

**From:** Becker, Stephan E. [<mailto:stephan.becker@pillsburylaw.com>]  
**Sent:** Monday, May 27, 2013 9:39 AM  
**To:** DDTC Response Team  
**Subject:** ATTN: Regulatory Change, USML Category XV and Defense Services -- Error in Fed Reg Notice

Please note that Section 120.38 – which is cross-referenced in the proposed rule in the May 24 Federal Register notice – was entirely omitted from the notice. That is the regulation that will define the different levels of maintenance.

120.38 was included in the proposed rule on defense services published in 2011, but was never published as a final rule and therefore doesn't exist.

I recommend that you publish an amendment to the proposed rule immediately or otherwise indicate where the public can find 120.38.

Best regards,

**Stephan Becker | Pillsbury Winthrop Shaw Pittman LLP**

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**From:** Marty Dresser [<mailto:marty.dresser@nts.com>]  
**Sent:** Friday, May 31, 2013 6:44 PM  
**To:** DDTC Response Team  
**Subject:** ITAR Amendment USML Category XV and Defense Services

This is a comment to the Federal Register Notice Dated May 24, 2013:

Definition of Defense Services: The exclusion from the definition of defense services for services which use public domain information would be clearer if stated as a separate sentence such as: "Defense Services do not include assistance provided to foreign persons which utilize or employ: public domain information, or publically used techniques or processes, or information which is widely available in the open literature, or from schools, colleges and universities."

This is a critical item for our particular testing business, as virtually all tests performed by us use such public domain techniques.

**Martin M. Dresser**  
Chief Contracting Officer  
NTS Technical Systems  
Cell: 310-621-0091 (Preferred)  
Direct: 760-298-3247  
E-mail: [marty.dresser@nts.com](mailto:marty.dresser@nts.com)

**From:** Margot Copeland [<mailto:margotcopeland@hotmail.com>]

**Sent:** Tuesday, June 04, 2013 12:06 PM

**To:** DDTC Response Team

**Subject:** ITAR Amendment—USML Category XV and Defense Services

Please help American businesses by **moving suborbital manned vehicles to the Commerce Control List.**

**Thank You,**

**Margot Copeland  
Phoenix, AZ**

**From:** Rumbolz, Timothy [<mailto:Timothy.Rumbolz@arcadis-us.com>]

**Sent:** Tuesday, June 04, 2013 1:58 PM

**To:** DDTC Response Team

**Subject:** ITAR Amendment—USML Category XV and Defense Services

Hello,

I am writing to ask that commercial manned spaceflight vehicles be put into the Commerce Control List for export controls. Putting these vehicles into the Munitions Control List would hamper a fledgling American industry and endanger our technological lead in the industry.

Thank you.

**Tim J. Rumbolz, CPESC, QSD** | Project Environmental Engineer |  
[timothy.rumbolz@arcadis-us.com](mailto:timothy.rumbolz@arcadis-us.com)

**From:** Rob Augusta [<mailto:rob@bighousect.com>]

**Sent:** Tuesday, June 04, 2013 4:15 PM

**To:** DDTC Response Team

**Subject:** ITAR Amendment—USML Category XV and Defense Services

Hello, I'm writing to offer my support of putting suborbital manned vehicles on the Commerce Control List, and not the munitions list. The devastating effect to the commercial satellite launch business is well documented because of USML restrictions. Placing fledgling suborbital manned launch vehicles on this list will certainly mean jobs that could have been created in the US will instead be created in other countries. There is no question of this, it has been demonstrated multiple times over the past 20 years. Please review the effect of these restrictions on past technologies and place smart restrictions on the suborbital vehicles which will still maintain national security without using the USML sledge hammer.

Thanks for your consideration,

Robert Augusta  
Los Angeles, CA

**From:** Steve Burrows [mailto:yamahaeleven@gmail.com]

**Sent:** Tuesday, June 04, 2013 5:38 PM

**To:** DDTC Response Team

**Subject:** ITAR Amendment—USML Category XV and Defense Services.

Dear Response Team,

My company supports many start up organizations in their efforts to create new capabilities for space access, placing manned commercial space flight vehicles on the Department of Defense Munitions List would be a disaster for those concerns, and as a result would severely impact my operations.

I strongly oppose this regulation change and will be in touch with my representatives immediately.

With warm regards,

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Steve Burrows

Twintec, Inc.

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[www.twintecinc.com](http://www.twintecinc.com)

[www.microrax.com](http://www.microrax.com)

253-218-0890

1510 Boundary Blvd., Suite 100

Auburn, WA 98001

From: Neil Lawhead [mailto:nsl6x6@mst.edu]  
Sent: Tuesday, June 04, 2013 10:18 PM  
To: DDTC Response Team  
Subject: ITAR Amendment—USML Category XV and Defense Services

To whom it may concern,

Move suborbital manned vehicles to the Commerce Control List and NOT to the Department of Defense Munitions List.

Let us not prevent private American companies from leading potentially great industries that are personal space flight and suborbital space-science research.

Kind Regards,

Neil Lawhead

-----Original Message-----

From: Tom Billings [mailto:itsd1@comcast.net]

Sent: Tuesday, June 04, 2013 8:14 PM

To: DDTC Response Team

Subject: ITAR Amendment—USML Category XV and Defense Services

Dear Sirs:

I am given to understand that a rule is proposed designating sub-orbital tourist vehicles as munitions under the law, thus restricting them to tortuous and prolonged approval procedures for each unit sold as an export. I disagree deeply with the thesis that such measures are a net positive contribution to US security and that of our allies around the world. Our security rests, in so much as it rests on our technological excellence, not on the lack of any particular technology by a possible opponent, but in the rate of advance in such technology here.

That rate of advance is best supported by participation in the world-wide networks of industrial society around the world. Government funding has been shown to not be a competent substitute, as witness the 30+ years long slow-down in the advance of rocketry during the years when it was insisted that virtually every advance be funded through government. This eventually was a strong contributor to the drop in the number of aerospace engineering majors, which is now producing problems even for NASA in adequately staffing its engineering efforts with new engineers.

Our participation must include at minimum both market networks and intellectual networks. Without inputs from those networks we will not be able to maintain adequate rates of technological advance above the rates of those who would harm us. Again, our long-term security is *\*far\** more dependent on the *\*rate\** of advance than it is on any one technology or application of technology.

I have spent over 5 decades by now, with my attention on spaceflight technology. Working from that experience, I see attempts to once again cut off the private US providers of launch vehicles, whether orbital or sub-orbital, from world-wide markets, as being focused on "getting things under control". They ignore what really will sustain this technology's contribution to the security of industrial society around the world, including the US- higher rates of progress in US rocketry technology.

Please move this category to the Commerce Department list. These vehicles are not military, but contribute strongly to the growth of an industry that can, at high

rates of technological advancement, enhance US security options for decades to come.

Tom Billings

-----Original Message-----

From: Geoffrey Licciardello [mailto:geo@xcor.com]

Sent: Tuesday, June 04, 2013 8:05 PM

To: DDTC Response Team

Subject: ITAR Amendment—USML Category XV and Defense Services

To whom it may concern,

I disagree with the proposed decision to classify US suborbital vehicles as "munitions". This classification will make it excessively difficult for US companies to grow and compete in the global marketplace as the emerging "new space" industry grows and matures.

If the US wants to maintain high tech leadership and encourage innovation, we need to not treat civilian suborbital vehicles the same way we treat ballistic missiles. If held to munitions level export restrictions, we will be ceding the market to other nations and hampering the growth of a new economy that can create tens of thousands of high paying new jobs.

Restricting suborbital vehicles as munitions will do the same amount of damage to US suborbital space companies as the decision has done to commercial satellite companies over the past 14 years, where the US saw global market share drop from 60% to less than 30% due to unnecessary ITAR restrictions.

I hope that this decision is reversed and that suborbital vehicles are instead added to the Commerce Control List.

Thank you.

Sincerely,

Geoffrey Licciardello

**From:** Rob Spence [mailto:sus\_spence55@hotmail.com]

**Sent:** Tuesday, June 04, 2013 5:36 PM

**To:** DDTC Response Team

**Subject:** ITAR Amendment—USML Category XV and Defense Services

Please place sub-orbital Space flight customers under Department of Commerce control rather than Defense. Commerce is the correct category to promote the species as well as the business.

Yours truly,

Robert D. Spence  
PO Box 1307  
Hatch, NM 87937

**From:** Ryan Wagner [mailto:rbwagner@purdue.edu]

**Sent:** Tuesday, June 04, 2013 7:47 PM

**To:** DDTC Response Team

**Subject:** ITAR Amendment—USML Category XV and Defense Services

Please move suborbital manned vehicles to the Commerce Control List.

**From:** Mike Hays [<mailto:hayswm@yahoo.com>]

**Sent:** Wednesday, June 05, 2013 11:07 AM

**To:** DDTC Response Team

**Subject:** ITAR Amendment—USML Category XV and Defense Services

Putting ITAR restrictions on suborbital manned aircraft is the same as ceding the entire industry to other countries. The US has a long history of leadership in government sponsored manned space flight. Commercial space flight is in its infancy, but it is growing quickly. Placing these units on the Commerce Control List makes sense. Restricting the development and growth in the US of commercial manned space flight does not.

Please do not jeopardize our leadership position in this emerging market space.

Sincerely,  
Mike Hays

20 Concord Ln.  
St. Louis, MO 63128

**From:** Mark Hudson Beale [<mailto:mark.beale@mhbinc.com>]  
**Sent:** Thursday, June 06, 2013 12:13 AM  
**To:** DDTC Response Team  
**Subject:** ITAR Amendment—USML Category XV and Defense Services

State Department,

As the owner of an engineering software company I am encouraged by recent growth in the U.S. space industry, especially the commercial and tourism possibilities. But I am discouraged by the proposal to put space flight vehicles on the Department of Defense Munitions List.

Putting space flight vehicles on the Munitions List will not stop this technology from developing elsewhere. It will not benefit our military, only our competitors. It will slow U.S. participation and reduce jobs and opportunities for Americans.

It is our Defense Departments job to protect our economy, not harm our economy through short sighted attempts to protect itself from inevitable international technological progress.

Please keep the commercial space flight industry off the Department of Defense Munitions List.

