing civil engines and also inhibit future development.

As much as the intent is to provide a positive, performance-based USML, this may not be possible in the case of turboshaft and turboprop gas turbine engines. Specific turboshaft and turboprop engines are already specified in paragraph (d). Military turboshaft and turboprop engines not specifically listed in paragraph (d) should move to control under the proposed CCL 9A619.a. Precisely because turboshaft and turboprop engines do not have the same limitations as turbofan or turbojet (e.g., weight for a land-based turboshaft; aircraft airspeed for a turboprop), the movement of these engines to the CCL is in line with the goals of Export Reform.

**1. Shaft Horsepower.**

If a separate performance-based definition of turboshaft and turboprop engines is retained in paragraph XIX(b), we recommend revisions to the criteria to delineate USML controlled turboshaft and turboprop engines. As noted above for turbofan and turbojet engines, we recommend replacing the term 'capable of' with the more precise term 'rated for.' An engine may be 'capable of' 1,500 shp (1119kW), but at the expense of greatly reduced life or reliability due to increased wear. 'Rated for' is more indicative of an engine that can achieve and sustain the performance threshold for a useful period of time. Additionally, horsepower can be measured in different ways, e.g., mechanical shaft horsepower, equivalent shaft horsepower, or thermal shaft horsepower. The most commonly cited measure of a turboprop or turboshaft engine's power output is mechanical horsepower, the output power delivered to and measured at the shaft. Accordingly, we recommend the following revised language:

*\*(b) Turboshaft and Turboprop engines, including those in development, production, operation, or technology demonstrators, rated for 1,500 mechanical shp (66.7kN) or greater that have any of the following:*

## **2. Cooled Turbines.**

XIX(b)(1) specifies turboshaft and turboprop (gas turbine) engines with cooled low pressure, intermediate pressure, or power turbines. In the pursuit of improved fuel economy, engine manufacturers seek to increase turbine temperatures.<sup>3</sup> In order to maintain engine durability, the future use of cooled low turbine stages is probable. Because they would be presumptively on the USML, this criterion would inhibit the advancement of high-efficiency commercial engines at a time when fuel economy and greenhouse gas emissions are a great concern. Accordingly, we recommend deleting the criterion.

## **3. Oil Sump Sealing.**

Paragraph XIX(b)(3) specifies engines ‘capable of oil sump sealing when the engine is in the vertical position’, which appears to be written in order to capture tilt-rotor engines. Although there are no commercial tilt-rotor aircraft today, this regulation would also inhibit this sector. At a minimum, this entry suffers from the same issue with ‘capable of’ noted above. If the intent is to capture tilt-rotor engines, the entry should state:

*\*(b)...*

*(3) designed for continuous operation in both vertical and horizontal positions.*

Regarding proposed Category XIX(d), turboshaft engines are used on both civil and military helicopters, with the latter to be split between proposed Category VIII(a) and proposed ECCN 9A610.a aircraft based on airframe designation. Some turboshaft engines can be considered a form of ‘dual use,’ powering both attack (Category VIII(a)) and utility (ECCN 9A610) aircraft. These engines cannot be said to be “specially designed” for the USML application. For example, the T700 engine, which has been in service for over 30 years, powers both the SH-60 ASW and UH-60 aircraft, with the utility aircraft being the first application. The level of technological sophistication of this engine is in line with the goals of 9A610; it is listed on the USML due to its use in specific USML aircraft. UTC suggests that in cases where an engine will have a significant presence on CCL-controlled airframes, such as the T700, consideration be made to move that engine to 9A619.a control.

## **E. Category XIX(f)(3) Engine Monitoring Systems**

Paragraph XIX(f)(3) specifies “engine monitoring systems ‘specially designed’ for gas turbine engines and components controlled in this category.” We believe that this entry is not necessary. While the use of “specially designed” should limit the control only to military-specific applications, the technologies used for engine monitoring are very similar to those in

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<sup>3</sup> While increased temperatures usually results in increased emissions, since ground and sea-based engines do not have the same weight constraints as aero-engines, heavy emission controls are easier to implement.

the commercial world. The technology for part life usage, or fault detection and isolation is the same for all gas turbine engines, regardless of application. Controlling these items on the CCL, if at all, is more in line with the goals of Export Reform.

If it is determined that some aspect of “monitoring systems” must remain on the USML, we make two suggestions:

- (1) Limit USML monitoring to military specific concerns, such as battle damage, or military specific hardware, such as afterburners or vectored thrust hardware.
- (2) Delete ‘engine’ from ‘engine monitoring systems’ as monitoring of components is also mentioned. Additionally, the use of the descriptor ‘gas turbine’ engines is redundant in this category.

**F. Category XIX(f)(4) Items Developed/Manufactured with Classified Data**

Paragraph (f)(4) specifies items that are (i) classified, (ii) contain classified software, (iii) manufactured using classified production data, and (iv) developed using classified information. Although entries (i) and (ii) are reasonable criteria, we believe that paragraphs (iii) and (iv) are unnecessary. The use of classified data or information in the development or manufacture of an item is known only to the developer/manufacturer, and may not have any bearing on the end use of the item. The characteristic of being “developed” or “manufactured” with classified data is not obvious at the next assembly level, and like ‘design intent’ can be difficult to trace or prove. This is especially true since due to Program Security requirements, the fact that classified data is used would not be open information. Therefore, the criteria in paragraphs (iii) and (iv) are not good indicators of a ‘military’ item and should be deleted.

**G. Missile Technology Control Regime Considerations**

There is overlap between XIX(c) (engines for unmanned aerial vehicle systems, cruise missiles, or target drones) and Category IV(d) (missile and space launch vehicle power plants.) Per Part 121.16, Missile Technology Control Regime Annex, Item 3, Category 2 (a) and (b), certain engines are referenced in both Categories IV(h) and VIII(b). Both USML categories reference power plants/engines for ‘missiles,” and it is up to the reader to parse between a ‘missile’ (Category IV) and a ‘cruise missile’ (Category XIX(c).) A good example is the TJ-150 turbojet, used in the ADM-160B missile; under the present Category IV and proposed XIX/9A619 wording, this small turbofan engine can be interpreted to be controlled under either Category IV(d), XIX(c), or 9A619.a. If controlled under XIX(c), then high turbine components would be XIX(f)(2) ‘hot section’ and SME; but if the engine is controlled under IV(d), then the same components are non-SME IV(h).

We urge the Administration to provide a clear delineation between engines controlled under Category XIX/9A619, and those controlled under Category IV/9A604. This includes both small turbofan and turbojet engines, and ramjet scramjet, pulse jet and combined cycle engines.

\* \* \*

For additional information, please contact the undersigned at (202) 336-7467 or, with regard to technical proposals, Ari Novis at Pratt & Whitney at (860) 557-2353.

Sincerely,



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January 18, 2012



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**Subject: Proposed Rule RIN 1400-AC98  
Amendment to the International Traffic in Arms Regulations:  
Establishment of U.S. Munitions List Category XIX for Gas Turbine  
Engines**

Dear Mr. Shotwell:

The Boeing Company (Boeing) welcomes the opportunity to comment on the referenced Proposed Rule (PR). The initiative to move to a clearer and more positive United States Munitions List (USML), coupled with the movement of less significant items to Commerce Control List (CCL), while difficult, is worthwhile. Boeing remains committed to working with the regulatory agencies on export control reform in order to achieve a modern and effective export control system.

While Boeing does not manufacture aircraft engines, they are critical to our products. Aircraft design and certification are closely linked to aircraft engine capability, which is in turn dependent on aircraft requirements. We work closely with engine manufacturers in areas such as engine and nacelle integration onto our aircraft. Commercial items that Boeing designs and installs, including thrust reversers and engine exhaust nozzles, could be subject to USML jurisdiction under this proposed rule.

Boeing believes that the proposed USML category XIX listing carries significant risk of classifying past, present, and future commercial aircraft engines as ITAR-

controlled, which would have serious negative consequences for U.S. commercial aviation.

In its current form, Boeing would strongly object and oppose the draft as written. We offer in our comments that follow, changes that we believe would make the proposed rule acceptable and would better meet the Government's intended objectives of export reform. Our objections would be mitigated by the careful use of "specially designed" and "required" in the text.

**I. Commercial engines captured**

A principal concern is that the capabilities listed in paragraphs (a) and (b) of USML Category XIX are not exclusive to military engines. Therefore, any engine that meets the control criteria listed in these two paragraphs would be subject to the ITAR, regardless of the purpose for which the engine was developed, or the platform on which it is used. Many of the capabilities listed in these two paragraphs would capture engines currently used on commercial aircraft, or in the development of future commercial applications.

According to the criteria used to determine whether an item should remain on the USML, we do not believe that the capabilities listed in paragraphs (a) and (b) adhere to the following:

- i. Inherently military and otherwise warrant control on the USML, or
- ii. Possess parameters or characteristics that provide a critical military or intelligence advantage to the United States, and are almost exclusively available from the United States.

In addition, we do not believe that these capabilities should be classified under Category 9 (600 Series) ECCNs because they are not a "type of article that is, as a result of differences in form and fit, ``specially designed" for military applications" as stated in the related Proposed Rule by the Bureau of Industry and Security on "Gas Turbine Engines and Related Items" (page 76073, column 1).

We provide general comments below and strongly recommend the establishment of a forum for sharing proprietary information to enable regulators to better understand current commercial engine capabilities. Again, Boeing believes that the proposed USML Category XIX carries significant risk of

capturing present, past, and future commercial aircraft engines on the USML, which would have significant negative consequences for the U.S. commercial aviation industry.

II. **Paragraph (a):**

Paragraph (a) of USML Category XIX lists turbofan and turbojet engines but does not specify that such engines be “specially designed” for defense applications. Thus, any engine that meets the control criteria of this list would be captured on the USML, regardless of what it was developed for or the platform on which it is used. All engines currently in use on Boeing commercial aircraft exceed the 15,000 lbf thrust threshold noted in the proposed USML Category XIX(a), so any engine Boeing uses that has any of the characteristics in (a)(1) through (a)(6) would be captured on the USML and thus would be subject to the ITAR.

Boeing believes that some of the capabilities described in (a)(1) through (a)(6) are not, or soon may not be, specific to defense applications and may inadvertently capture commercial engines now or in the future. An example of the proposed criteria capturing existing commercial aircraft engine capability arises from section (4): *capable of inverted flight*. Boeing commercial aircraft are not designed for inverted flight, but our aircraft may be “capable” of negative-G operation and limited inverted flight in unanticipated or emergency situations.

Further, section (6): *capable of directed flow thrust reversing using bypass/fan and core flow air and also capable for being deployed in flight*, could capture existing commercial engine technology that is important to commercial aircraft operation. The thrust reverser on the DC-8 commercial transport is capable of being deployed in flight and, in fact, was designed for that purpose to slow the aircraft down during the descent phase, counter the velocity increase that results from reducing altitude, and optimize safe landing conditions. This capability, entirely developed in the commercial realm, could be a desirable safety feature on future commercial aircraft. Boeing recommends that section (6) be deleted to avoid capturing commercial technology that has been in use for decades.