Mark Hudson Beale

MHB Inc

Coeur d'Alene, Idaho

[mark.beale@mhbinc.com](mailto:mark.beale@mhbinc.com)

Phone & Text 208-755-5565



**Mark E. Sagrans**  
1007 Market Street  
D-7054-1  
Wilmington, DE 19898  
Telephone: (302) 774-4356  
Fax: (302) 774-1398

June 14, 2013

BY E-MAIL: [DDTCResponseTeam@state.gov](mailto:DDTCResponseTeam@state.gov)

Ms. Sarah Heidema  
Acting Director, Office of Defense Trade Controls Policy  
U.S. Department of State, PM/DDTC, SA-1, 12<sup>th</sup> Floor  
2401 E Street, NW  
Washington, D.C. 20037

Re: ITAR Amendment – USML Category XV and Defense Services (RIN 1400-AD33)

Dear Ms. Heidema:

E.I. DuPont de Nemours & Company (“DuPont”) appreciates the opportunity to provide comments on the Department of State’s proposed rule concerning the definition of “defense services” in the International Traffic in Arms Regulations (“ITAR”) under §120.9.<sup>1</sup> While the proposed definition is an improvement over the existing, it will continue to broadly capture technical assistance that is inherently under the jurisdiction of the Export Administration Regulations (“EAR”) whenever the ultimate end-item is a defense article, even if those EAR-controlled services are not unique or specific to the ultimate end-item. Such common types of services not seem to provide the United States with a critical military or intelligence advantage nor otherwise warrant control under the ITAR.

**I. The Concern with the Definition of Defense Service: Overly Broad**

The May 24, 2013 Proposed Rule includes in the definition of a defense service:

“[t]he furnishing of assistance (including training) using other than public domain information (*see* 120.11 of this subchapter) to a foreign person (*see* §120.16 of this subchapter) whether in the United States or abroad, in the design, development . . . of defense articles (*see* §120.6 of this subchapter)... [sic]<sup>2</sup>”

This definition would control the transfer of **any** proprietary data or technology to foreign nationals, including data and technology controlled under the EAR, if used in any stage in the design or modification of a defense article even if the data or technology is also regularly used in

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<sup>1</sup> 78 Fed. Reg. 31444 (May 24, 2013).

<sup>2</sup> *Id.* at 31445.

the design of an item controlled under the EAR and not unique or particular to the relevant performance characteristic or military function.

DDTC addressed a comment raising this concern in the Supplementary Information to the May 24, 2013 Proposed Rule in the context of DDTC's previous April 13, 2011 Proposed Rule that first addressed potential revisions to the definition of "defense services." DDTC noted that it "did not accept this comment because it intends to control as a defense service certain services that use other than technical data. An example would be the services covered under ITAR §120.9(a)(3)."<sup>3</sup> However, with the exception of the narrow carve-outs for organizational level maintenance training (ITAR §120.9(b)(1)) and servicing of an item subject to the EAR (ITAR §120.9(b)(3)) the proposed definition of "defense services" goes beyond merely capturing training and broadly controls assistance **in any way** related to a defense article that itself utilizes proprietary or EAR-controlled data or technology ("other than public domain information").

DuPont would characterize this inclusion-by-definition as going all the way back up the value chain or down the chain-of-production. DuPont, for example, routinely and globally assists Body Armor Manufacturers (BAMs) in the weaving of fabric and alignment and use of that fabric in the design of body armor. The vast majority of this assistance is common to both EAR and ITAR body armor because the materials and design services cannot, in and of themselves, provide protection above NIJ level 3, the EAR control cut-off. Thus, this data and service can be considered in and of themselves to be technical transfers captured under ECCN 1E001 of the EAR's Commodity Control List. However, if this same service and technology is provided to a BAM who concurrently (or even later) informs DuPont that the ultimate end-item will have the eventual or further capability that succeeds NIJ level 3 for a reason or modification that in no way is directly related to our provision of services, our efforts are controlled as defense services.

The Supplementary Information in the May 24, 2013 Proposed Rule also attempts to address this concern in referencing another comment to the April 13, 2011 Proposed Rule concerning the use of "other than public domain data" to provide assistance and indicates that "[t]his matter will be addressed more fully in the forthcoming rules regarding the revision of the definitions for technical data and public domain information."<sup>4</sup> This concern cannot, however, be addressed by through the revision of the definitions of "technical data" and "public domain" because of the inherent breadth of the proposed language in ITAR §120.9(a)(1) and because the issue is exactly one of providing services in the context of transferring proprietary data and services.

## **II. How to Address the Concern of Breadth**

DuPont respectfully offers the following alternatives:

### **A. Limit "Defense Services" to "Required and Unique" Assistance**

DDTC should tailor the proposed definition of a defense service in ITAR 120.9(a)(1) to focus on the assistance that is required and unique to the design, development, engineering, manufacture, etc. of a defense article. This would carve out of ITAR §120.9(a)(1) assistance

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<sup>3</sup> Id.

<sup>4</sup> Id. at 31446.

provided using proprietary EAR-controlled data and technology where that data or technology is not required and unique for the design, development, engineering, manufacture, etc. of a defense article that is not on the Commerce Control List. This approach would be consistent with the objectives of the USML review and the Government's efforts to control articles based on their inherent capabilities that provide a critical military or intelligence advantage. For example, ITAR §120.9(a)(1) could be revised to add the following *highlighted* language:

[t]he furnishing of assistance (including training) using other than public domain information (*see* 120.11 of this subchapter) to a foreign person (*see* §120.16 of this subchapter) whether in the United States or abroad, *that is required and unique to* the design, development, engineering, manufacture, production, assembly, testing, intermediate- or depot-level maintenance (*see* §120.38 of this subchapter), modification, demilitarization, destruction, or processing of defense articles (*see* §120.6 of this subchapter).

This revision has the advantage of maintaining ITAR jurisdiction over assistance that is required and unique to a defense article without capturing dual-use assistance.

#### B. Limit "Defense Services" to Assistance Utilizing ITAR-Controlled Technical Data

In the alternative, DDTC could adopt a suggestion from the comments to the previous Proposed Rule and revise the definition of "defense services" to require the use of ITAR-controlled technical data. DDTC could continue to carve-out specific situations such as ITAR §120.9(a)(3) where assistance does not involve ITAR-controlled technical data but continues to warrant control. ITAR 120.9(a)(1) could, therefore, be revised as follows:

*With the exception of §120.9(a)(3),* [t]he furnishing of assistance (including training) using ~~other than public domain information (see 120.11 of this subchapter)~~ *"technical data" (per 120.10 of this subchapter)* to a foreign person (*see* §120.16 of this subchapter) whether in the United States or abroad in the design, development, engineering, manufacture, production, assembly, testing, intermediate- or depot-level maintenance (*see* §120.38 of this subchapter), modification, demilitarization, destruction, or processing of defense articles (*see* §120.6 of this subchapter).

Either of these revisions would accomplish the goal of removing from the definition of "defense services" assistance that is provided using only proprietary, EAR-controlled information. Should you require further information, please contact the undersigned at (302) 774-4356.

Respectfully submitted,



Mark E. Segrans  
Corporate Counsel

**From:** Allen Taylor [<mailto:centenarian@comcast.net>] **On Behalf Of** Allen Taylor

**Sent:** Tuesday, June 11, 2013 10:57 PM

**To:** DDTC Response Team

**Subject:** ITAR Amendment-USML Category XV and Defense Services

Greetings,

Please move manned suborbital vehicles to the Commerce Control List. Such vehicles are not weapons and considering them to be such will destroy the US suborbital spacecraft industry. There is no sensitive technology in such vehicles that is not already in the hands of people all over the world. Listing such vehicles as munitions would have no beneficial effect on US security, but would seriously wound the US spacecraft industry, driving many potential providers out of business before they even get started.

Best regards,

Allen G. Taylor  
Oregon, USA

**From:** [greg.valentine@wellsfargo.com](mailto:greg.valentine@wellsfargo.com) [<mailto:greg.valentine@wellsfargo.com>]  
**Sent:** Tuesday, June 11, 2013 1:22 PM  
**To:** DDTC Response Team  
**Subject:** ITAR Amendment-USML Category XV and Defense Services

Dear Dept. of State,

I am writing to voice my support for removing suborbital manned vehicles from the DoD Munitions list to the Commerce Control List. Suborbital travel and tourism may be the next big American industry – providing jobs, growth, and high profile “win” for American ingenuity and resourcefulness. Please consider a designation / classification that will promote and nurture the industry.

Regards,

Greg

**Gregory S. Valentine, CFA**  
Wells Fargo Securities  
Vice President | Mergers & Acquisitions  
Office: (704) 715-8929  
Cell: (704) 441-2441  
efax: (704) 715-0422  
[greg.valentine@wellsfargo.com](mailto:greg.valentine@wellsfargo.com)

-----Original Message-----

From: Alex Forster [<mailto:arforster@gmail.com>]

Sent: Wednesday, June 12, 2013 6:40 AM

To: DDTC Response Team

Subject: ITAR Amendment—USML Category XV and Defense Services

Hello there,

I'm writing to request that US suborbital flight vehicles be no longer considered as munitions and be considered for the Commerce Control List (CCL). This is important as America moves forward and will foster, not hamper, America's burgeoning private space industry. Thank you for your time.

Alex R. Forster

**From:** Dave Huntsman [<mailto:dave.huntsman@yahoo.com>]

**Sent:** Tuesday, June 11, 2013 3:04 PM

**To:** DDTC Response Team

**Cc:** [DAVID.P.HUNTSMAN@NASA.GOV](mailto:DAVID.P.HUNTSMAN@NASA.GOV)

**Subject:** ITAR Amendment—USML Category XV and Defense Services

In real life I'm a 38-year NASA aerospace engineer who has spent the past several years trying to affect US government policies in a way that will help facilitate - or at least not prevent - the creation of whole new commercial space industries.

I am very concerned, and strongly oppose, the Department of State's proposal to explicitly include (NPRM Rule 78 FR 31 444) both suborbital and orbital manned spacecraft on the DOD Munitions List. Like the prior inclusion of commercial satellites on that list, this single act will have a chilling affect on an entire, new industry - the nascent commercial space transportation industry. Prior (negative) experience with commercial satellites and commercial launchers would lead one to conclude that inappropriately including manned spacecraft on the DOD Munitions List will not only hamper the creation of a US manned spacecraft industry, but it will lead to a vast reduction otherwise in the use of US launch vehicles.