Boeing recommends changes to paragraph (a) such that the control is limited to engines “specially designed” for defense applications as follows:

*\*(a) Turbofan and Turbojet engines “specially designed” for “end items” enumerated in USML Category VI, VII, or VIII, whether in development, production, or inventory (including technology demonstrators), capable of 15,000 lbf (66.7 kN) of thrust or greater that have any of the following:*

Alternatively, and preferably, Boeing recommends the adoption of a harmonized definition of “military gas turbine engines” that applies to both the USML and the CCL. Boeing finds the BIS proposed definition in ECCN 9A619.a to be an excellent starting point:

*“military gas turbine engines” means gas turbine engines “specially designed” for “end items” enumerated in USML Category VI, VII, or VIII or on the CCL under ECCN 9A610, ECCN 0A606, or the 600-series ECCN that would control vessels transferred from the USML to Category 8 of the CCL by a proposed rule that BIS plans to publish.*

Capabilities required to be listed in the proposed USML Category XIX should be refined to preclude applicability to purely commercial jet engine applications now and in the foreseeable future. Recommended revisions to (a)(4) and (a)(5) are:

*(4) designed to be capable of sustained inverted flight for periods in excess of TBD minutes.*

*(5) capable of high power extraction (greater than 50 percent of maximum available engine thrust at altitude at altitudes greater than 40,000 feet;*

We believe that these recommended revisions would mitigate the (a)(4) problem described above, and because thrust levels in (a)(5) can vary at a given altitude, this revision provides additional clarity.

Other performance parameters listed under paragraph (a) are likely to apply to future commercial aircraft engine / nacelle applications of a proprietary nature. Boeing welcomes the opportunity to continue the dialogue regarding improvements to the control criteria in paragraph (a) in a forum in which proprietary developments can be protected.

III. **Paragraph (b):**

Paragraph (b) should also be limited to articles specially designed for military aircraft. Therefore we recommend the following revision:

*\*(b) Turboshaft and Turboprop engines “specially designed” for “end items” enumerated in USML Category VI, VII, or VIII, whether in development, production, or inventory (including technology demonstrators), capable of 1500 shp (1119 kW) or greater that have any of the following:*

Additionally, the proposed control text in (b) covers capabilities that are not inherently military. The proposed text is:

*\*(b) Turboshaft and Turboprop engines, whether in development, production, or inventory (including technology demonstrators), capable of 1500 shp (1119 kW) or greater that have any of the following:*  
*(1) Cooled low pressure turbine, cooled intermediate pressure turbine, or cooled power turbine;*  
*(2) contains parts or components controlled in paragraph (f)(4)(i) or (f)(4)(ii) of this category; or*  
*(3) capable of oil sump sealing when the engine is in the vertical position.*

Boeing subject matter experts believe that both turbo shaft and turbo prop engines satisfying (b)(1) and (b)(3) above are viable candidates for commercial products. Cooled turbines are a design option for open fan engines for commercial transport aircraft and for commercial tilt rotor aircraft. Further, engines operating in the vertical orientation would be a required feature of many commercial tilt rotor design concepts. Accordingly, Boeing recommends that these paragraphs should be removed or revised to capture uniquely military functionality. If unique military functionality is identified for cooled turbine components, those control listings should be located in paragraph (f).

IV. **Paragraph (e)**

Paragraph (e) should be limited to digital engine controls “specially designed” for military aircraft gas turbine engines rather than the catchall coverage in the proposed listing.

V. **Paragraph (f):**

Paragraph (f)(1) should be limited to parts, components, accessories, attachments, and equipment “specially designed” for military aircraft, rather than the catchall coverage of the proposed list.

The paragraph on *hot section* in paragraph (f)(2) is confusing and seems to represent a significant expansion of controls from the definition in current USML Category VIII(b), which was revised as recently as 2008 and has been incorporated into industry practices. If the 2008 definition is adopted for this rule, Boeing would like the language to be clarified to indicate that the listed hot section components are the only hot section components controlled. It is not clear from either definition where *hot section* ends, and what constitutes a “related” item. The ultimate definition should be placed in the definitions section of the regulations and apply to both the USML and CCL.

VI. **Paragraph (g):**

As written, the phrase “directly related to the defense articles” could capture common aircraft services that are commercial in nature, such as maintenance manual data that is common to commercial engines rather than specific to uniquely military functions. This section should be revised as follows:

*Technical data and defense services directly related to the **uniquely military functionality** of the defense articles enumerated in paragraphs (a) through (f) of this category.*

VII. **Engines in USML Category XIX/ECCN 9X619**

A factor to consider regarding whether military gas turbine engines should be controlled in the same category as military aircraft is the lack of clarity in the proposed rules regarding where the engine ends and the airframe begins. For example, “directed flow thrust reversing” engine capability as described in proposed XIX(a)(6) would be subject to the ITAR, but this capability relates to the nacelle and not to the engine.

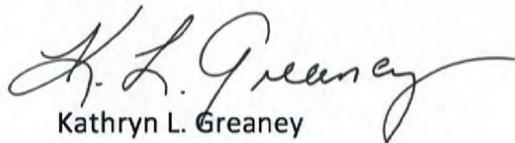
In terms of overall reform transition, Boeing reiterates our view that a phased implementation of the ultimate final rules implementing these regulatory changes is needed. This type of approach will provide exporters the ability to

January 18, 2012  
Charles B. Shotwell, Esq.  
Director, Office of Defense Trade Controls Policy

adequately implement the required trainings, the necessary re-marking, and overall systems changes to their processes and procedures and to ensure compliance. As mentioned in previous response letters, we support an interim rule, a pilot program that engages industry and the regulatory authorities, and a transition period involving a phased implementation over the course of a calendar year.

We appreciate the substantial effort that this proposed rule and the Export Control Reform Initiative represents. Boeing believes this is important work that will enhance national security and rationalize the existing outdated export control system. Please do not hesitate to contact Stephanie Reuer of our Rosslyn, Virginia office should you have any questions or desire additional information. You can reach Stephanie by phone at 703-465-3505, or via e-mail at [Stephanie.A.Reuer@boeing.com](mailto:Stephanie.A.Reuer@boeing.com).

Very truly yours,

  
Kathryn L. Greaney



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2401 E Street, NW, (SA-1)  
Washington, D.C. 20037

January 20, 2012

Subject: ITAR Amendments—Category XIX

Reference: Public Notice: 7703

Dear Mr. Shotwell:

The General Electric Company, acting through its GE Aviation business unit (GE), submits the following comments for the referenced proposed changes to 22 CFR Part 121. GE appreciates the Department's effort to remove broad-based controls on generic engine parts and components. By far, this is the most significant Export Control Reform accomplishment to-date and will greatly improve our ability to focus our compliance efforts on protecting critical DoD technologies.

Our comments for §121 USML Category XIX fall into two general categories:

**Vital for Export Reform success and “must do” . . .**

- Retain the existing ITAR definition of “hot section”;
- Remove special controls for turboprop and turboshaft engines with cooled low pressure, intermediate or power turbines;
- In order to fully evaluate the impact of these changes, it is essential to understand the full and complete definition of “Specially Designed” in context; and
- Clarify some entries which could inappropriately control commercial engines.

**Necessary for Export Reform and “highly recommended” . . .**

- Retain controls in USML category VIII and do not separately enumerate in XIX;
- Include language confirming the sanctity of existing CCL commodity jurisdiction determinations;
- Rather than list specific engine product lines, where possible specifically identify key technologies or military unique capabilities in an expanded listing of positive controls;

- Include language similar to the existing note in USML category VIII(h) affirming that certain standard equipment certified by the U.S. FAA (ideally all Wassenaar member country civil air authorities) is subject to the EAR; and
- Although the new XIX represents a more positive list, there are opportunities to add further clarity and precision.

## **SPECIFIC COMMENTS**

### **CJ SANCTITY**

GE recommends adding clarification confirming that the proposed rule will not reverse or “roll back” existing commodity jurisdiction determinations. The language should be consistent with the EAR proposed rule change (RIN 0694–AF36), published November 7, 2011.

### **RETAIN ENGINE CONTROLS IN USML CATEGORY VIII**

The proposed USML category XIX is a significant step forward in terms of positively listing technologies or capabilities that require control under the USML. However, we are concerned that separating engines into a new USML category actually adds a layer of complexity that will impact the license process. In addition, separate categories will make it difficult to classify certain types of components as part of the airframe or as components of the engine. Many aircraft OEMs impose requirements on engine manufacturers to deliver an overall “propulsion system”, which includes a mix of structural components such as nacelles and the actual gas generator. We anticipate that the line between “propulsion system” and the aircraft will continue to blur with newer, state of the art integrated system solutions.

Finally, there is the potential that as the regulation continues to evolve; disconnected language in VIII and XIX could result in inconsistent or contradictory controls. For example, an update to USML VIII could be inadvertently overlooked resulting in inconsistent or contradictory controls in USML XIX or vice versa.

When assessing the impact of a stand-alone category for gas turbine engines, we evaluated the level of effort needed to implement the August 2008 changes to USML VIII, which required the reclassification of more than 20,000 items from VIII(h) to VIII(b). The change also required a one time, \$511,000 update to our logistics database and re-training for over 1,400 engineers responsible for determining export classifications. Finally, we updated our license process to separately identify “hot section” parts, added a requirement to collect DSP-83 Non-Transfer and Use Certificates and changed our process for filing AES reports in order to decrement USD value from the correct line item. Although these changes introduced more complexity to our product classification, licensing and supply chain logistics processes, we understood that the changes were needed to improve safeguards for “hot section” parts.

However, we do not see similar rationale driving the creation of USML Category XIX. A new USML category for gas turbine engines will require repeat re-classification activity for over 65,000 GE items, which will ultimately increase our costs for little to no benefit.

## COMMENTS AND SUGGESTED CHANGES TO XIX

1. Change XIX(a) as follows (changes in **RED**):

“Turbofan and Turbojet engines **“specially designed” for the items in USML category VI, VII and VIII, whether in development, production, or inventory** (including technology demonstrators), capable of 15,000 lbf (66.7 kN) of thrust or greater that have any of the following:”

Because turbofan and turbojet engines are essentially propulsion systems and are used for land, sea or air vehicles in the same manner and to the same extent whether in a military or civil use, the addition of “specially designed” further narrows the scope of the ITAR to those engines designed uniquely for defense articles separately listed on the USML.

Most aircraft engine platforms are developed using commercial technology and methodology and predominantly used in commercial applications. Only those engines with “specially designed” features or capability specific to USML items should be captured under the ITAR. An F414 engine with thrust augmentation is “specially designed” for USML items. A CF6-80C2L1F engine used in military transport aircraft is developed using commercial technology used to efficiently provide thrust to a USML aircraft, but it is not “specially designed” for that purpose.

Deleting the phrase **“whether in development, production, or inventory”** will help clarify the scope of intended control over gas turbine engines with specific performance capability regardless of the stage of development, production or use. If the Department retains the phrase, we recommend further clarifying the definition of **“inventory”**. Our concern is that the term **“inventory”** could be interpreted narrowly to include engines in operational use and inadvertently decontrol engines that have been mothballed or temporarily removed from active service.

2. Change XIX(a)(1) as follows (changes in **RED**):

“(1) with **or capable of** thrust augmentation (afterburner);”

The phrase **“or capable of”** is subject to wide interpretation. With sufficient engineering re-design, any gas turbine engine could potentially be adapted for thrust augmentation. Deleting the phrase will target the control on engines that actually possess the capability.

3. Change XIX(a)(2) as follows (changes in **RED**):

“(2) thrust or exhaust nozzle vectoring **(excluding thrust reversers);**”

The parenthetical addition will help clarify that the scope of control does not include engines simply because of thrust reverse capability, which is common in civil aircraft engines.

4. Change XIX(a)(4) as follows (changes in **RED**).

“(4) **“Specially Designed” for sustained** inverted flight;”

Clearly, the intention here is to control engines that provide tactical maneuverability. But, the term **“or capable of”** is too generic and would have the unintended effect of controlling engines

that operate temporarily in an inverted state (e.g., commercial aircraft recovering from emergency flight conditions.).

5. Change XIX(a)(5) as follows (changes in **RED**).

“(5) ~~capable of Rated for~~ high power extraction (greater than 50 percent of **maximum rated engine thrust**) at altitudes greater than 40,000 **feet while engaged in propulsion**; or”

The addition will target controls on power extraction from the primary propulsion system vs. an auxiliary power unit and will help establish the parameters for measuring thrust.

6. Delete XIX(a)(6) in its entirety.

Inflight thrust reverse capability is not a unique military function. GE has developed and produced commercial, civil certified engines with inflight thrust reverse capability to comply with civil aviation authority mandated emergency descent requirements. While newer aircraft utilize on-wing speed brakes or other suitable control surface that permit rapid descent, older commercial aircraft (such as the DC-8), employ thrust reversers that can be deployed in-flight.

While in-flight thrust reversal is predominantly used for USML purposes, it presents no technical advantage to an aircraft over modern speed-brakes, and inclusion of this as a determining factor will capture unintended, older technology engines.

7. Change XIX(b) as follows (changes in **RED**):

“(b) Turboshaft and Turboprop engines **“specially designed” for the items listed in USML Category VI, VII or VIII, ~~whether in development, production, or inventory~~** (including technology demonstrators), capable of 1,500 shp (119 kW) or greater that have any of the following:”

Because turboshaft engines are essentially powerplant systems and are used for land, sea or air vehicles in the same manner and to the same extent whether in a military or civil use, the addition of “specially designed” further narrows the scope of the ITAR to those engines designed uniquely for defense articles separately listed on the USML.

The deletion of the phrase **“whether in development, production, or inventory”** is based on the same rationale as item 1 above.

8. Delete XIX(b)(1) in its entirety.

Cooled low pressure turbines do not provide any inherent military capability. Cooled Low Pressure Turbines become required at higher engine pressure ratios, where temperatures after the HPT are higher. Higher engine pressure ratios result in higher fuel efficiency and lower Carbon Dioxide emissions. Cooled Low Pressure Turbine blades are inherently lower technology than current HPT blades. While no current commercial engines use cooled LPT blades, this functionality does not provide any particular military advantage. Inclusion here also raises inconsistencies between XIX(a) and CCL category 9, which currently do not have similar expansive controls.

The net effect of the rule change is that any turboprop or turboshaft engines, that is capable of 1,500 shp would be controlled by the ITAR simply because the engine has a cooled low pressure turbine. This expanded control will severely inhibit our ability to apply existing commercial LPT technology for the civil turboshaft or turboprop market and put GE at a distinct competitive disadvantage. Cooled LPT technology will be a key discriminator for commercial customers who demand greater SFC and lower emissions.

9. Change XIX(c) as follows (changes in **RED**):

“(c) Engines, ~~whether in development, production, or inventory~~ (including technology demonstrators), “specially designed” for armed or military unmanned aerial vehicle systems cruise missiles, or target drones **listed in USML Category VIII.**”

Same rationale as item 1 above.

10. Delete XIX(d) in its entirety.

Rather than listing particular engine families, where possible we recommend further identifying specific technologies or engine performance characteristics that warrant inclusion on the USML. Proposed USML subparagraphs XIX(a) and (b) appear to capture those critical technologies or engine performance characteristics in a positive format and should negate the need for an engine family listing.

It is unclear why the T700 engine has been singled out for inclusion on the USML given similarity to its CT7 commercial variant. The original T700/CT7 model, designated the T700-GE-700, was developed in the 1970's and entered production in 1978. The CT7-1 was the very first T700/CT7 engine certified by the FAA for commercial use in 1977. Since then, GE has developed over 25 different models used on both rotary and fixed-wing aircraft for over 130 customers in over 50 countries.

The T700 turboshaft and CT7 turboshaft and turboprop engines form a family of engines where there are no significant differences between the military and commercial models. All T700 and CT7 engines have the identical architecture of a 5-stage axial compressor, a 1-stage centrifugal compressor, a 2-stage cooled high pressure turbine, and a 2-stage uncooled low pressure turbine. The entire family also shares identical bearing and lubrication systems and a top mounted accessory module.

There are no significant hardware differences between military T700 and CT7 engines, and none of the minor differences that do exist have anything to do with commercial versus military functionality. In fact, over the last 20 years, product advancements are typically introduced for the CT7 engine and leveraged for use on the T700. For example, the current engine for the UH-60M Black Hawk helicopter, the T700-GE-701D, owes most of its power and durability improvements over its predecessor T700-GE-701C to hardware developed for the commercial CT7-8 engine. Moreover, the most recent T700 model developed for the Special Operations MH-60M helicopter, was derived from and is almost identical to, the commercial CT7-8A engine that powers Sikorsky's S-92 commercial helicopter.

With the re-write to USML VIII, a number of logistics and other transport aircraft platforms that utilize the T700 engine will migrate to the CCL. Retaining the T700 engine on the USML while

controlling the aircraft on the CCL will significantly complicate the end user's supply chain logistics and maintenance activity. Likewise, aircraft suppliers will need to develop processes to comply with two sets of regulations and potentially double the license workload. The net result will be increased costs for the end user and U.S. supplier for little to no gain.

Finally, even if the engines are not caught by XIX(a) or (b) they will remain subject to "600-series" controls of the CCL and will require an EAR authorization to all destinations except Canada.

11. Change XIX(e) as follows (changes in RED)

~~“(e) Digital engine controls (i.e., e.g., Full Authority Digital Engine Controls (FADEC) and Digital Electronic Engine Controls (DEEC)) “specially designed” for gas turbine engines controlled in this category.~~

This change will help clarify that the references to FADEC and DEEC are all inclusive rather than illustrative examples.

12. Change XIX(f) as follows (changes in RED)

~~“Components, parts, accessories, attachments, **firmware and systems** or associated equipment as follows:~~

a

~~(1) components, parts, accessories, attachments, **firmware and systems** and equipment “specially designed” for the following U.S.-origin engines (and military variants thereof): **AE1107C, F101, F107, F112, F118, F119, F120, F124, F125, F135, F136, F414, F415, J402, GE38, TF40B, and TF60** to achieve the capabilities and features described in XIX(a) (other than XIX(a)(3)), (b), and (c) above;~~

b

~~Note: Components, parts, accessories, attachments, firmware and systems that are common to listed and non-listed engines shall not be considered “specially designed” for the engines in this subparagraph.~~

c

Note: Digital engine controls (e.g., Full Authority Digital Engine Controls (FADEC) and Digital Electronic Engine Controls (DEEC)) “specially designed” for the engines identified in (f)(1) of this category are controlled by (e) of this category.

~~(2) hot section components (i.e., combustion chambers and liners; high pressure turbine blades, vanes, disks and related cooled structure; cooled low pressure turbine blades, vanes, disks and related cooled structure; cooled augmenters; and cooled nozzles). However, if such military hot section components are manufactured to engineering drawings dated on or before January 1, 1970, with no subsequent changes or revisions to such drawings, they are not controlled under the USML.~~

d

~~\*(2) hot section components (i.e., combustors, turbine blades, vanes, nozzles, disks and shrouds) “specially designed” for gas turbine engines controlled this category and related cooled components (i.e., cooled low pressure turbine blades, vanes, disks; cooled augmenters; and cooled nozzles) “specially designed” for gas turbine engines controlled in this category. The cowl, diffuser, dome, chamber, shells, and liners for the combustors are also controlled by this paragraph;~~

e

~~(3) engine monitoring systems (i.e., prognostics, diagnostics, and health) “specially designed” for gas turbine engines and components controlled in this category; or~~

f

(4) any component, part, accessory, attachment, **equipment, firmware**, or system that:

\* (i) is classified;

\* (ii) contains classified software;

~~\*(iii) is manufactured using classified production data; or~~

~~\*(iv) is being developed using classified information.~~

g

“Classified” means classified pursuant to Executive Order 13526, or predecessor order, and a security classification guide developed pursuant thereto or equivalent, or to the corresponding classification rules of another government **or other collective defense organization (e.g., NATO).** h

- a. These additions throughout this subparagraph will ensure conformity with §121.8.
- b. As discussed above, the final regulation should not call out specific engine model families. Simply listing parts and components for specific engine families contradicts the objectives of export reform and runs the risk of inadvertently excluding critical technologies simply because the engine family is not included in the static list. The GE proposed language references the capabilities/technologies list enumerated under XIX(a) as a more appropriate descriptor. This approach also has the advantage of not defining the control in an overly-broad manner. Even the most sophisticated military engine contains parts that do not warrant control on the USML. A capability based approach will help focus and target ITAR controls over critical military technologies, which is the key objective of export reform. If the Department does not like the approach of a cross reference, another possibility would be to enumerate specific paragraphs that relate back to the critical capabilities, for example:

**“(1) components, parts, accessories, attachments, firmware and systems “specially designed” to provide Low Observable and/or Counter-Low Observable (LO/CLO) capabilities.”**

**Or**

**“(2) components, parts, accessories, attachments, firmware and systems “specially designed” to provide thrust or exhaust nozzle vectoring capability.”**

- c. If the engine list is retained, we recommend this clarifying note. This change will ensure that parts and components that are common to listed and non-listed engine families will be subject to the EAR.
- d. GE proposes retaining the existing definition of “hot section” currently in use. Changing the definition of “hot section” will require wholesale changes to classification processes and electronic databases already developed and used by US industry, requiring significant investment in employee retraining and modifications to various software applications. In addition, the proposed definition unnecessarily changes a well-established and generally understood definition and expands the definition of “hot section” to include uncooled, technologically insignificant components.

For example, combustor diffusers are transitional features between the compressor exit and combustion process. They are not thermally driven components, and are uncooled. The technology in diffusers is aerodynamic in nature, and less sophisticated than other technologies such as compressors that are currently considered 'cold-section' and would not be ITAR controlled under the new definition.

Likewise, a combustion cowl's sole purpose is to efficiently direct air to the outer portions of the combustor, and is uncooled, with no exposure to combustion products. It is a simple aerodynamic feature of lower technology than other 'cold-section' technology.

Uncooled structural components, even when related to the combustion system, are of technical complexity similar to structural components and not of specific USML value.

If the State Department retains the expanded definition of "hot section", we request that uncooled components be separately identified and not designated as Significant Military Equipment.