To institute a rule that would essentially short-circuit the growth of two industries to ground, that rule would need a *compelling, clear, and immediate* national security concern to be satisfied. There is no such compelling, clear, and immediate national security concern regarding manned suborbital and orbital spacecraft of which I am aware.

It is in the US national interest that manned orbital and suborbital spacecraft not be on the DOD Munitions List, but instead be transferred to the Commerce Control List.

Dave Huntsman  
6360 Olde Eight Rd  
Peninsula, OH 44264  
216-433-6801

*This wonderful planet of ours isn't the endpoint of human evolution, but just the beginning.*

-----Original Message-----

From: Bennett Dawson [<mailto:mhddesigns@myfairpoint.net>]

Sent: Tuesday, June 11, 2013 2:27 PM

To: DDTC Response Team

Subject: ITAR Amendment—USML Category XV and Defense Services

Dear Sirs and Madams,

I have been following our nation's developing sub-orbital tourism industry with great interest, and I urge you to rethink your proposed regulations that will put manned spacecraft on the DoD Munitions list.

This will strangle this new industry in its cradle and cost our country tens of thousands of well paid jobs.

Rule 78 FR 31 444 does a wise thing in moving commercial satellites from the US Department of Defense (DoD) Munitions List to the Department of Commerce's commerce control list (CCL). This is a great step for the industry. Since the time commercial satellites were placed on the munitions list in 1999, the commercial satellite industry was almost wiped out.

You are about to repeat this tragic move with Manned Space Craft, specifically sub-orbital tourism vehicles.

I ask that you close your ears to the lobbyists who will benefit by killing off this developing industry and do the right thing! Please rethink this proposed rule, and place these type of crafts on the CCL.

Thank you,

Bennett Dawson  
Fairfield, Vermont

**From:** Shaffer, Debbie [<mailto:debbie.shaffer@swri.org>]  
**Sent:** Wednesday, June 12, 2013 12:29 PM  
**To:** DDTC Response Team  
**Subject:** ITAR Amendment - USML Category XV and Defense Services

Southwest Research Institute (SwRI) wishes to submit a comment on the rule proposed by the U.S. Department of State published in the Federal Register on Friday, May 24, 2013 (Vol. 78, No. 101, Page 31444).

**OBSERVATION:** The new proposed Category XV (a)(2) states: “Track ground, airborne, missile, or space objects using imaging, infrared, radar, or laser systems;”

**DISCUSSION:** Some research/scientific satellites track objects like comets, asteroids, moons or planets, which are naturally occurring phenomena in space. In reading the items remaining on the USML, it would seem unlikely that a satellite whose scientific mission required the tracking of a comet or asteroid would be ITAR controlled.

**PROPOSED SOLUTION:** SwRI recommends that section (a)(2) be edited to read as follows: “Track ground, airborne, missile, or **man-made** space objects using imaging, infrared, radar, or laser systems;” By adding the qualifier “man-made”, the confusion would be eliminated.

Debbie Shaffer  
Manager  
Export & International Affairs Office  
Legal Department  
Phone: 210-522-6689  
Fax: 210-522-4956

**From:** [thisisevo@gmail.com](mailto:thisisevo@gmail.com) [<mailto:thisisevo@gmail.com>] **On Behalf Of** Travis Unwin  
**Sent:** Friday, June 14, 2013 10:03 AM  
**To:** DDTC Response Team  
**Subject:** ITAR Amendment—USML Category XV and Defense Services

Please move suborbital manned vehicles to the Commerce Control List. They are not, and should not, be listed as "munitions". I'll take commerce over cold-war, please.

Travis Unwin  
Tempe, AZ

**From:** Dan Thompson [<mailto:dan@zurg.net>]

**Sent:** Friday, June 14, 2013 11:48 AM

**To:** DDTC Response Team

**Subject:** ITAR Amendment-USML Category XV and Defense Services

In Category XV, Spacecraft Systems and Related Articles, I have some concern over clause (4) "Provide space-based logistics, assembly or servicing of any spacecraft (*e.g.*, refueling);"

Wouldn't that have made the Space Shuttle a munition? After all, it assembled the International Space Station, and it serviced the Hubble Space Telescope. As we move into an increasingly privatized space venture, is all space-based construction to be deemed military in nature and all support vehicles considered munitions?

You might be thinking about refueling stations for space-bombers or some such thing, but please rethink this to allow private space industry to keep going without this unnecessary regulatory complication.

-Dan Thompson, private citizen

**From:** Doug Plata [<mailto:dougspace007@gmail.com>]

**Sent:** Sunday, June 16, 2013 10:56 PM

**To:** DDTC Response Team

**Subject:** ITAR Amendment—USML Category XV and Defense Services

I just want to urge that manned spacecraft NOT be included in the list of munitions for ITAR. It took a very long time for satellites to be considered to be removed from that list and the negative impact was huge and negative. Let's please not harm the emerging commercial human spaceflight industry by calling a manned craft a munitions.

Thanks,

Doug

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Doug Plata, MD, MPH  
LunarCOTS.com

June 20, 2013

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

From: waroot23@gmail.com

Subject: ITAR Amendment - USML Category XV and Defense Services RIN 1400-AD33  
EAR Amendment - Spacecraft RIN 0694-AF87

### Public Domain Information

The proposed clarification in 22 CFR 120.9 that “defense service” means furnishing of assistance using “other than public domain information” would be usefully matched by revising 15 CFR 732.2(b)(1) to read simply: “If your technology or software is publicly available and therefore outside the scope of the EAR, you may proceed with the export or reexport.” Deletion of “if you are not a U.S. person subject to General Prohibition Seven” would be consistent with all other parts of the EAR, which treat publicly available information as outside the scope of the EAR.

### EAA Section 17(c)

The April 16 final rule relies on “specially designed” to comply with the Export Administration Act Section 17(c) requirement that components certified for civil aircraft by FAA are under EAR, rather than ITAR, jurisdiction. My comments on that rule recommended that the 22 CFR 120.3 list of what is not ITAR-controlled include EAA 17(c). Otherwise, use of “specially designed” wherever 17(c) might apply, now or in the future, would conflict with the objective of minimal use of “specially designed” on the USML. Despite the “operation at altitudes greater than 100 km” definition of “space qualified,” proposed XV(a)(2, 3, 4, 7, 8, 9,), (b), (c), and most of the (e) sub-items might include FAA-certified items now or in the future.

### Second Order Components

Proposed USML Category XV(e)(3,4,5,6,8,9,10,11,16,17,18,19) would control not only various spacecraft components but also various components of those components.

Of these, XV(e)(8,9,10,11,16,17,18,19) are modified by only the words “specially designed.” This is the same formula used to identify components of lesser significance that are proposed for EAR “600 series” controls.

The definition of component as an item that is useful only when used in conjunction with an “end-item” indicates that XV(e) items are end-items with respect to second-order components but components with respect to spacecraft. This creates confusion as to how to apply the definition of “specially designed.” (a)(2) and (b) of that definition apply to a “part,” “component,” “accessory,” “attachment,” or “software”; whereas (a)(1) applies otherwise.

It is, therefore, recommended that, at a minimum, “and specially designed parts and components therefor” be deleted from XV(e)(8,9,10,11,16,17,18,19) and be covered by 9A515.x. It is recommended that “specially designed” be deleted from XV(e)(3,4,5,6) if accompanying language is sufficiently precise. If not, the second order components in XV(e)(3,4,5,6) should also be completely deleted from the USML and be similarly covered by 9A515.x.

### Space Qualified vs. Specially Designed

The Note to the proposed EAR definition of “space qualified” states that the terms ‘designed’ and ‘manufactured’ in this definition are synonymous with “specially designed.” This statement is needlessly confusing. Its purpose may have been to be sure that all “catch-all” components being removed from USML Category XV would be covered by 9A515. But 9A515.x use of “space qualified,” rather than “specially designed,” seems to make the Note unnecessary for this purpose.

Moreover, the Note would have the unintended consequence of removing from EAR “500 series” control components meeting the definition of “space qualified” but also qualifying for release under the definition of “specially designed.” For this reason, the statement on page 31434 that the Note does not constitute a modification of the Wassenaar definition of “space qualified” appears to be incorrect. Therefore, it is recommended that the Note be deleted from the EAR rule and that the US instead propose to Wassenaar that the definition of “space qualified” be amended by changing “Designed, manufactured, or” to “Designer intent if publicly known, or according to the manufacturer’s technical specifications, or”. This would be much more precise and understandable.

The proposed ITAR definition of “space qualified” does not contain such a Note. But use of “specially designed” in XV(a)(1), (a)(10), and (e)(7) would have the same unintended consequence of removing from control what is stated in these sub-items if the product qualified for release under the definition of “specially designed.” It is, therefore, recommended that:

- “Are specially designed to mitigate ...” in (a)(1) be changed to “Mitigate ...”;
- “specially designed to be” in (a)(10) be deleted; and
- “and specially designed for a spacecraft in paragraph (a) of this category” in (e)(7) be deleted, so that (e)(7) would then read: “Non-communications space-qualified directed energy (e.g., lasers or RF) systems.”

### Arms Embargoes

Only half of the countries listed in Country Group D:5 are labeled in 22 CFR 126.1 as arms embargoes (10 UN plus three unilateral - Burma, China, Sudan). Therefore, the following restrictions in the EAR proposed rule are more restrictive than apparently intended: 734.4, 736.2(b)(3), 740.2(a)(12), 740.9(a), 740.10(a)(3)(viii) and (b)(3)(i)(F), 742.4(b)(1)(ii), and 742.6(b)(1),

### China Licensing Policy

The proposed 742.6(b)(1) last sentence policy of denial for “500 series” to China is more restrictive than case-by-case review to China for “600 series” per revised first and fourth sentences. Although neither “500 series” nor “600 series” would be eligible for License Exception STA per 740.2(a)(12), treating “500 series” more restrictively than “600 series” with respect to licensing policy to China is inconsistent with the reasoning for treating “500 series” more liberally than “600 series” with respect to License Exception STA restrictions to other countries.