- e. We recommend deleting subparagraph XIX(f)(3) in its entirety. If retained, we recommend the following alternative language (changes in **RED**):

**"(3) engine monitoring systems (i.e., prognostics, diagnostics, and health) for gas turbine engines and components controlled in this category "specially designed" to achieve the capabilities and features described in XIX(a) (other than XIX(a)(3)), (b), and (c) above; or"**

The proposed language references the capabilities/technologies list enumerated under XIX(a) as a more appropriate descriptor. This approach also has the advantage of not defining the control in an overly-broad manner, particularly since the phrase **"engine monitoring systems"** is not further defined. Broad references to undefined terms such as **"prognostics, diagnostics, and health"** make it difficult to ascertain the breadth and reach of the intended controls. Absent further specificity, the rule change risks imposing increased levels of control over insignificant, commercial logistics technology.

- f. The asterisk is needed to designate relevant classified items Significant Military Equipment pursuant to §120.7.
- g. We fully concur with the need for increased scrutiny over classified components or items that contain classified software. However, it is unclear why unclassified items require equivalent controls just because they are developed or manufactured with classified information. If a security classification guide allows the end product to be considered unclassified, then it should not be treated differently unless the item in question provides a unique military capability or functionality.

In fact, increased ITAR scrutiny may actually have the unintended effect of drawing unnecessary attention to the component and expose sensitive development or production capability. The bottom line is that if the component requires additional protection, the item will be appropriately classified by the governing security classification guide. Raising the unclassified item's profile could pose OPSEC risk and jeopardize sensitive design or production information.

- h. This addition expands the definition of “classified” to include designations made by collective defense organizations such as NATO.
13. We recommend inclusion of language, similar to the existing note to USML VIII(h), that establishes a bright line for standard equipment covered by a civil aircraft type certificate issued by the Federal Aviation Administration. Alternatively, the proposed note would not be required if the Department adopts our proposed recommendations for the term “specially designed” discussed below.

### **PROPOSED COMMENTS FOR SPECIALLY DESIGNED**

GE understands that the Departments of State, Commerce and Defense are still reviewing the definition of “specially designed”, both in the context of public comments received to the Department of Commerce propose definition published for public comment on July 15, 2011 and the Defense Trade Advisory Group (DTAG) presentation of November 9, 2011, and that it is their intent to have a single definition for this term that would be common to both the USML and the CCL. GE commends the Administration’s efforts to establish clearer lines between the USML and the CCL and believes that a common definition of “specially designed” will help to resolve much uncertainty related to the determination of jurisdiction over military aircraft and related articles.

After review of each definition, we believe that the different versions published by the Department of Commerce on July 15 and by the Department of State in the December 2010 ANPRM (75 FR 76935) have certain merits worthy of consideration. As instructed, we are not using this forum to make specific comments on those definitions. But we do want to emphasize our belief that a successful reorganization of the USML depends on application of certain basic principles in the final definition.

First, the definition should avoid over-inclusiveness by excluding items with simple or common functions that have the identical utility regardless of the specific application. Thus items such as nuts and bolts, fasteners and other common hardware should be excluded. But also excluded should be parts and components with low levels of technology and having identical utility regardless of the specific application. Notably this would result in the exclusion of simple assemblies or “minor components” that incorporate technologies and are commonly used in end items that are described generally or specifically in multiple CCL categories<sup>1</sup>.

Second, the definition should exclude any part or component that is interchangeable with identical parts or components used in an item listed or controlled on the CCL (including, but not limited to, 600 Series items). This would exclude any part or component used both on an article listed on the USML and an article controlled on the CCL. Thus an engine component that is used off the shelf both on an armed unmanned aerial vehicle and on a civil aircraft would not be on the USML.

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<sup>1</sup> Examples would include wiring harnesses, thermo-couples, pressure sensors and other components, which are types of items that are used broadly in a number of diverse civil engine products (e.g. planes, trains and automobiles), and which incorporate civil technologies that are not specifically controlled on the USML (or even on the CCL because of the low level of technology).

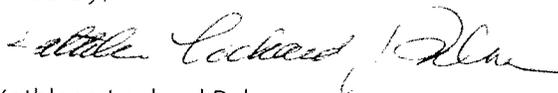
Third, when excluding common or interchangeable parts and components, modifications that result in the part functioning for the exact same purpose with no additional performance criteria should not cause the part or component to be included on the USML. A simple change in the fit or form of an item does not distinguish the item in any meaningful way from commercial items with the same function<sup>2</sup>. A piece of equipment that is “specially designed” for use in a defense article should only be considered so if it has no other practicable function or use.

Fourth, when an item is specifically enumerated in another USML or on the CML category, it should be excluded from being included in a list through the operation of the “specially designed” definition<sup>3</sup>. This will avoid any confusion caused by whether one entry or another is used to test whether the item is on the USML or CML.

Finally, since the Department of State has instructed Industry to use the definition for “specially designed” provided in the December 2010 ANPRM, it is important to note that Industry’s comments only reflect the concerns and issues raised in the context of that definition. Accordingly, GE strongly requests that when the definition is finalized<sup>4</sup>, the public be given another opportunity to comment on the definition and on this proposed revision of U.S. Munitions List Category XIX prior to any adoption in the USML.

If you have any questions or require additional information concerning this submission, please contact the undersigned at (202) 637-4206 or by e-mail at: kathleen.palma@ge.com or Mr. Scott W. Jackson at (513) 243-5755 or by email at scott\_jackson@ge.com.

Sincerely,



Kathleen Lockard Palma  
Executive Compliance Officer  
International Trade Compliance

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<sup>2</sup> This point is illustrated by a simple component such as a spacer with a length unique to a particular defense article but otherwise no different, in terms of strength, materials etc., from many other spacers used on articles not on the USML. This spacer should not be listed on the USML but without a clear exclusion would be captured by the “specially designed” definition because (i) its dimensions are properties that distinguish it for the predetermined purpose of being used in a particular defense article, (ii) it is directly related to the defense article’s function (the article can’t function without being properly held together), and (iii) because of its one unique dimension (the length), it is only used on the one particular article, which is a defense article and not on any other.

<sup>3</sup> An example is an engine for an aircraft. An engine may be captured within the definitions of components or equipment for certain aircraft, but engines are separately treated in another USML category.

<sup>4</sup> The US Government should not assume by the fact that industry has commented on the BIS proposed definition for the EAR, that those comments address any concerns about its use in the USML. The USML changes proposed by this proposed rule were unknown at the time of those comments so could not be factored into Industry’s deliberations.



January 20, 2012

Directorate of Defense Trade Controls  
Office of Defense Trade Controls Policy  
Department of State  
VIA EMAIL: DDTCResponseTeam@state.gov

**Re: Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XIX (Federal Register Docket ID. 2011-30977, RIN 1400-AC98)**

IPC — Association Connecting Electronics Industries welcomes the opportunity to comment on the proposed revision of United States Munitions List (“USML”) Category XIX as detailed by the Department of State’s Federal Register notice. As an organization with a long history of cooperation with and support of the agencies that develop and implement national security policy, IPC shares the Department of State’s concern that the proposed rule ensures appropriate USML coverage and fully protects U.S. national security.

In December 2011, IPC submitted extensive comments to the State Department in response to proposed revisions of USML Category VIII. In this submission, IPC recommended that the Directorate of Defense Trade Controls (“DDTC”) clarify in a final Category VIII rule the treatment of printed boards, ensuring that a printed board’s designs and digital instructions be subject to the USML when the end item for which the printed circuit board is designed is identified on the USML. In making its case, IPC provided a diverse selection of examples to illustrate the highly sensitive and important role of printed boards in military electronics.

The concerns and recommendations that IPC detailed in its December 2011 comments parallel those IPC has with regard to the Department of State’s Category XIX revisions. IPC believes it is important that the Category XIX rule – and similar USML/CCL rules developed in the future – ensure clear treatment of printed boards and their designs as the DDTC transitions certain parts, components, accessories, and attachments from the USML to the Commerce Control List (“CCL”). Specifically, the rules should make clear that the design instructions (known as “digital data” in the industry) for printed circuit boards will remain under International Traffic in Arms Regulation (“ITAR”) control when the end item for which the board was designed is included on the USML. This clarification would ensure appropriate USML coverage and protect national security by controlling important technical data about ITAR controlled items.

These comments provide a concise response to the State Department’s Category XIX revisions. IPC has attached its comments to Category VIII as well, and it urges DDTC to reference this lengthier explanation of IPC’s position concerning export control reform. IPC also intends to comment on any proposed rule that DDTC publishes regarding Category XI.

## **I. About IPC**

IPC is a U.S.-headquartered global trade association, representing all facets of the electronic interconnect industry, including design, printed board manufacturing and printed board assembly. IPC has more than 3,000 member companies of which 1,900 members 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 and public policy advocacy and other programs to meet the needs of an estimated \$1.7 trillion global electronics industry.

## **II. National security importance of printed circuit boards and designs**

Specialized printed board and printed board assemblies are custom-made and uniquely designed for the specific function of the electronic items in which they are incorporated. Drawing upon very precise specifications for the design and placement of parts, a printed board contains a roadmap for the operation of that item. Manufacture of the printed board, then, requires access to and use of all of the board's design information. This access exposes a significant portion of the intellectual property for both the printed board and the item for which it is uniquely designed. Companies with access to the designs of printed boards for defense articles thereby also have access to sensitive information about controlled technologies.

Printed circuit boards and their designs, in fact, hold valuable and specific information about the workings of the underlying defense articles that make up USML Category XIX. For example, printed circuit boards are central to both the command and control functions of turbine engines, as well as to the electronic sensors that measure and communicate engine temperature, pressure oscillations, and vibration. Failure to properly secure the information embedded in printed boards that are custom-designed for defense articles could result in a breach of national security, theft of critical defense-related intellectual property and allow for reverse engineering of our critical defense systems.

## **III. Current Rule**

Under the current ITAR, printed circuit boards designed for gas turbine engines covered by ITAR are generally within the scope of the USML's controls on "components" that are specifically designed or modified for defense articles. Their printed board designs are also controlled by Category XIX(g) and/or Category XI (Military Electronics), because they reveal technical data regarding both the printed boards and the ultimate defense articles into which the printed boards are installed. IPC understands the treatment of printed boards under ITAR to be unequivocal, but the Association has longstanding concerns that current law is frequently misunderstood, leading to preventable ITAR violations. IPC maintains that greater clarity about the controls on printed boards is necessary to protect national security.

## **IV. Proposed Rule**

Under the proposed rule, it is unclear whether printed boards would be transferred to the jurisdiction of the CCL. The proposed rule generally transfers to the CCL all components specifically designed for military ground vehicles, but as IPC noted in its Category VIII comments, printed boards may be considered as "technical data" related to the defense articles

into which they are incorporated, such as gas turbine engines. IPC recommends that DDTC clarify the proper treatment of printed boards, to ensure that the industry understands the U.S. government's position regarding the proper export control jurisdiction of these important products.

If printed boards themselves are retained on the USML as “technical data” in physical form, then printed board designs necessarily must be retained on the USML as well. They convey the same information, just in a different format. Even if DDTC determines that printed boards for defense articles are not subject to USML jurisdiction, however, DDTC should determine that printed board designs are subject to the USML as “technical data” as they convey technical data regarding the defense items into which printed boards are incorporated. Control of printed circuit board digital data and related designs, in short, should follow the categorization of the end item itself, whether or not the physical printed circuit board remains an ITAR controlled item.

## **V. Recommendation**

Given confusion over the treatment of printed boards under ITAR, IPC contends that DDTC clarify the status of printed board designs in its final rule regarding Category XIX. For instance, DDTC could state the following in the Final Rule when it responds to public comments:

One commenter requested that DDTC confirm that the design and digital instructions for printed circuit boards specifically designed for military aircraft and other Category XIX items are “technical data” within the meaning of Category XIX(g). DDTC confirms that these designs and digital data fall within the standard definition of “technical data,” to the extent that they contain technical data directly relating to Category XIX items. Accordingly, such printed board designs and digital instructions are subject to the USML when the end item for which the printed circuit board is designed is identified in Category XIX.

IPC seeks similar clarification for printed boards in other USML categories, although IPC recognizes that there could be a number of additional ways to address this issue. DDTC may wish to amend the definition of “technical data” in 22 C.F.R. §120.10, to clarify this point. Another approach would be to address the issue clearly in Category XI (Military Electronics), to explicitly cover all printed board designs related to defense articles.

## **VI. Conclusion**

IPC supports the State Department's goal of reforming the USML to clearly describe what items it covers. However, in order to prevent the unintentional release of detailed design information about these items, the State Department should clarify that printed circuit board designs remain under the jurisdiction of ITAR when the end item for which the board is designed is a USML item.

The issue of printed circuit board designs is not unique to the Category XIX. Every category of USML items includes the technical data directly related to those items.<sup>1</sup> These printed circuit board designs and digital data constitute technical data relating to the various end-items and USML components identified in each category because they contain information required for the design, development, manufacture, etc. of those defense articles.

Accordingly, IPC recommends that DDTC clarify the status of printed board designs in its final rule regarding Category XIX and has suggested one approach in Section V. Further, IPC recommends that DDTC consider the issue of printed circuit board designs in the context of its ongoing revision of the USML, through steps such as (1) clarifying the scope of technical data in each USML Category, noting that printed board design coverage follows the coverage of the end item itself, (2) amending the definition of “technical data” in 22 C.F.R. §120.10, to clarify this point across all categories, and (3) clarifying Category XI to refer expressly to printed board designs for defense articles.

Thank you again for the opportunity to comment on the proposed amendments to USML Category XIX. If IPC can offer additional information or assistance, please contact me at AnthonyHilvers@ipc.org or 847-597-2837.

Sincerely,



Anthony Hilvers  
Vice President, Industry Programs

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<sup>1</sup> See 22 C.F.R. § 121.1 Category I(i), II(k), III(e), IV(i), V(h), VI(g), VII(h), IX(e), X(e), XI(d), XII(f), XIII(l), XIV(m), XV(f), XVI(e), XVII(a), XVIII(f), XX(d), XXI(b).

Honeywell  
101 Constitution Avenue, N.W.  
Suite 500 West  
Washington, DC 20001  
202-662-2650

January 20, 2011

U.S. Department of State  
PM/DDTC  
SA-1 12<sup>th</sup> Floor  
Directorate of Defense Trade Controls  
Office of Defense Trade Controls Policy  
Bureau of Political Military Affairs  
Washington, DC 20500-0112

**Attn:** Charles B. Shotwell  
Director, Office of Defense Trade Controls Policy

**Subject:** Notice of Proposed Rulemaking: "Amendment to the International Traffic in Arms Regulations: Establishment of U.S. Munitions List Category XIX for Gas Turbine Engines" (Federal Register Vol. 76, No. 234 DATED Tuesday, December 6, 2011 / RIN1400-AC98

Dear Mr. Shotwell:

Honeywell appreciates the opportunity to submit comments on the proposed rule regarding an amendment to the International Traffic in Arms Regulations: Establishment of U.S. Munitions List Category XIX for Gas Turbine Engines" published in the Federal Register Vol. 76, No. 234 dated December 6, 2011. The proposed rule establishes criteria and describes more precisely gas turbine engines that warrant control under the International Traffic in Arms Regulations (ITAR).

Honeywell provides the following comments and suggested revisions to ITAR Section 121.1 as proposed:

**Section 121.1 "Category XIX – Gas Turbine Engines and Associated Equipment"**

**Category XIX**

Honeywell suggests revising the category heading to include the term "Military" to avoid any unintended consequence relating to commercial engines.

Suggested edit – "Category XIX – Military Gas Turbine Engines and Associated Equipment"

**Category XIX(a)**

Honeywell believes the phrase "or capable of" in terms of thrust augmentation is overreaching, since certain engines not configured with an afterburner could be adapted for thrust augmentation. Deleting the phrase "or capable of" and including in the heading of Category XIX(a) the phrase "rated for" establishes a threshold discriminator that is clear. This would also require the deletion of "or capable of" in Category XIX(a)(1) regarding thrust augmentation.

Additionally, Honeywell suggests revising Category XIX(a)(4) to remove reference to "or capable of" since many engines are physically capable of inverted flight, based upon certain inherent

abilities to withstand negative G situations (e.g., downdrafts and wind-shear), which can cause oil to move to the top of the compartments.

Suggested edit – Category XIX(a)

- (a) Turbofan and turbojet engines (including technology demonstrators), and **“specifically designed” for items in USML category IV, VII, and VIII and capable of—rated at 15000lbf (66.7kN) of thrust or greater that have any of the following:**
- (1) ~~with or capable of thrust augmentation (afterburner);~~
  - (4) ~~capable of designed for sustained inverted flight in excess of 30 second;~~

#### **Category XIX(d)**

It appears the intent of this Category XIX(d) is to specifically capture engines that do not trip the technical thresholds defined under parts XIX(a) or XIX(b). Therefore, Honeywell believes that this part could also capture Honeywell’s F125/TFE1042 engine, which is specifically annotated in part XIX(f). The rationale for the F125/TFE1042 engine as a system being annotated in part XIX(f) is supported by the fact the engine includes an “afterburner.”

Suggested edit – Category XIX(d)

- (d) AGT1500, CTS800, TF40B, T55, TF60, T700, TF50 and F125/TFE1042 engines.

#### **Category XIX(f)(1)**

Honeywell believes certain parts of the Category XIX(f) (1) contradict the intent of a “positive list” of engines and reasons for control. The following example is provided supporting this concern. Example:

- “Specially designed” parts and components are included for both the F124 and F125 engines under ITAR Cat. XIX(f)(1)
- The F124 and F125 BOM are 80% identical with the exception that the F125 includes an afterburner, a different main fuel control, external harness and plumbing, and other minor parts and components.
- Neither engine meets the criteria set forth under Cat. XIX(a), performance capability for the F124 is approximately 6000 lbf thrust and the F125 is approximately 9,500 lbf thrust
- The F125 as a “system” could be controlled under Cat. XIX(d) since the F125 includes an afterburner
- The F124 as a “system” should be controlled under an EAR “600-series” ECCN as a military engine that does not meet any of the criteria under Cat. XIX
- The F125 “afterburner” and certain other parts as described above are the only parts that would be subject to Cat. XIX(f)(1) defined as “specially designed”
- All other F124 and F125 common parts and components should be subject to the EAR “600 series” military parts and components

Suggested edit – Category XIX(f)(1)

(f)(1) components, parts, accessories, attachments, and equipment “specially designed” for engines identified in Category XIX(d) and for the following U.S.-origin engines (and military variants thereof): AE1107C, F101, F107, F112, F118, F119, F120, ~~F424~~, F125/TFE1042, F135, F36, F414, F415, J402, GE38, TF40B, and TF60;

#### **Category XIX(f)(2)**

Honeywell believes the proposed change to the definition of “hot section” in Category XIX(f)(2) is a more expansive control than currently defined in the ITAR today. The proposed definition

expands to parts and components in the Low Pressure Turbine (LPT) regardless of "cooling status" that are otherwise not controlled today. The expansion in scope is also problematic from an export classification perspective, as more parts would be unnecessarily deemed SME, require Congressional Notification for items manufactured abroad where it is not required today, nor has been for many years.

Suggested consideration – Category XIX(f)(2)

The definition of "hot section" items in the proposed Category XIX(f)(2) should be replaced with the existing language in ITAR Category VIII(b) as established in 2008 and not be expanded to include parts otherwise currently excluded.

If you have any questions or would like to discuss the comments provided above, feel free to contact the undersigned at 202-662-2641 or via e-mail at [dale.rill@honeywell.com](mailto:dale.rill@honeywell.com).

Sincerely,

A handwritten signature in black ink, appearing to read "Dale Rill". The signature is fluid and cursive, with the first name "Dale" and last name "Rill" clearly distinguishable.

Dale Rill  
Director, Export Control and Compliance  
Honeywell International Inc.



January 20, 2011

Submitted Via E-Mail (DDTCResponseTeam@state.gov)

Attn: DDTC Response Team  
Directorate of Defense Trade Controls  
U.S. Department of State

**Re: ITAR Amendments – Category XIX Gas Turbine Engines (RIN 1400-AC98)**

Lockheed Martin Corporation (Lockheed Martin) is pleased to submit comments on the proposed rules issued by the U.S. Department of Commerce, Bureau of Industry and Security and by the U.S. Department of State, published in the Federal Register on Tuesday, December 6, 2011 (76 Fed Reg. 234.) Taken together, the proposed rules establish a new Category XIX on the U.S. Munitions List (USML) for gas turbine engines and associated equipment and address how articles that are no longer controlled on the USML would be controlled under the Commerce Control List (CCL).

The proposed rules to create Category XIX continue 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.

Lockheed Martin's Aeronautics Company is known for building the finest military aircraft in the world, including the F-16 Fighting Falcon; C-130J; and the 5<sup>th</sup> Generation fighters, F-22 Raptor and F-35 Lightning II. Lockheed Martin uses the latest in engineering technology, including the leading edge engines that power these aircraft. Under the new rules, these engines will remain controlled on the USML. Like the proposed changes to Category VIII that controls aircraft and related components, Lockheed Martin does not expect the proposed controls on engines to have a direct impact on export licensing for our military aircraft systems. However, the proposed reforms will continue efforts to streamline the ability of suppliers for Lockheed Martin to resupply some of these programs with certain parts and components.

Lockheed Martin continues to encourage the Departments of State and Commerce to implement export control reforms that will have a more immediate and direct impact on how the United States licenses the export of defense systems and equipment to allies and partners throughout the world. As we have stated in previously submitted comments, without implementation of additional reform measures to address how licensing can be managed in a more streamlined manner, the proposed control list changes will have only a modest effect on facilitating international defense sales and programmatic collaboration with our friends and allies. Coupled with control list reform, implementation of a successful "program licensing" framework, for example, would increase the efficiency, predictability, and transparency of the U.S. export

control system, thereby facilitating the supply of the engines that remain controlled on the USML to priority joint international programs and resulting in the systematic and comprehensive reform envisioned by the President.