### Missile Technology

In XV(c) heading, add at end “(also see EAR ECCNs 7A005 and 7A105)”

In XV(c)(1), add “(MT if designed or modified for airborne applications)”

(To conform with MTCR 11.A.3.b.2)

In XV(c)(3) add “(MT if designed or modified for airborne applications)”

(To conform with MTCR 11.A.3.b.3)

In XV(c)(4) change “with” to “in”; after “for use in” insert “rockets or”; and add at end “(MT)”

(To conform with MTCR 11.A.3.a)

In Note 2 to paragraph XV(c)(4) at end of first sentence, change “this paragraph (c)(4)” to “the first part of the heading of XV(c)”

In 7A005 heading after “equipment” insert “, not controlled by USML XV(c),”

In 7A005 delete License Requirements that these items are subject to DOS DDTC export licensing authority.

In 7A005 Related Controls change “Categories XI and XV” to “Category XV(c)”

Revise 7A105 to read:

“Receiving equipment for Global Navigation Satellite Systems (GNSS,; e.g., GPS, GLONASS or Galileo), designed or modified for airborne applications and capable of providing navigation information at speeds in excess of 600 m/s (1,165 nautical miles/hour)

MT applies to entire entry MT Column 1

Related Controls: See also USML XV(c) and 7A005.”

(To conform with MTCR 11.A.3.b.1)

In XV(e)(16), change “(MT)” to “(MT, also see EAR ECCNs 7A004 and 7A104)”

In XII(d), delete “astrocompasses and star trackers and”

In 7A004 heading after ““star trackers”” insert “not controlled by USML XV(e)(16)”

In 7A004 delete Related Controls (1) re USML XV star trackers

In 7A104 heading change “other than those controlled by 7A004” to “not controlled by USML XV(e)(16) or 7A004”

In 7A104 delete Related Controls (1) re USML XV star trackers

(To conform with MTCR 9.A.2)

In XV(e)(19) change “specially designed parts and components” to “equipment designed or modified”

In XV(e)(19) add at end “(MT)”

In 9A116 add at end “USML Category XV(e)(19)”

(To conform with MTCR 2.A.1.b.)

In XV(f), change “(MT for technical data and defense services related to articles designated as such.)” to “(MT for software specially designed for “use” of XV(c)(1,3,4) or specially designed or modified for “use” of XV(e)(16) or XV(e)(19)(iii) and for technology for the “development,” “production,” or “use” of XV(c)(1,3,4), (e)(16), or (e)(19) not controlled by 9E515 for 9B515 for USML Category XV or for 9D515 for 9B515 for USML Category XV”

(To conform with MTCR 11.D.2 and 11.E.1 for 11.A.3, 9.D.1 and 9.E.1 for 9.A.2, and 2.D.4 for 2.A.1.b.iii and 2.E.1 for 2.A.1.b)

In 9A515 revise MT applies to read: “MT applies to 9A515.d when also described in 3A101.a”

In 3A001.a.1 add “not controlled by 9A515.d”

In 3A001 revise MT applies to read: “MT applies to 3A001.a.1.a when also described in 3A101.a or to 3A001.a.5.a when also described in 3A101.c”

Revise 3A101 heading to read: “Electronic equipment, devices, and components, not controlled by 9A515.d, 3A001.a.1, or 3A001.a.5.a, as follows (see List of Items Controlled):”

Revise Items to read:

- a. “Radiation hardened” “microcircuits” usable in protecting rocket systems and unmanned aerial vehicles against nuclear effects (e.g., Electromagnetic Pulse (EMP), X-rays, combined blast and thermal effects) and usable for “missiles” or UAVs having a “payload” of at least 500 kg and a “range” of at least 300 km.
- b. Accelerators capable of delivering electromagnetic radiation produced by bremsstrahlung from accelerated electrons of 2 MeV or greater, and equipment containing those accelerators, usable for rockets or UAVs having a “range” of at least 300 km; individual rocket stages usable in those rockets or UAVs controlled by USML IV(d)(1); re-entry vehicles and equipment controlled by USML XV(e)(19) or IV(h)(6); solid propellant rocket motors, hybrid rocket motors (see below re IV(d)(2,3)), or liquid propellant rocket engines usable in those rockets or UAVs having a total impulse capacity of  $8.41 \times 10^5$  Ns or greater controlled by USML IV(d)(2,3); ‘Guidance sets’ usable in “missiles” or UAVs having “payloads” of at least 500 kg and “range” of at least 300 km capable of achieving system accuracy of 3.33% or less of the “range” controlled by USML XII(d) (see below re XIII(d)); thrust vector control subsystems usable in “missiles” or UAVs having “payloads” of at least 500 kg and “range” of at least 300 km controlled by 9A106.c; or weapon or warhead safing, arming, fuzing, and firing mechanisms usable in “missiles” or UAVs having “payloads” of at least 500 kg and “range” of at least 300 km controlled by USML IV(h)(9)
- c. Analog-to-digital converters, usable in “missiles” or UAVs having a “payload” of at least 500 kg and a “range” of at least 300 km, having any of the following characteristics:
  - c.1 Designed to meet military specifications for ruggedized equipment; or
  - c.2 Designed or modified for military use and being any of the following types:
    - c.2.a Analog-to-digital converter “microcircuits”, which are “radiation-hardened” or have all of the following characteristics:

- c.2.a.1 Having a quantization corresponding to 8 bits or more when coded in the binary system;
- c.2.a.2 Rated for operation in the temperature range from below - 54°C to above +125°C; and
- c.2.a.3 Hermetically sealed; or
- c.2.b Electrical input type analog-to-digital converter printed circuit boards or modules, having all of the following characteristics:
  - c.2.b.1 Having a quantization corresponding to 8 bits or more when coded in the binary system;
  - c.2.b.2 Rated for operation in the temperature range from below -45°C to above +55°C; and
  - c.2.b.3 Incorporating “microcircuits” specified in 3A101.b.2.a.

In IV(d)(2,3) add “hybrid rocket motors”

In XII(d) add ‘Guidance sets’ usable in “missiles” or UAVs having “payloads” of at least 500 kg and “range” of at least 300 km capable of achieving system accuracy of 3.33% or less of the “range”

(To conform with MTCR 18.A.1, 15.B.5, and 14.A.1)

In 3D101 heading add “for testing equipment in which 3A101.b accelerators must be usable”

#### EAR/ITAR Non-MT Cross-References

In 3A001 either delete Related Controls (1) or identify portions of XV and 3A001 which overlap. If the latter, after each 3A001 overlapping sub-item add “not controlled by XV (overlapping sub-item of XV) and after each XV overlapping sub-item add “See also CCL ECCN 3A001 (overlapping sub-item).

(Existing 3A001 Related Controls states DDTC jurisdiction for 3A001.b.1.a.4.c space qualified TWT helix and 3A001.e.4 space qualified solar cells if efficiency 31% or greater (e.4 efficiency is 20% or greater). No similar texts appear on the existing USML or in proposed USML XV. The EAR proposed rule explicitly excludes 3A001.b.1 and e.4 (and related 3A991.o solar cells) from 9A515.x. So there would also be no overlap with 9A515 for TWT helix and solar cells. Perhaps proposed XV(e)(3) for readout integrated circuit or (e)(4,5,6) for control electronics are perceived to overlap something in 3A001. If so, it is not clear what parts of 3A001 are seen as overlapping XV(e)(3,4,5,6).)

In XV(e)(9) add “See CCL ECCN 3A002.g for other atomic frequency standards.”

In 3A002.g add “not controlled by USML XV(e)(9)” and delete first sentence of proposed 3A002 Related Controls.

(No portions of 3A002.a.3.b and 3A992.b.3 (space qualified digital instrumentation tape recorders) have ever been noted as DDTC jurisdiction.)

In 3D001 Related Controls first sentence add “except 9D515 for 9B515 for USML XV”

In 3E001 Related Controls first sentence add “except 9E515 for 9B515 for USML XV and for 9D515 for 9B515 for USML XV”

In 5A001.e add “not controlled by USML Category XI(a)(13)

In 5A001 delete Related Controls (1) re USML XI

In 6A002, delete Related Controls (1)

In 6A002.a.1.b, and a.1.c add “(controlled by USML XV(e)(3))”

In 6A002.d.1 cryocoolers add “(controlled by USML XV(e)(4))”

(Proposed XV does not control image intensifiers and proposed XV(e)(3) is limited to “space qualified” focal plane arrays whereas 6A002.a.3 is limited to non-“space qualified” focal plane arrays. The ITAR proposed rule appears to remove the existing CCL Related Controls statements that 6A002.a.2 and a.3 are DDTC jurisdiction when for military use and not part of civil equipment. There is also no indication in the two proposed rules that DDTC jurisdiction for 6A002.b.2.b.1, as now stated in 6A002 Related Controls, is intended to continue. A proposed revision of USML Category XII is not yet available for public comment.)

In 6A004, delete Related Controls (2)

(There is no indication in the two proposed rules that DDTC jurisdiction for portions of 6A004.c and .d is intended to continue.)

In 9A004 Related Controls (4) delete “and related articles” and delete “and 9B515”

(There are many articles related to spacecraft which are controlled by ECCNs other than 9A004, 9A515, or 9B515.)

In 9A515.a after “not enumerated in USML Category XV” add “or controlled by 9A004”

In 9A515.x delete 6A002.e

(Use of this sub-item was discontinued in 2008.)

**From:** Charles Rash [<mailto:cmrash@live.com>]  
**Sent:** Monday, June 24, 2013 5:49 PM  
**To:** DDTC Response Team  
**Cc:** Steve Rash  
**Subject:** ITAR Amendment—USML Category XV and Defense Services

Dear Sir,

Being a retired military and aerospace employee, I have been involved directly and indirectly with the ITAR regulations and the munitions list items for many years. Originally, I was in favor of our attitude and methods of slowing the development of weapons by foreign governments or entities. I clearly understood that we, in the United States, were far ahead of some countries and, therefore, the restrictions made perfect sense at the time. In today's environment, those restrictions have lost some of their validity because many nations have advanced as far as the U.S. in their development of space systems and in weapons.