## **I. RECOMMENDED CHANGES TO THE PROPOSED RULES**

### **A. Relationship of Category VIII and Category XIX**

In response to the Departments of State and Commerce request for comments on the creation of a new Category XIX to control gas turbine engines, Lockheed Martin recommends retaining gas turbine engines and associated equipment in the applicable USML categories which control the end-item platform (*i.e.* Category IV for missiles, Category VII for vehicles, and Category VIII for aircraft). This is the preferred approach. The creation of a new category to control this equipment is unnecessary and may result in additional supply chain and compliance costs for U.S. industry. Moreover, in some cases, delineating between the end-item platform (*e.g.*, “aircraft”) and the “engine” components may be difficult. Consolidation within a single USML Category would help to address these concerns.

### **B. Category VIII: Note on Section 17(c) of the Export Administration Act (EAA)**

If the Departments of State and Commerce determine that the creation of a new Category XIX is the best course of action, Lockheed Martin recommends including the existing Category VIII note regarding the compliance with Section 17(c) of the EAA, as amended. Removal of the note could be interpreted that Federal Aviation Administration (FAA) certification is no longer applicable as a means by which to determine licensing jurisdiction for aircraft engines. This omission could be interpreted to mean that items which currently are controlled under the Export Administration Regulations (EAR) will move back to the USML. We understand that the Administration generally does not intend such a “roll-back” effect.

### **C. Category XIX (f)(2): Hot Section Parts/Components**

The new definition of “hot section” contained in the proposed rule is a significant expansion of controls on these items that would capture standard parts and components not considered representative of “engine hot section” technology. The current definition of “hot section” technology has been in use and accepted by the U.S. Government and industry for the past two decades. The proposed change would result in the reclassification of many engine parts – such as uncooled nozzles, cowls, diffuser, liners, shells, etc. – that would place a significant new compliance burden on U.S. industry. The new definition would also result in removing these items from Section 17(c) eligibility and establish the need for the exporters to obtain DSP-83 end use certificates for these items. Expanding the definition would require additional time and expense for U.S. exporters without an identified national security benefit. Both the Departments of State and Commerce have made clear that the intention of the export control list review and reclassification effort is not to “roll back” controls by expanding the scope of items controlled on the USML. We believe that the change in the definition for “hot section” technology is such a roll-back that would have an adverse effect on our ability to export and resupply Lockheed

Martin aircraft. Accordingly, Lockheed Martin recommends the reinstatement of the existing definition, revisited in 2008, as follows:

(f) Components, parts, accessories, attachments, or associated equipment as follows:

~~\* (2) hot section components (i.e., combustion chambers and liners, high pressure turbine blades, vanes, disks and related cooled structure; shrouds-cooled low pressure turbine blades, vanes, disks and related cooled structure; cooled augmenters; and cooled nozzles). However, if such military hot section components are manufactured to engineering drawings dated on or before January 1, 1970, with no subsequent changes or revisions to such drawings, they are not controlled under the USML. "specially designed" for gas turbine engines controlled in this category and related cooled components (i.e., cooled low pressure turbine blades, vanes, disks, cooled augmenters, and cooled nozzles) "specially designed" for gas turbine engines controlled in this category. The cowl, diffuser, dome, chamber, shells, and liners for the combustors are also controlled by this paragraph;~~

## II. CONCLUSION

Thank you again for the opportunity to provide comments on the proposed rules. Lockheed Martin remains committed to supporting the ongoing comprehensive export control reform effort, and we look forward to reviewing additional proposed rules that will have a substantial, positive impact on our ability to support U.S. national security programs and international defense trade priorities.

Sincerely,



For Lockheed Martin Corporation  
Gerald Musarra  
Vice President  
Government and Regulatory Affairs

**Franklin Vargo**

*Vice President*

*International Economic Affairs*

January 20, 2011

The Honorable Ellen Tauscher  
Under Secretary of U.S. Department of State  
Arms Control and International Security  
Washington, DC 20230

Re: ITAR Amendments - Category XIX, Gas Turbine Engines (RIN 1400-AC98)

*Via email: DDTCTeam@state.gov*

Dear Ms. Tauscher:

The National Association of Manufacturers (NAM) welcomes the opportunity to comment on amendments to the International Traffic in Arms Regulations (ITAR) and the proposed establishment of Category XIX to describe gas turbine engines and associated equipment that warrant control on the United States Munitions List (USML).

The NAM is the nation's largest industrial trade association, representing small and large manufacturers in every industrial sector and in all 50 states. Our members play a critical role in protecting the security of the United States. Some are directly engaged in providing the technology and equipment that keep the U.S. military the best in the world. Others play a key support role, developing the advanced industrial technology, machinery and information systems necessary for our manufacturing, high tech and services industries.

We commend the State Department and the Administration for undertaking this significant exercise. We hope such changes will better focus limited government resources on protecting those items that are truly sensitive, end jurisdictional confusion, bolster interoperability with our allies, and provide greater clarity both for the exporters who comply with the regulations and for the government officials who administer and enforce them. The NAM has long been a staunch advocate of rational export control policies that address evolving national security concerns and modern business practices.

The new USML Category XIX would cover gas turbine engines and associated equipment currently covered in USML Categories VI (missiles), VII (vehicles) and VIII (aircraft). The NAM is concerned that this substantial change would cause confusion for manufacturers and customers as well as for government officials. In aircraft engines, for example, it can often be difficult to determine where an airframe ends and an engine begins. By removing aircraft engines from Category VIII, exporters will be required to identify which parts and components belong to the aircraft and which belong to the engine. This technical task will be, at best, difficult. At worst, the confusion could result in unintended export violations. The NAM suggests the State Department reexamine the impact of moving gas turbine engines and related equipment from Categories VI, VII and VIII to Category XIX.

Broadly, the NAM strongly recommends that the Administration establish a forum for sharing proprietary information to regulators. This type of forum would enable government officials to gain a deeper understanding of commercial engine and airframe capabilities. The new Category XIX, as proposed, carries the risk of controlling commercial aircraft engines under the ITAR. The text of the

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proposed rule does not limit the scope of the new Category XIX to military engines. Instead, it captures capabilities that are shared with commercial engines. This would have significant negative consequences for U.S. commercial aviation.

The harmonization of definitions has been a key tenet of the current Export Control Reform initiative and is particularly important as the Administration establishes the framework for transferring items from the USML to the CCL. As an example, the definition for “military gas turbine engines” should be consistent on both lists. “Military gas turbine engines” as defined in the BIS proposed rule (RIN 0694-AF21) should be adopted in the USML.

Although the NAM applauds the State Department’s attempt to create objective parameters for ITAR controls, as opposed to the “specially designed” standard currently in use, there are significant problems with the objective parameters outlined in this proposed rule.

Most aircraft engine platforms, for example, are developed using technologies that are essentially common to both military and commercial applications. Only those engines with “specially designed” features or capabilities specific to USML aircraft should be controlled by the ITAR. The NAM recommends the State Department add language to XIX(a), XIX(b) and XIX(e) to limit the applicability of ITAR to engines that are “specially designed” for “end items” enumerated in Categories VI, VII or VIII. Commercial helicopter engines, for example, tend to be very similar to military helicopter engines. Tilt-rotor aircraft technology is not inherently military, and the commercial market for such technology is developing. The NAM also recommends limiting ITAR controls to those parts and components that create or significantly contribute to the capabilities or features that are outlined in XIX.

Of note, engines are often capable of actions far outside their intended use. An engine could be significantly over-driven to produce extra thrust, or it could be “capable of” inverted flight under certain conditions. The NAM suggests that the State Department address this issue by clarifying that ITAR controls only apply to engines that are designed for military functions. For example, an engine that is designed for sustained inverted flight for a certain time period or an engine that is rated for high power extraction at certain altitudes would be appropriately controlled under the ITAR.

The 17(c) note to Category VIII(h) implemented in 2008 helped manufacturers of commercial aviation technology to more effectively compete in the competitive global marketplace. To avoid the regulatory uncertainty that preceded that 17(c) note, the NAM also suggests a final rule on Category XIX reiterate that 17(c) is still applicable by retaining the note.

The NAM also recommends revising XIX(g) to clarify that ITAR only applies to technical data and services that are directly related to the military functionality of the defense articles as enumerated. As proposed, Category XIX would capture activities and data that are not related to defense activities, such as maintenance manuals that are common to commercial engines.

Additionally, the proposed rule would substantially change the definition of “hot section” adopted in 2008. By including an illustrative list in XIX(f)(2) instead of providing a definition. The section of the proposed rule related to “hot section,” therefore, is overly expansive and would require manufacturers to reclassify thousands of items that were previously not considered Significant Military Equipment (SME). The NAM recommends utilizing the existing Category VIII(b) wording established in 2008.

In conclusion, the NAM strongly supports the State Department’s efforts to move forward with an ambitious export control reform initiative. As the interagency task force continues its work on identifying appropriate levels of control for goods and technologies, we encourage the Administration

The Honorable Ellen Tauscher  
January 20, 2012  
Page 3

to move forward simultaneously on reforming and streamlining the mechanisms used to manage licensing. Specifically, the NAM strongly recommends the Administration adopt a program licensing regime that dramatically reduces the number of licenses required to support U.S. government defense and security programs. Program licensing and other licensing management improvements would provide greater predictability for U.S. industry and thereby enhance our ability to support U.S. security cooperation priorities.

The NAM appreciates this opportunity to provide comments on the proposed rule establishing USML Category XIX for gas turbine engines. We look forward to continuing to work with the State Department and its partners on this important initiative.

Thank you,

A handwritten signature in black ink, appearing to read "Frank Vargo", with a long horizontal flourish extending to the right.

Frank Vargo

FV/la



January 20, 2012

Department of State  
Bureau of Political-Military Affairs  
Department of Defense Trade Controls  
2401 E Street, N.W.  
12<sup>th</sup> Floor, SA-1  
Washington, D.C. 20522

ATTN: Charles B. Shotwell  
Director, Office of Defense Trade Controls Policy

RE: Notice of Proposed Rulemaking, RIN 1400-AC98, Amendment to the International Traffic in Arms Regulations: Establishment of U.S. Munitions List Category XIX for Gas Turbine Engines.

Dear Mr. Shotwell:

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 XIX (gas turbines and associated equipment) of the U.S. Munitions List (USML) to describe more precisely which gas turbine engines and associated equipment warrant control on the USML will create a "positive" list which will result in a more predictable, efficient, and transparent export control system. AIA has long been a champion of sensible export control reform and we are encouraged the Administration shares this priority.

It should be noted that Category XIX is closely related to certain parts within Categories IV (missiles), VI (vehicles) and VIII (aircraft). A successful export control reform effort should address the symbiotic relationship of USML categories and enable security cooperation and building partnership capacity essential to U.S. national security interests.

The proposed rule for Category XIX carries significant risk in capturing commercial aircraft engines under the USML with significant negative consequences for U.S. commercial aviation. We would recommend a forum to discuss proprietary information so that the government can better understand commercial engine capabilities.

The harmonization of definitions has been a key tenet of Export Control Reform and is particularly important as the Administration establishes the framework for transferring items from the US Munitions list to the Commerce Control List. For example, the definition of "military gas turbine engines" requires additional clarification (please see below) and should be consistent on both lists.