Today, we have fledgling commercial space industry that will generate jobs and advances in our space programs in the future, thereby, relieving the government of that development effort and expense. I am a partner in a commercial space company that has been working on the development of a horizontally launched, single stage-to-orbit vehicle. We have the system ready for funding and production with a number of markets open to us here in the U.S. and in several friendly foreign nations. In my opinion, by placing this type commercial space craft and the launch systems supporting it on the munitions list subject to ITAR, you, in effect, are (putting it very bluntly) destroying our business and the businesses of a number of other commercial entities that have, to date, invested a great deal of their time, intellectual energy, and millions of their own capital and that of private investors in pursuit of this next step in the evolution of our space industry. Placing this type system on the munitions list could very well inhibit the industry that might be what saves the space program in the U.S. NASA has been investing in commercial space and recognizes the benefits. When all is said and done, if there is still a space race, you will, in effect, disqualify commercial space companies in this country from participating. Rest assured the other countries, like China, would like nothing better than for someone to eliminate their competition.

Thank you,

Charles M. Rash  
Vice President, Chief Engineering Officer  
Global Design Solutions, Inc.  
Charles.[rash@gds-rd.com](mailto:rash@gds-rd.com)  
720-480-6334

**From:** Marc R Cumbow [<mailto:mrcumbow@spacetechnologyassociates.com>]  
**Sent:** Monday, June 24, 2013 12:04 PM  
**To:** DDTC Response Team  
**Subject:** "ITAR Amendment-USML Category XV and Defense Services."

Ms. Candace M.J. Goforth,  
Director, Office of Defense Trade Controls Policy,  
U.S .Department of State  
Washington, DC 20520

Dear Director Goforth,

As a member of the New Space Industry for many years, I would like to voice opposition to the above named section of the recently issued NPRM Rule 78 FR 31 444 in regards to placing Manned Commercial Spaceflight Vehicles on the munitions list.

Our fledging industry is one of America's most exciting and innovative technology industries today. When looked at on a global scale, the advances in this industry are clearly being led by American entrepreneurs, manufacturers and investors.

This fast maturing industry is moving towards a multibillion dollar impact on American manufacturing, trade and commerce. The United States in now strides ahead of the global competition in the development of private manned commercial spaceflight vehicles and is well on its way to conquer the privatization of space.

We have not only invigorated our mature entrepreneurs and scientists, but have captured the imagination and attention of many science and engineering students who are eagerly participating in, and closely following this upstart industry.

The industry absolutely needs the global marketplace to achieve its full potential.

The potential ruinous impact to our industry under this proposed will doom our industry to repeat the past loss of leadership and dominance that was felt by the US commercial satellite industry when commercial satellites were placed on the munitions list in 1999.

While we clearly understand the need to protect the United States intellectual properties, and protect our citizens and others from those whom would want to use our technology for depraved purposes, this proposed rule will only allow and motivate our adversaries and/or allies to gain traction as competitors, but as been proven in the past, eventually allow them to dominate the future of the industry.

In effect, the United States will quickly lose its existing dominance and control it

hold today, and will cause what we believe is the opposite result than what the proposed rule is intended to have.

We strongly agree with others in our industry that the best protection and direction is to place these vehicles on the Commerce Control List. We kindly ask that that our concerns and those of others in our industry are taken into consideration when discussing and deciding the outcome of the above named NPRM in regards to Manned Commercial Spaceflight Vehicles and more specifically suborbital manned commercial spaceflight vehicles.

Thank you in advance for your time and consideration.

Sincerely,

Marc R Cumbow

Marc R. Cumbow  
Founder, CEO  
Space Technology Associates, Inc  
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Albuquerque, NM 87104  
Ph: 505-767-1000 \* (505) 247-4560

**From:** George Thompson [<mailto:gthompson@npwdc.com>]

**Sent:** Friday, June 21, 2013 7:13 PM

**To:** DDTC Response Team

**Subject:** ATTN: Regulatory Change, USML Category XV and Defense Services

I have a question regarding the scope of proposed revised subcategory XV(e), which describes certain antennas thusly:

(e) Spacecraft parts, components, accessories, attachments, equipment, or systems, as follows:

(1) Antennas as follows:

(i) Having a diameter greater than 25 meters;

(ii) Are actively scanned;

(iii) Are adaptive beam forming; or

(iv) Are for interferometric radar;

This provision does not include a reference to specifically-designed or modified parts of such antennas nor did I find such a reference elsewhere in proposed revised Category XV. Therefore, my interpretation is that such parts would be excluded from the ITAR and would instead be covered by the EAR pursuant to Note 1 to paragraph (e). (Such parts are covered by current subcategory XV(e)).

Could you let me know whether that interpretation is correct and if it is not direct me to where in proposed revised Category XV such parts would be covered?

Thanks.

**From:** Stephen C. Rash [<mailto:stephen.rash@gds-rd.com>]  
**Sent:** Thursday, June 27, 2013 12:07 AM  
**To:** DDTC Response Team  
**Cc:** [charles.rash@gds-rd.com](mailto:charles.rash@gds-rd.com)  
**Subject:** ITAR Amendment-USML Category XV and Defense Services

To whom it may concern,

I agree with the need for the International Traffic in Arms Regulations (ITAR) to stop or limit the ability of foreign governments and other groups from using United States technologies in the development of weapons. Unfortunately, due to these regulations the United States is starting to lag behind other countries in the development of space and weapons systems. It is becoming more available, more cost effective and less restrictive for foreign governments to look elsewhere than the United States for the development and procurement of space related services and equipment. We in the United States are losing our competitive advantage because we cannot work more freely with friendly foreign nations to advance space systems.

In my opinion the future of space is commercial. Adding provisions into ITAR that would classify commercial space vehicles as munitions would be very damaging to the commercial space industry in the United States. Currently the United States is having trouble competing against foreign governments and foreign commercial space organizations that are not restricted by ITAR. We here in the United States need to be doing more to promote commercial space and the advancement of technologies that will again make us the leader in space.

I strongly request that you consider the ramifications of placing commercial space vehicles and launch systems on the munitions list... and please do anything in your power to stop this from happening. The United States needs a strong commercial space presence and the ability to further commercial space through a less restrictive ITAR with regard to friendly foreign organizations.

Regards,

**Stephen C. Rash**  
**President and Chief Executive Officer**  
*Global Design Solutions*  
Phone: 303-617-8464

**Cellular:** 303-898-0037

**E-mail:** [stephen.rash@gds-rd.com](mailto:stephen.rash@gds-rd.com)

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**From:** Martin Sweeney [[mailto:Martin\\_Sweeney@raytheon.com](mailto:Martin_Sweeney@raytheon.com)]

**Sent:** Monday, July 01, 2013 9:55 AM

**To:** DDTC Response Team

**Subject:** ITAR Amendment--USML Category XV and Defense Services

With reference to the above subject,

I feel that the amendment will cause serious damage to the US development of space vehicles and the space industry.

This will cause the established and start-up company's to relocate to foreign soil which would again leave a gap in the US space exploration and domination of the space frontiers.

Space, at the moment, has no political base. It is for the discovery that would aid the complete human race as it has in the past.

"BY IMPOSING SUCH AN AMENDMENT WOULD PUT THE UNITED STATES PLAYING SECOND FIDDLE AND RELYING ON FOREIGN GOVERNMENTS TO GET OUR ASTRONAUTS INTO SPACE." Which could cause a complete break down and reorganization of our space agency.

Much Appreciated

J. Martin Sweeney (MSME - product design, MBA - finance/management)

[Martin4509@comcast.net](mailto:Martin4509@comcast.net)

**From:** Evan Bassford [<mailto:evanbassford@gmail.com>]

**Sent:** Monday, July 01, 2013 10:51 PM

**To:** DDTC Response Team

**Subject:** ITAR Amendment--USML Category XV and Defense Services

With NASA no longer being the worldwide powerhouse that it once was, private companies are stepping in to fill the void. These companies inspire and drive the future of technology and innovation. The technologies that come from space flight are beneficial to all of mankind.

Many students, including myself, are going to school for the sole purpose of working for these companies and creating the future. Inspire the next generation do not smother it. Please do not put private spacecraft on the Munitions list; it will only hurt our future.

Evan Bassford

**From:** Charles Hill [<mailto:hill@tamu.edu>]

**Sent:** Tuesday, July 02, 2013 2:26 PM

**To:** DDTC Response Team

**Subject:** ITAR Amendment: USML Category XV and Defense Services

Sirs:

I interpret from the Proposed Rule p. 31449 FR Vol. 78, specifically Part 121, Category XV, (a) (11), that the proposal is to add commercial space vehicles, such as the manned suborbital vehicles being planned by the commercial space industry, to the U.S. Munitions List. In other words, to bring these vehicles under ITAR control. This seems directly at odds with the charter of the committee revising the ITAR guidelines, i.e. to remove the blanket categorizations that resulted in a broad list of technologies, many with no obvious military value, being restricted from export, collaborations, etc. The number of cases where U.S. companies lost business or went out of business due to ITAR are legion, and the current rewrite was meant to address these deficiencies. Instead, if I interpret this proposed rule correctly, a broad class of vehicles providing experimental and tourist space access, will be unnecessarily restricted in their business development and competitive position relative to similar industries abroad, at a critical juncture of this young industry. It was hoped the ITAR definitions would be narrowed rather than broadened. Request you reconsider the munitions list assignment of this class of space vehicles.

Respectfully,

*Chip Hill*

**Charles H. Hill, Director**  
**Space Engineering Research Center**  
Texas Engineering Experiment Station  
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# NATIONAL FOREIGN TRADE COUNCIL, INC.

1625 K STREET, NW, WASHINGTON, DC 20006-1604

TEL: (202) 887-0278



FAX: (202) 452-8160

July 3, 2013

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

Mr. Kerem Bilge  
Acting Director  
Office of Defense Trade Controls Policy  
U.S. Department of State  
2401 E Street, N.W.  
Washington, D.C. 20037

Re: Control of Spacecraft Systems and Related Items the President Determines No Longer Warrant Control Under the United States Munitions List (USML) (*Federal Register* Notice of May 24, 2013; RIN 0694-AF87) and Revision of U.S. Munitions List Category XV and Definition of Defense Services (*Federal Register* Notice of May 24, 2013; RIN 1400-AD33)

Dear Messrs. Mooney and Bilge:

The National Foreign Trade Council (NFTC), a trade association of 200 global companies, has long supported the objectives of the Administration's Export Control Reform Initiative ("ECRI") and is an active participant in the Coalition for Security and Competitiveness, which has worked closely with the Administration to advance that project to its successful completion. We believe the proposed reforms will bring transparency and clarity to a field of regulation which has long been lacking both and will enhance both our national security and the competitiveness of American manufacturing and technology sectors in the process. In particular, the proposed revisions to USML Category XV, and, including the proposed elimination of USML XV (d), is consistent with ECRI goals by moving from the USML certain integrated circuits that meet certain technical parameters. This clarification of Category XV would help the government focus more closely on the items that are of the greatest security concern, and it provides regulatory clarity that would be helpful to the U.S. semiconductor industry. As a result, the NFTC supports the proposed revisions but believes the effective date should be significantly shortened.