**Category XIX:**

Part 121.16, Missile Technology Control Regime Annex, references engines in Categories IV and VIII. This section needs to be updated to reflect the movement of engines from VIII(b) to XIX. Additionally, there is overlap between Categories IV and the present VIII and proposed XIX/9A619. We recommend that clear guidance be provided to determine when an engine, including ramjets and scramjets, is controlled under IV, and when it is controlled under VIII/XIX.

With few exceptions, most aircraft engine platforms are developed using technologies and methodologies that are essentially common to both military and commercial applications. Only those engines with “specially designed” features or capability specific to USML aircraft should be controlled under the ITAR.

Additionally, the term “inventory” can be interpreted in multiple ways. It is not clear from the context of proposed XIX(a) if inventory is intended to mean in active use or “moth-balled” in storage. Removing the word “inventory” will not minimize the control but will help to clarify the scope of the rule. Further clarification/definition will be needed if the Administration decides to retain the word “inventory.”

The phrase “or capable of” is subject to wide interpretation. In terms of thrust, an engine can be significantly over-driven to produce extra thrust, but at the expense of reliability and durability. Yet, the engine is ‘capable of’ higher thrust, which means uncertainty in how to apply the threshold. By substituting ‘rated for,’ the engine thrust threshold is clear.

In addition, with sufficient engineering, a gas turbine engine could potentially be adapted for thrust augmentation. Deleting the phrase, “or capable of” will target the control on engines that actually possess the capability. Below are suggested revisions.

- (a) Turbofan/Turbojet engines ~~whether in development or production, or inventory~~ (including technology demonstrators), **“specifically designed” for end items in USML category VI, VII, and VIII** and **rated for** 15,000 lbf (66.7 kN) of thrust or greater that has any of the following:

- (1) with ~~capable of~~ or designed for thrust augmentation (a.k.a. afterburner);

**Category XIX(a)(4):**

Many aircraft engines are physically “capable” of inverted flight, because downdrafts and wind-shear can create extended periods of negative-G operation. Any negative-G operation causes oil to move to the top of the compartments, so there is no difference to the engine between a slight negative G situation and inverted flight. However this inherent capability alone does not differentiate between military and commercial products. The term “capable of” would unintentionally control engines that operate temporarily in inverted flight (e.g. sport aircraft) or commercial aircraft recovering from emergency flight conditions. Below is suggested revision.

- (a)(4) **designed for sustained** ~~capable of~~ inverted flight **in excess of 30 seconds**;

**Category XIX(a)(5):**

Commercial airlines regularly fly above 40,000 feet. The capability to produce greater than 50 percent of aircraft engine thrust at 40,000 feet will not differentiate between commercial vs. military engines. Additionally, it is not clear what engine thrust level should be used to set the 50 percent threshold. Since it is unclear how the thrust level is to be measured, AIA is unable to produce a specific list of commercial engines which would now be controlled on the ITAR. At cruise conditions, engine thrust is very low, but power extraction for environmental controls, meal preparation, lighting, and passenger entertainment is high. Therefore, the thrust level should be based on the engine's maximum thrust capability, which is typically at take-off. Below is suggested revision.

(a)(5) **rated for** capable of high power extraction (greater than 50 percent of **maximum rated** engine thrust) at altitudes greater than **50,000** feet;

**Category XIX(a)(6):**

Many commercial aircraft engines will be caught unintentionally under Category XIX (a)(6).

In-flight thrust reversal is a capability found in commercial engines. Although it is predominantly used for USML purposes, in-flight thrust reversal presents no technical advantage to an aircraft over modern speed-brakes, and inclusion of this as a determining factor will unintentionally capture older technology engines. Whether the engine has the ability to reverse thrust while in the air, e.g., the DC-8, or on the ground should not determine its USML vs. CCL jurisdictional status. AIA suggests Category XIX (a)(6) be deleted in its entirety.

**Category XIX(b):**

Turboshaft engines are essentially power plant systems and are used for land, sea or air vehicles in the same manner and to the same extent whether in a military or civil use. AIA recommends the addition of the phrase "specially designed for systems listed in Categories VI, VII and VIII" to limit the scope of the ITAR to those engines designed uniquely for defense articles separately listed on the USML. In addition, for the reasons described above, we recommend the deletion of the word "inventory."

**Category XIX(b)(1):**

Additionally, the proposed rule categorizes turboshaft and turboprop engines meeting the horsepower threshold and that have cooled low pressure turbines (LPT) or cooled power turbines (PT) as subject to USML control. While no current commercial engines use cooled LPT or PT blades, this functionality does not provide any particular military advantage. Inclusion here also raises inconsistencies between XIX and CCL Category 9, which currently does not have similar expansive controls. The net effect of the rule change is that all turboprop or turboshaft engines capable of 1,500 shp would be controlled by the ITAR simply because the engine has a cooled LPT or PT. This expanded control will severely inhibit AIA member companies' ability to commercialize cooled LPT or PT technology for the civil turboshaft or turboprop market and put them at a distinct competitive disadvantage. Cooled LPT or PT technology will be a key discriminator for commercial customers who demand greater specific fuel consumption and lower emissions. Turboshaft and turboprop engines with cooled LPT or PT are more appropriately controlled on the CCL.

**Category XIX(b)(3):**

Commercial use of tilt-rotor aircraft is a developing sector. This technology is not innately military and should not be relegated to USML control. U.S. government officials recognize the benefits of tilt-rotor aircraft and have used it themselves while traveling within the U.S. Private citizens should also be able to enjoy the benefits of tilt rotor aircraft as the technology commercializes. By controlling this technology on the USML AIA member companies will be at a competitive disadvantage as they work to expand this technology to the commercial market. AIA recommends eliminating XIX(b)(3).

**Category XIX(c):**

There is an overlap between XIX(c) (engines for unmanned aerial vehicle systems, cruise missiles, or target drones) and Category IV(d) (missile and space launch vehicle power plants.) Per Part 121.16, Missile Technology Control Regime Annex, Item 3, Category 2 (a) and (b), certain engines are referenced in both Categories IV(h) and VIII(b). Both USML categories reference power plants/engines for 'missiles.' We urge the Administration to provide a clearer distinction between the two Categories.

**Category XIX(d) and (f)(1):**

Categories XIX(d) and (f) of the proposed rule also cite aircraft engines by name. Specifying engine numbers creates a static list and will eventually "catch" obsolete engines on the USML. Rather than listing particular engine families, we recommend where possible further identifying specific technologies or engine performance characteristics that warrant inclusion on the USML. If a critical technology is not already included in the draft XIX(a) or (b), those sections should be revised to capture any critical technologies or engine performance characteristics where possible to craft an appropriately targeted definition. Even if the engines are not caught by XIX(a) or (b), they will remain subject to "600-series" controls of the CCL and will require an EAR authorization to most destinations. Further, the controls on parts and components defined in Category XIX (f) (1) should be limited to those items "specially designed" for the critical technologies or engine performance characteristics.

**Category XIX(f)(2):**

The proposed change to the definition of "hot section" in Category XIX(f)(2) would represent a substantial increase in control over the present VIII(b). The existing VIII(b) control is well established and generally understood, and covers the combustor, high pressure turbine (HPT) components regardless of cooling, and cooled low pressure turbine (LPT), nozzle, augmentor and nozzle components. The proposed definition would cover all components in the LPT and exhaust, regardless of cooling status. Because XIX(f)(2) is categorized as Significant Military Equipment (SME), this would reclassify a large number of formerly Category VIII(h) non-SME components as SME.

The change is inadvisable as it would have a severe, adverse impact on both U.S. industry and the supply of engine parts to the U.S. and partner militaries. Changing the "hot section" definition will require wholesale changes to classification processes and electronic databases already developed and used by U.S. industry, requiring significant investment in employee retraining and modifications to various software applications. The change also would impose significant new and unwarranted licensing burdens on exporters. Agreements for the manufacture abroad of these parts and components also would require Congressional Notification, and the lesser technology associated with uncooled turbine components would

be subject to the same heightened requirements as for the more sensitive 'hot section'(e.g., nontransfer and use certificates, 'build-to-print' restrictions, fewer available exemptions, etc.). The definition of 'hot section' components in Category XIX(f)(2) should utilize the same Category VIII(b) wording established in 2008, and not be expanded.

**Category XIX(f)(3):**

Regarding engine monitoring systems, these systems are found on most commercial engines and are not military technology. We suggest deleting section XIX (f)(3).

Additionally, AIA believes all items qualifying under 17(c) as of 2008 should not be captured in the final rule. We recommend inclusion of language, similar to the existing note to USML VIII(h), that establishes a bright line for standard equipment covered by a civil aircraft type certificate issued by the Federal Aviation Administration.

We fully concur with the need for increased scrutiny over classified components or items that contain classified software. However, it is unclear why unclassified items under the proposed rule require equivalent controls just because they are developed or manufactured with classified information. If a security classification guide allows the end product to be considered unclassified, then it should not be treated differently unless the item in question provides a unique military capability or functionality.

In fact, increased ITAR scrutiny may actually have the unintended effect of drawing unnecessary attention to the component and expose sensitive development or production capability. The bottom line is that if the component requires additional protection, the item will be appropriately classified by the governing security classification guide. Raising the unclassified item's profile could pose OPSEC risk and jeopardize sensitive design or production information.

Below are suggested edits for Section 121.1, Category XIX:

~~\*(a) Turbofan and turbojet engines (including technology demonstrators),~~  
**"specifically designed" for items in USML category IV, VII, and VIII** and ~~capable of~~ **rated at** 15000lbf (66.7kN) of thrust or greater that have any of the following:

~~(1) with or capable of~~ or designed for-thrust augmentation (afterburner);

~~(4) capable of~~ designed for sustained inverted flight in **excess of 30 second**;

~~(5) capable of~~ **rated for** high power extraction (greater than 50 percent of **maximum rated** engine thrust) at altitudes greater than **50,000** feet.

~~(6) capable of directed flow thrust reversing, using bypass/fan and core flow air and also capable for being deployed in flight.~~

\*(b) Turbohaft and Turboprop engines, including those in development, production, **operation or technology demonstrators**, and **“specially designed” for end items in USML Categories VI, VII or VIII, and** ~~or inventory (including technology demonstrators)~~, **rated at** 1500 shp (1119 kW) that:

- (1) ~~cooled low pressure turbine, cooled intermediate pressure turbine; or~~
- (2) contain parts or components controlled in paragraph (f)(4) of this category; or
- (3) ~~capable of oil sump sealing when the engine is in the vertical position.~~

\*(c) Engines, **including those** in development, production, operation, or ~~inventory~~ technology demonstrators, “specially designed” for armed or military unmanned aerial vehicle systems, cruise missiles, ~~or~~ target drones, or other items listed in USML Categories IV and VIII.

~~\*(d) AGT1500, CTS800, TF40B, T55, TF60, T700, and TF50 engines.~~

\*(e) Full Authority Digital Engine Controls (FADEC) and Digital Electronic Engine Controls (DEEC) “specially designed” for gas turbine engines controlled in this category.