In light of the rapidly evolving nature of semiconductor technology, the NFTC is concerned that the lengthy implementation period that has been proposed (180 days) could lead to the USML effectively "capturing" many commercial integrated circuits (ICs) that meet or exceed the technical

parameters contained in Category XV (d). These commercial ICs were originally developed for civilian applications and are not specially designed for military use. We believe the best way to avoid this potential problem is by eliminating the 180 day implementation period and moving forward with this revision immediately.

As a general matter, the NFTC has supported lengthy implementation periods because of the concern by a number of our members that it will take substantial time to adjust their compliance procedures and reorganize their licensing operations, but in this particular case we believe the costs of delaying implementation of the final rule outweigh any benefits, and we note that that is the view of the directly affected companies as well.

As you know, the purpose of the President's Export Control Reform Initiative is to clarify and simplify the licensing process so the government can focus its resources on the most immediate and most serious threats to our security, and so our high-technology companies have clearer guidance on how to traverse the regulatory path. If substantial numbers of commercial products not subject to ITAR control at the beginning of this year became subject to ITAR control as a result of the proposed 180-day implementation period for the proposed elimination of USML XV (d), then the goals of the ECRI would be undermined. In order to avoid that consequence, we urge the Administration to waive the 180-day implementation period for the elimination of USML XV (d) as well as make the effective date of that change coincident with the publication date of the final rule.

Sincerely,



William A. Reinsch

President

National Foreign Trade Council

**Linda Dempsey**

*Vice President*

*International Economic Affairs*

July 3, 2013

Candace M. J. Goforth  
Acting Director, Office of Defense Trade Controls Policy  
Department of State  
Washington, DC 20520

Re: ITAR Amendment—USML Category XV and Defense Services (RIN 1400-AD33)

*Via e-mail: DDTCTeam@state.gov*

Dear Ms. Goforth:

The National Association of Manufacturers (NAM) welcomes the opportunity to comment on amendments to the International Traffic in Arms Regulations (ITAR) to revise U.S. Munitions List Category XV (Spacecraft Systems and Related Articles) and a revised definition of “defense services.”

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.

The NAM strongly supports the stated objectives of the President’s Export Control Reform Initiative to focus federal resources on the threats that matter most, to bring transparency and coherence to these regulations and to enhance the competitiveness of manufacturing and technology sectors in the United States. Revising USML Category XV to describe more precisely the articles warranting control on the USML is another vital step toward a more predictable, efficient, and transparent export control system. The NAM applauded the provisions in the FY2013 National Defense Authorization Act (H.R. 4310) that returned to the President the authority to determine appropriate export controls for satellites. We believe this statutory change will benefit U.S. manufacturers of satellites—as well as their suppliers and the R&D pipeline—by rationalizing export controls and expanding opportunities for foreign sales. The NAM has long been a staunch advocate of balanced export control policies that address evolving national security concerns and modern business practices. We commend the work of the State Department, along with the Departments of Defense and Commerce, to analyze and revise USML Category XV.

As the State Department works to further advance these sensible export controls, we would like to highlight a few recommendations and concerns on both the proposed parameters for USML Category XV and on the proposed definition for “defense services.”

### **Category XV**

The proposed revisions to USML Category XV, and particularly the proposed elimination of USML Category XV(d), appear intended to avoid the coverage of widely available integrated circuits (ICs) that inadvertently meet certain technical parameters to satisfy the needs of the commercial

semiconductor industry. We are, however, extremely concerned that implementation of the proposed revisions may occur too late – perhaps not until March 2014, or even later – to avoid the inappropriate capture by the USML of many commercial ICs that, due to the ongoing and rapid advancements in semiconductor technologies, meet or exceed all five of the technical parameters contained in USML XV(d) even though these products were developed for civilian applications.

Accordingly, the NAM recommends the State Department forgo the proposed 180-day implementation period for the proposed elimination of USML XV(d) and implement the proposed USML revision as quickly as possible on or after publication of a final rule. While a delayed implementation of the final rule may be appropriate for elements of the final rule that result in increased administrative burden on either the exporters or the federal licensing agencies, that is not the case regarding semiconductor technologies. In this case, large numbers of commercial products not currently subject to ITAR control at the beginning of this year would be inappropriately subjected to ITAR control if there is a delay in implementation of the final rule pertaining to USML Category XV. Such a result would not only hurt manufacturers and consumers but contravene the fundamental objectives of the Export Control Reform Initiative. Accordingly, we urge the Administration to waive the 180-day implementation period for elimination of USML Category XV(d) and consider an effective date that coincides with the publication date of the final rule. We will make a similar recommendation to the Commerce Department, urging that the Bureau of Industry and Security (BIS) implement the corresponding category on the Commerce Control List – the proposed ECCN 9A515.d – as soon as possible.

### **Defense Services**

The NAM previously commented on a proposed revision to the definition of “defense services,” as published on April 13, 2011 (RIN 1400-AC80). Because this revised proposal does not include new definitions for basic, intermediate and depot level maintenance, we would like to reiterate our previous comments. As previously proposed, §120.38(a) is restricted to equipment “assigned to the inventory of the end-user unit.” This requirement would effectively require a company to verify a foreign military’s inventory before performing maintenance on a piece of equipment – a restriction that is not found elsewhere in the ITAR. The current restriction, outlined in §124.2(a) and §124.2(c), requires that the defense article for which basic maintenance is provided must be lawfully exported or authorized for export to the same recipient. The NAM recommends amending the definition to reflect the current ITAR.

Given that one goal of the Export Control Reform Initiative is a set of harmonized definitions, the NAM also urges the Department to harmonize this proposal with the definitions of maintenance levels previously published by the Defense Department in DoD Directive 4151.18. Standard definitions in this area would prevent confusion and help industry to support more effectively the U.S. and foreign governments.

We also note that the maintenance level definitions do not provide guidance for intangible maintenance at the organizational (or basic) level. Such activities might include off-the-shelf installations, basic upgrades, basic fixes, and simple modifications to allow for system integration. The NAM would encourage the Department to consider specifying that basic maintenance on software is not a defense service.

Additionally, we believe that the proposed definition continues to capture technical assistance that is under the jurisdiction of the Export Administration Regulations (EAR), when the end-item is a defense article precursor but the services are not unique or specific to the ultimate end-item. The definition provided in §120.9(a)(1) includes the “furnishing of assistance (including training) using other than public domain information” whether in the United States or abroad, in the

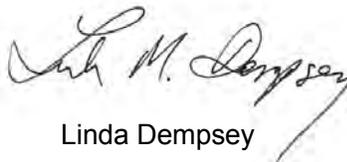
“design, development, engineering, manufacture, production, assembly, testing, intermediate- or depot-level maintenance, modification, demilitarization, destruction, or processing of defense articles.” This definition seems to control the transfer of any proprietary data or technology to foreign nationals, including data and technology controlled under the EAR, if used in at any stage of design or modification of a defense article – even in circumstances where that data or technology is also regularly used in the design of an EAR-controlled item and not unique to the performance characteristics or military function. For example, the installation instructions of an EAR-controlled radio for a military vehicle would seem to fall under this definition of “defense services.”

The NAM recommends that the State Department tailor the proposed definition to focus on the assistance that is required, unique and specific to the design, development, engineering, manufacture, production, assembly, testing, intermediate- or depot-level maintenance, modification, demilitarization, destruction, or processing of defense articles. This would alleviate the need to control assistance using proprietary EAR-controlled data and technology. The approach would also be consistent with the Export Control Reform Initiative’s objectives to control articles based on the capabilities that provide a critical U.S. military or intelligence advantage. Alternatively, we would suggest revising the definition of “defense services” to instead refer to “technical data,” as defined in §120.10 of this subchapter, rather than “other than public domain data.”

We also recommend the State Department further clarify the controls outlined in §120.9(a)(5) and (a)(6). Both paragraphs cover the furnishing of assistance (including training), but the assistance does not seem to be confined to a foreign person. We urge the Department to specify that these “defense service” circumstances are covered by ITAR when regarding a foreign person, as Paragraphs (a)(1), (a)(2) and (a)(3) do.

The NAM appreciates this opportunity to provide comments on the proposed rule for USML Category XV and on the definition for “defense services.” 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 "Linda M. Dempsey". The signature is written in a cursive style with a long, sweeping tail on the final letter.

Linda Dempsey

LMD/la

July 3, 2013

Via E-Mail ([DDTCResponseTeam@state.gov](mailto:DDTCResponseTeam@state.gov))

Directorate of Defense Trade Controls  
Office of Defense Trade Controls Policy  
U.S. Department of State  
PM/DDTC, SA-1, 12<sup>th</sup> Floor  
Washington, DC 20522-0112



ATTN: ITAR Amendment—USML Category XV and Defense Services

Re: Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service”

RINs: 1400-AC80 and 1400-AD33

The Commercial Spaceflight Federation (CSF) is the industry association of leading businesses and organizations working to make commercial spaceflight a reality. Our mission is to promote the development of commercial spaceflight, pursue ever higher levels of safety, and share best practices and expertise throughout the industry. On behalf of the CSF, I respectfully submit these comments concerning the proposed rule on changes to the United States Munitions List (USML) Category XV under the International Traffic in Arms Regulations (ITAR), as issued by the Department of State and published in the Federal Register on May 24, 2013.

CSF commends the Department of State for taking the initial step towards modernizing the USML, as the restrictions placed on the commercial space industry are actively harming it. The proposed rule improves the status quo by removing most commercial satellites from the USML and placing them on the CCL where they will more appropriately be regulated under the Export Administration Regulations (EAR). With this reform, the commercial satellite industry will once again be able to compete more successfully in the international market, grow our nation’s space industrial base, and bring high-tech jobs back to the U.S.