(f) Components, parts, accessories, attachments, or associated equipment as follows:

- (1) components, parts, accessories, attachments, and equipment “specially designed” **for the technology or engine performance characteristics listed in XIX (a) or (b) above** AE1107C, F101, F107, F112, F118, F119, F120, F124, F125, F135, F136, F414, F415, J402, GE38, TF40B, and TF60;

**Note: Components, parts, accessories, attachments, and equipment that are common to listed and non-listed engines shall not be considered “specially designed” for the engines in this subparagraph.**

**Note:** Digital engine controls (e.g., Full Authority Digital Engine Controls (FADEC) and Digital Electronic Engine Controls (DEEC)) “specially designed” for the engines identified in (f)(1) of this category are controlled by (e) of this category.

- \*(2) hot section components (i.e., combustors **chambers and liners, high pressure** turbine blades, vanes, ~~nozzles, disks and related cooled structure; shrouds~~) **cooled low pressure turbine blades, vanes disks and related cooled structure; cooled augmenters; and cooled nozzles**). **However, if such military hot section components are manufactured to engineering drawings dated on or before January 1, 1970, with no subsequent changes or revisions to such drawings, they are not controlled under the USML.** “specially designed” for gas turbine engines controlled this category and related cooled components (i.e., cooled low pressure turbine blades, vanes,

~~disks; cooled augmenters; and cooled nozzles) "specially designed" for gas turbine engines controlled in this category. The cowl, diffuser, dome, chamber, shells, and liners for the combustors are also controlled by this paragraph;~~  
~~(3) engine monitoring systems (i.e., prognostics, diagnostics, and health) "specially designed" for gas turbine engines and components controlled in this category; or~~  
(4) any component, part, accessory, attachment, equipment, or system that:

(i) is classified;

(ii) contains classified software;

~~(iii) is manufactured using classified production data; or~~

~~(iv) is being developed using classified information.~~

~~"Classified" means classified pursuant to Executive Order 13526, or predecessor order, and a security classification guide developed pursuant thereto or equivalent, or to the corresponding classification rules of another government.~~

(g) Technical data and defense services directly related to the uniquely military function defense articles enumerated in paragraphs (a) through (f) of this category.

Finally, there are current exemptions on the USML that are critical to efficient defense trade. There is an exemption under Section 123.16(b)(9) for the export of unclassified parts and components to a U.S. company's foreign subsidiary if the item will be used for manufacture, assembly, testing production, or modification. Unfortunately, there is no parallel license exception in the EAR for intra-company transfers. If a USML item does not need a license to be sent to Country X, then that same item should not need a license to travel to Country X under the CCL. AIA encourages the Department of Commerce to enact similar licensing exemptions on the CCL for former ITAR items that currently enjoy such exemptions on the USML.

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



**Rolls-Royce**

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January 20, 2012

Director Charles B. Shotwell  
Office of Defense Trade Controls Policy  
Department of State  
12<sup>th</sup> Floor, SA-1  
2401 E. Street NW  
Washington DC 20037

Submittal via Regulations.gov Portal

**Reference:** RIN 1400-AC98 [Public Notice 7703]  
Proposed Rule

**Subject:** Amendment to International Traffic in Arms Regulations: Establishment of U.S. Munitions List Category XIX for Gas Turbine Engines

Dear Mr. Shotwell,

Rolls-Royce North America Holdings Inc. (Rolls-Royce) is pleased to respond to the December 6, 2011 Federal Register Notice requesting comments on the proposed establishment of *USML Category XIX for Gas Turbine Engines*.

Rolls-Royce appreciates the opportunity to review and comment on the proposed amendment to the International Traffic in Arms Regulations (ITAR) with regards to Category XIX. Rolls-Royce agrees that a separate positive listing of gas turbine engines and associated equipment will help define the proper parameters for export.

Rolls-Royce has reviewed the proposed changes, and has the following comments.

Category XIX is closely related to Categories IV (Missiles), VI (Naval Vessels), VII (Vehicles) and VIII (Aircraft). There must be a relational aspect in the ITAR to assist in building partnerships and enhancing security cooperation. There is no clear delineation regarding where the platform ends and the gas turbine engine begins. For example: Category VIII defines aircraft and Category XIX defines gas turbine engines. There is no clear line in the regulations with regard to interface and integration. Exporters will be left to decide which Category in the ITAR properly reflects the components and associated technical data.

The current proposed language does not segregate military and civil gas turbine engines. Most gas turbine engines are developed with technologies and methodologies that are common to both military and civil applications. The lack of segregation may increase the burden on U.S. exporters by capturing gas turbine engines that are currently controlled under the Export Administration Regulations (EAR). The ITAR is to capture goods and associated technical data “specifically designed” for military applications. Rolls-Royce proposes to add the term “military” into the Category heading to read as follows:

Category XIX – **Military** Gas Turbine Engines and Associated Equipment.

The 17C explanation helped to clarify commercial aviation technology. The goal was to enable U.S. business to remain competitive in the global market regarding these technologies. Rolls-Royce believes 17C should be included as a note to Category XIX.

The following details are for specific items listed in Category XIX:

Category XIX (a):

Remove the term “whether in production, development or inventory”, replace the term “capable of” with “rated for” and include relational Categories. The term “inventory” is not defined and therefore creates too much opportunity for interpretation. Removing the term does not minimize the intended control. The term “capable of” is similar in that it is too broad and could increase the burden on U.S. industry. Rolls-Royce suggests replacing the term with “rated for” to be clear. The suggested language for (a) is as follows:

- (a) Turbofan and Turbojet engines ~~whether in development or production, or inventory~~ (including technology demonstrators), and **“specifically designed” for end items in USML Categories VI, VII, and VIII and rated for 15,000 lbf (66.7 kN) of thrust or greater that has any of the following:**

(a)(1): Remove the term “capable of” to clarify items specifically captured.

(1) with ~~or capable of~~ thrust augmentation

(a)(4): Replace the term “capable of” with “designed for sustained” and include a time reference. Many aircraft engines have the capability of inverted flight albeit temporarily. The current proposal leaves the controls too vague and would unintentionally capture EAR controlled goods.

(4) **designed for sustained** ~~capable of~~ inverted flight **in excess of 30 seconds**

(a)(5): Replace the term “capable of” with “rated for” for consistency.

(5) **rated for** ~~capable of~~ high power extraction (greater than 50 percent of engine thrust) at altitudes greater than 40,000 feet; or

(a)(6): Delete in its entirety. The capability for in-flight thrust reversal can be found in commercial gas turbine engines although predominantly used in USML engines. There is no significant technical advantage. The proposed language may capture additional engines currently not on the USML.

Category XIX (b):

Remove the term “whether in production, development or inventory”, replace the term “capable of” with “rated for” and include relational Categories (see part (a)).

- (b) Turboshaft and turboprop engines, ~~whether in development or production, or inventory~~ (including technology demonstrators), and **“specifically designed” for end items in USML Categories VI, VI, VII, and VIII** and **rated for** ~~capable of~~ 1500 shp (1119 kW) or greater that has any of the following:

(b)(1): Remove “Cooled low pressure turbine” and “cooled power turbine”. The proposed language includes “cooled low pressure turbine” and “cooled power turbine”. The two terms are basically the same assembly in a gas turbine engine. Cooled low pressure turbines and cooled power turbines do not give a significant military advantage even though there are no current civil applications. Including cooled low pressure turbine and cooled power turbine as a determining factor on turboshaft and turboprop engines for USML inclusion would put U.S. industry at a considerable disadvantage. The inclusion is also inconsistent with the EAR definition.

(b)(3): Delete in its entirety. The engine in vertical position is reference to tilt-rotor platforms. Civil tilt-rotor is a developing sector in the global aerospace industry. Including tilt-rotor in the USML will put U.S. industry at a competitive advantage. The tilt-rotor is not innately military and therefore should not be included.

Category XIX (c):

Remove “whether in development, production or inventory” to be consistent with (a) and (b).

- (c) Engines ~~whether in development or production, or inventory~~ (including technology demonstrators) “specially designed” for armed or military unmanned aerial vehicle systems, cruise missiles or target drones.

Category XIX (d):

Delete in its entirety. The proposed language includes specific engines. The list is a static list that will become obsolete and require additional administration. Rolls-Royce recommends removing this list and including the specific critical or sensitive technologies in parts (a) and (b).

Category XIX (e):

Delete the term “Digital engine controls” and add a clarifying definition. Item (e) should be made to mirror the recently updated language from the Wassenaar Control List, which has been incorporated into the EAR as well. Engine controls have civil and military applications. The techniques and methodologies are the same for both civil and military. Rolls-Royce recommends re-evaluating the language in (e) to ensure the critical technology is defined and controlled. The note being added is to harmonize the definition with regards to the EAR.

- (e) ~~Digital engine controls (e.g., Full Authority Digital Engine Controls (FADEC) and Digital Electronic Engine Controls (DEEC))~~ “specially designed” for gas turbine engines controlled in this category.

**Note: FADEC or DEEC means a digital electronic control system for a gas turbine engine that is able to autonomously control the engine throughout its whole**

**operating range from demanded engine start until demanded engine shut-down, in both normal and fault conditions.**

Category XIX (f):

(1): Remove the specific listing of engines and replace with language to control the sensitive goods within USML platforms. The engine list is static as described in (d) and will become obsolete. The specific listing also does not clarify if the entire engine assembly is controlled based on inclusion of said components, parts, accessories and equipment.

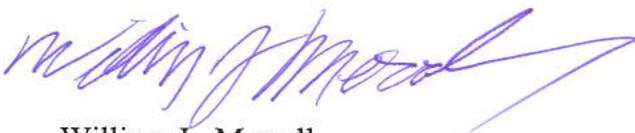
(1) Components, parts, accessories, attachments, and equipment for gas turbine engines “specially designed” **to achieve the capabilities and features for end items in USML Categories VI, VI, VII, and VIII or described in XIX(a) (other than XIX(a)(3) (b) and (c); for the following U.S. origin engines (and military variants thereof): AE1107C, F101, F107, F112, F118, F119, F120, F124, F125, F135, F136, F414, f415, J402, GE38, TF40B and TF60**

(2): Remove or rewrite in its entirety. The updated language on hot section has expanded upon the current definition. The update includes parts and components that have not been included in the hot section definition. This would create a major burden to industry to change a well known and understood portion of the regulations. In addition to specific comments on hot section technology, we question whether hot section should remain on the USML. As previously mentioned most gas turbine engines are developed with technologies and methodologies that are common to both military and civil applications. The technology is well established, and most components are dual-use. Any components that should be controlled for military use should be clearly identified by objective, positive standards. That being said if the hot section is to continue to stay on the USML, Rolls-Royce prefers to continue to utilize the current standard.

(3) Delete in its entirety. The technology in engine monitoring systems is not unique to military platforms and is utilized on most civil engines.

(4) While Rolls-Royce agrees with the intent of **(iii-iv)**, the implementation of these controls would be difficult. It is not uncommon for classified items to be developed and manufactured using both classified and unclassified data. Rolls-Royce suggests deleting **iii and iv**.

Sincerely,



William J. Merrell  
Vice President, Global Trade Compliance  
Rolls-Royce North America Inc.