However, the severe impact that these restrictions had on the commercial satellite industry in the past 15 years is a useful warning of the potential impact of cementing current restrictions on the commercial spaceflight industry. In that light, CSF respectfully raises the following points for your consideration:

**1. Part 121.1 Category XV(a)(11) capturing spacecraft that are “man-rated sub-orbital, orbital, lunar, interplanetary or habitat”**

The next-generation suborbital, orbital, and planetary vehicles, in addition to manned habitats, will be platforms for exploration, R&D, science, and education, all of which are inherently civilian and commercial activities, not military ones. Playing these important roles in our nation’s science and space program would be inhibited under the highly restrictive export control rules of ITAR, when they would be more appropriately regulated under the EAR. For example, the International Space Station (ISS) is a manned space habitat that is currently under the jurisdiction of the EAR. In September 1994, it was moved off of the USML to the CCL under the recommendation of the

Space Technical Working Group made up of representatives of the Departments of State, Commerce, and Defense, and has been controlled there ever since, allowing for international cooperation, the advancement of many different research disciplines, and a robust space program.

Furthermore, the U.S. is currently the leader in the emerging manned suborbital vehicle market. Virgin Galactic has begun the testing phase of its SpaceShipTwo vehicle and conducted its first rocket-powered flight earlier this year. XCOR Aerospace has begun assembling its Lynx suborbital vehicle and is testing the propulsion system. Blue Origin successfully conducted a test of its pusher escape system for its suborbital crew capsule. The market potential for these vehicles has been independently estimated to be about \$1.6 billion in the next 10 years<sup>1</sup>, and could dramatically exceed that if they are not categorically placed on the USML. However, if they are regulated under ITAR, that could cost the U.S. several hundred million dollars in near-to-mid-term revenue, along with the direct economic growth and indirect national security benefits of a stronger industrial base. By restricting the export of these vehicles abroad through the explicit placement of these vehicles on the USML, the rate of innovation and development of the next generation of these vehicles will be slower. This will delay product improvements only possible from the real world experience of building and flying vehicles repeatedly for revenue.

In addition, ITAR restrictions will harm this industry just as it is successfully emerging into the global marketplace. Meanwhile, other countries have also recognized the scientific and economic potential of the suborbital sector. For example, EADS Astrium is currently developing a spaceplane in partnership with Singapore; a Swiss consortium, Swiss Space Systems, is developing a reusable manned suborbital vehicle; and the U.K. has begun research on an orbital spaceplane, Skylon. These other parties, using similar technologies, will be direct competitors, and could even capture a dominant share of the international market if American vehicles are restricted from export by being explicitly placed on the USML.

U.S. vehicles will begin routine commercial spaceflights in the next two years, carrying passengers and payloads for civil and commercial purposes only. Virgin Galactic and XCOR have a pipeline of space tourists and research payloads for flight, and there are over 900 people that have placed reservations for manned suborbital flight in the U.S. Keeping manned commercial spacecraft, especially manned commercial suborbital vehicles, on the USML is not in line with the stated goal (ref. page 31445 of the May 24<sup>th</sup> Federal Register Notice) of “not want(ing) to inadvertently control items on the ITAR that are in normal commercial use.”

For all of these reasons, CSF proposes that Part 121.1 Category XV (a)(11) of the USML which reads, “Are man-rated sub-orbital, orbital, lunar, interplanetary or habitat;” be stricken from the proposed rule in its entirety, allowing spacecraft not otherwise captured within the other subparagraphs of Cat XV (or any other USML category) to be controlled, as applicable, under the EAR (ref. the proposed ECCN 9A515 published in the proposed Commerce rule on May 24, 2013).

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<sup>1</sup> According to The Tauri Group’s study titled, “Suborbital Reusable Vehicles: A 10-Year Forecast of Market Demand.”

If the Administration determines that this is not possible, then CSF would propose two more modest amendments.

**A. Use of the Federal Aviation Administration licensing regime for commercial spacecraft.**

As an alternative, CSF proposes that the rule use the Federal Aviation Administration's (FAA) licensing structure to limit which spacecraft will be under the jurisdiction of the ITAR. The emerging commercial human spaceflight industry's business will be non-defense related and should be regulated as such. The FAA licenses all commercial space launches by U.S. entities, whether or not they take place on U.S. soil, by conducting a thorough policy review and approval, i.e. determining whether the launch presents any issues affecting national security or foreign policy interests or international obligations, along with its safety review, payload review, financial responsibility determination, environmental review, and monitoring of post-licensing compliance. Moreover, all such FAA licenses and permits are reviewed by the Departments of Defense and State to ensure that they are consistent with U.S. national security and foreign policy objectives. This would ensure that the 'man-rated sub-orbital or orbital' spacecraft would serve a purely commercial purpose, approved by the FAA, to not pose any risk to U.S. national security. Thus CSF would propose Category XV(a)(11) be rewritten to read:

"Are man-rated sub-orbital, orbital, lunar, interplanetary or habitat not permitted or licensed for launch by the Federal Aviation Administration under Title 14 CFR, Chapter III;"

**B. Clarification of "man-rated."**

Additionally, if our primary proposal to strike Part 121.1 Category XV (a)(11) in its entirety is not adopted, we request clarification regarding the 'man-rated' portion of sub-orbital, orbital, lunar, interplanetary vehicles or habitats. We do not know of a universally accepted definition of 'man-rated' nor a legally binding one.

The above two alternatives notwithstanding, I would like to reiterate that CSF's primary recommendation is to strike Part 121.1 Category XV (a)(11) in its entirety as that would remove a critical barrier to the expansion of this industry's commercial market abroad, with significant direct and indirect benefits to U.S. economic prosperity and even national security.

**2. Proposed definition of "Defense Service"**

CSF welcomes the proposed definition of "defense service," which has several elements that facilitate the international operations of the commercial spaceflight industry without posing any threat to U.S. national security. CSF applauds these changes, specifically:

1. Excluding "public domain information" from the scope of a "defense service" in Part 120.9(a)(1). Companies engaged in commercial and civil activities are routinely asked to provide public domain information to customers, suppliers, and regulatory authorities.

2. Substituting “tactical employment” for “use” and “operation” of a defense article in the definition of a “defense service.” Although the proposed definition does not define “tactical employment” (apart from noting that it is not “basic operation”), it is clear that the proposed regulation intends to be narrower in scope than the terms that it replaces. However, CSF would still recommend defining “tactical employment” in the rule for clarification purposes.
3. Providing examples of activities that would not constitute a “defense service” to Part 120.9 helps in clarifying more complex services.

However, there are also parts of the ‘defense service’ definition that pose some questions and would benefit from clarification. Specifically:

1. The distinction between “integration” and “installation” in the note to paragraph 120.9(a)(2) is welcome and useful. However, it is important that there be no erosion of the principle that “integration” (which is a “defense service”) requires changes or modifications to the defense article into which the item is being installed. If even small changes or modifications would qualify as “integration,” e.g., moving a hinge from the left side of a door to the right, much of the value of this distinction between “integration” and “installation” would be undercut, with no benefit to national security.
2. Part 120.9(a)(5) and (6) include in the definition of “defense service” the integration of a satellite onto a launch vehicle and assistance with launch failure analysis, regardless of export control jurisdiction, ownership, origin, or whether technical data is used. However, there are public domain “standard” nano- and small-satellite launcher interfaces and satellites that are plug-and-play, requiring only “installation,” not “integration,” e.g., the CubeSat format and the “peapod” ejector system. Is it the intent of the proposed regulation to capture all new public domain satellite bus and ejector technology? For example, if the launch is publicly broadcast on YouTube or live webcast with streaming data from the launch (as many educational payloads could possibly be), under the current definition the analysis of that publicly broadcast data from a launch failure would be a “defense service.” CSF requests clarification for the apprehensions cited above, as we believe the impact on the emerging small sat market is of concern. Additionally, the proposed rule appears to inadvertently omit reference that such services must be provided to a foreign person to be considered a defense service, which is not consistent with the previous paragraphs of the proposed rule. CSF recommends including that the “furnishing of assistance” in both 120.9(a)(5) and (6) include the phrase, “to a foreign person.”

### **3. Part 121.1 Category XV(a)(2)**

The proposed text in Part 121.1 Category XV(a)(2) states that items that “[t]rack ground, airborne, missile, or space objects using imaging, infrared, radar, or laser systems” are to remain on the USML. However, many research satellites are made to track celestial objects such as asteroids, planets, moons, and comets. Given the purpose of this reform, a satellite tracking an asteroid or similar celestial object, with a purely scientific mission should not be controlled under ITAR.

CSF recommends that Part 121.1 Category XV(a)(2) be rewritten with “man-made” inserted before “space objects” as follows:

“Track ground, airborne, missile, or man-made space objects using imaging, infrared, radar, or laser systems;”

**4. Part 121.1 Category XV(a)(4) “Provide space-based logistics, assembly or servicing of any spacecraft (e.g., refueling)”**

CSF is concerned over the ambiguity of this control parameter, as including this clause would include services such as refueling or cargo transport to manned space stations, cutting into the commercial market for Low-Earth Orbit, a critical market segment for long-term routine space accesses and sustainability. CSF proposes that this item be clarified, or better yet, removed.

The commercial space industry is an important emerging sector as companies complete the development phase of their vehicles and begin testing. It is increasingly crucial to modernize the USML so as not to stifle this burgeoning industry that will be primarily serving a commercial purpose. CSF commends the State Department for taking the initial steps to reform ITAR to meet a constantly growing and changing industry. However, while Category XV has many important reform measures, it does not yet adequately address an industry that will be able to provide new commercial business and research opportunities for our nation, and others in space. I would be happy to discuss any of our concerns outlined in this document.

Sincerely,

A handwritten signature in black ink, appearing to read 'Michael Lopez-Alegria', written over the word 'Sincerely,'.

Michael Lopez-Alegria

President

Arlington July 03, 2013

## ITAR Amendment – USML Category XV and Defense Services Comments on proposed rules

### Specific comments:

1. The term “payload”, as reported in various sections, is too wide and may constitute a grey area for assuming that the mission of a satellite should be classified under USML and does not fit the definition of civilian or commercial use; it is suggested to modify the definition of “payload” by providing specific characteristics (i.e. frequency, power, channels, etc.) and/or adding terminology to indicate that it is related to military use (e.g military payload);
2. The term classified as reported in various sections (in particular section XV(a) (12)), could be clarified as for example, commercial satellites may use commercial cryptology, which could be deemed “classified”, to protect its data link. Commercial cryptology should not be considered “classified”, therefore it is suggested to modify the wording to say that the term “classified” excludes commercial encryption methods;
3. Section XV(e) (14) “space qualified” monolithic microwave integrated circuits (MMIC) should meet both the two criteria deemed (i) and (ii) to be elected to control under cat XV and not one of the two as the current wording suggests; it proposed to change “or” by “and” at the end of paragraph (i).
4. Access to e-trade by non-US companies: today foreign companies have access to the Department of Commerce SNAP-R system information system. Will they have access to the same type of information tool with the Department of State to prepare, submit and track Re-Export licenses (per ITAR paragraph 123.9 (c) ?

### General comments:

1. Clarification of the key definition of “space qualified” to categorize US manufactured items among the different regimes:

The current definition reads: “...an article is “space qualified” if it is designed, manufactured, **or** qualified through successful testing, for operation at altitudes greater than...”.

Under this definition an item, which is not designed or manufactured for operations at altitude greater than 100 Km and used for other applications could be considered “space-qualified” as long as it is successfully tested.

Therefore it is suggested to change “or” by “and” in the above definition. The modified definition would read: “...an article is “space qualified” if it is designed, manufactured, **and** qualified through successful testing, for operation at altitudes greater than...”

# U.S.-CREST Group

## 2. Dealing with inventory

It is clear that an exporter can ask to retire an ITAR license for a product that is moved to the 515 series, and request an EAR license in its stead.

It is less clear what a foreign company should do if it has similar products in inventory that were imported with an ITAR license. The original exporter may not be interested in making the necessary changes in licensing, or may not even be in business any longer.

Consequently, it would be helpful if the final rule would lay out a procedure for importers to shift such items to EAR control. Guidance is also needed on what record keeping would be required if items are shifted from ITAR to EAR control. For example, can the importer exercise self-determination and transfer such items under a STA regime among authorized countries?

## 3. Guidance / Directives

Once the final rules on Category XV/515 are published, further issues will undoubtedly arise as the rules are implemented. Furthermore guidance will be needed in order for industry to determine the classification of their products.

Will the administration likely amend the final rules in the future, and will proposed rules and associated guidance first be issued for public comment?



Via E-Mail ([DDTCResponseTeam@state.gov](mailto:DDTCResponseTeam@state.gov))

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

3 July 2013

**SUBJECT: ITAR Amendment -- USML Category XV Regarding – FAA Licensed  
Manned Suborbital Rockets Used as Reusable Launch Vehicles**

XCOR Aerospace ([www.xcor.com](http://www.xcor.com)) is a company located in Mojave, California, and (with local, state and Congressional representatives' support), has publicly announced we will soon expand to Midland, Texas and Cape Canaveral, Florida.

XCOR is developing the small (30-foot length, 24-foot wingspan) Lynx reusable suborbital space plane for carrying a pilot and single private (human) participant and/or small scientific experiments to the edge of space. In Commodity Jurisdiction 501-11, the Lynx Mark II production vehicle was classified as a defense article controlled under Category XV(a) of the US Munitions List (USML) because its roughly 56 seconds of flight time over the “nebulous boundary between Earth’s atmosphere and space” made it a “spacecraft,” and that current US law required that all spacecraft, except the International Space Station (ISS), be controlled under Category XV.

Therefore, XCOR was pleased that Section 1261 of the National Defense Authorization Act for 2013 restored to the President the authority to determine that exports of satellites and spacecraft may be controlled under the Commerce Department’s Export Administration Regulations (EAR) instead of the State Department’s International Traffic in Arms Regulations (ITAR). In general, we commend the proposed regulations published by the Departments of State and Commerce in the Federal Register on May 24, 2013. Identifying specific characteristics that would draw a “bright line” between which spacecraft should be retained on the USML and which could be transferred to Commerce licensing jurisdiction is the same approach used in the Export Control Reform Initiative with other USML categories and provides a sound basis for protecting legitimate US national security concerns while allowing the US defense industrial base to compete with foreign firms in developing products for commercial and civil applications.

In this regard, XCOR particularly welcomes that the proposed Commerce regulation concludes that the passenger participation in space travel for purposes of space tourism, research or scientific endeavors, or transportation from one point to another for commercial purposes, would not require a license from either the Department of State or the Department of Commerce unless

technology otherwise controlled under USML Category XV or ECCN 9E515 is released to a foreign person.

However, paragraph XV(a)(11) of the proposed revision of USML Category XV published in the Federal Register indicates that all “man-rated” suborbital spacecraft would remain subject to USML Category XV. The purpose of this submission is to urge that manned suborbital spacecraft such as the Lynx that are usable only for civil purposes be controlled by the EAR rather than the ITAR. We also propose what we hope US Government agencies will consider an effective means of determining which manned spacecraft should be subject to the ITAR and which could be licensed by Commerce. We outline three possible adjustments that could be made in the final rule, any one of which would, in our view, improve the classification between EAR and ITAR so that the “crown jewels” of technology are protected without unnecessarily impacting the commercial space industrial base, and specifically the developing space tourism and suborbital research and education industry.

The production model of the Lynx (the Lynx Mark II), which may enter service in 2015 (the less-capable Lynx Mark I is a prototype that will be used for testing, training and early commercial service), will have a total flight time of less than 30 minutes (1,710 seconds) and will be capable of carrying a maximum payload (human or experiments) of 145 kg to a maximum altitude of 350,000 feet, barely grazing the Karman Line (100 km above sea level) that is often considered the boundary between the atmosphere and space. Lynx’s maximum velocity (1,040 meters/second, which it will attain only during its unpowered descent from its apogee) is only about one-eighth the speed necessary to reach orbital velocity above 100 km altitude (7,910 meters/second). Further, the amount of energy that suborbital vehicles can produce for a pound of payload is about 1/50<sup>th</sup> the amount of energy needed to reach orbit with that same payload when accounting for system level trade offs of such parameters as mass fraction of the overall vehicle.

In short, the Lynx Mark II will not only be completely incapable of any military application, it will also be useless for any spaceflight purpose except that for which it designed, i.e., carrying a human participant or small scientific experiments to an altitude that is barely space at all.<sup>1</sup> The Federal Register notice states that “the US Government does not want to inadvertently control items on the ITAR that are in normal commercial use,” and that “The public is thus asked to provide specific examples of satellites and related items, if any, that would be controlled by the revised USML Category XV that are now in normal commercial use.” We have designed and are currently building the Lynx production vehicles exclusively for commercial use and have sold flights to the general public, scientists, educators, and major companies like Unilever for global marketing contests. We are convinced that the Lynx and similar spacecraft are capable of use only for normal civil, commercial purposes and therefore should not be controlled by USML Category XV.

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<sup>1</sup> As noted in information provided in the context of CJ 501-11, if the Lynx Mark II proves a commercial success, a future variant, currently referred to as Lynx III, may be developed with a dorsal pod that would permit the launching of a small satellite (e.g., 10 kilograms) into low Earth orbit (LEO). Lynx III is seen as only operating in the United States from government launch ranges and would be significantly different in design from Lynx Mark II. A possible future Lynx III was not the subject of CJ 501-11 and is not why XCOR is proposing reconsideration of the revised Category XV. In any case, due to its LEO-satellite launch capability, Lynx III would presumably be considered a “launch vehicle” subject to USML Category IV, not XV.

We provide the following additional three points:

1) XCOR understands and appreciates that other space vehicles, manned or unmanned, may have more threatening capabilities than the Lynx, e.g., if they are classified or have one or more of the characteristics in XV(a)(1-10) or contain parts or components identified in XV(e). In other words, applying the same standards to manned suborbital spacecraft as to satellites would seem a reasonable and fair solution. This is particularly true given that, under the proposed revision of the Commerce Control List published in the Federal Register, all exports of spacecraft hardware and technology under Export Control Classification Number 9X515 would require a Commerce license for all locations except Canada (NS and RS controls), which would be reviewed by all relevant US Government agencies.

The first option we propose, therefore, is to strike section (11) of the proposed revision of USML Category XV. Like satellites and other spacecraft, manned space vehicles are specifically mentioned in Category XV(a). In general, it is difficult to understand why the proposed revision of Category XV(a) would make satellites subject to the ITAR only if they are classified (paragraph 12) or contain the specific characteristics described in XV(a)(1-10), while all “man-rated” suborbital vehicles are placed under the ITAR even if they are unclassified, were designed for purely commercial purposes, and lack those specific characteristics and do not contain the parts or components identified in XV(e). If anything, the electronics and propulsion systems of commercial satellites are significantly more advanced and sensitive than anything on the Lynx or (presumably) other suborbital space planes currently being developed for civil commercial purposes.

We note that in the history of the U.S. space program, no unclassified military manned spacecraft program has ever been completed, and those projects that have been proposed and begun (such as Blue Gemini (<http://history.nasa.gov/SP-4203/ch6-2.htm>), the Manned Orbiting Laboratory (<http://www.astronautix.com/craft/morl.htm>), and Dyna-Soar (<http://www.astronautix.com/craft/dynasoar.htm>)) were all canceled in large part because of the lack of a military requirement for such manned spacecraft. In other words, we agree that a manned vehicle might belong on the USML, but only if it has one of the specific characteristics described in XV(a) 1-10 or 12. It is possible that some assumed that a “man-rated” spacecraft must necessarily have one of those characteristics and therefore should remain on the USML. That is certainly not correct in the case of reusable manned suborbital vehicles like the Lynx.

Indeed, it only is because the proposed XV(a)(11) controls all manned spacecraft that Lynx would be subject to the ITAR. If Lynx were capable of flight without a pilot (it is not), it would not be covered by any other part of Category XV. Nor would it be covered by the final rule on USML Category VIII (aircraft), as it meets none of that category’s criteria for ITAR control, including the paragraphs on Unmanned Aerial Vehicles (VIII(a)(5) and (6)). What is there about having a human onboard an aircraft/spacecraft that requires it to be controlled as a defense article?

2) The second proposed course of action is to distinguish between “manned” and “man-rated” spacecraft. The first paragraph of the proposed Category XV(a) refers to “manned” spacecraft, while Category XV(a)(11) refers to “man-rated” spacecraft. The term “man-rated” dates to the early days of the NASA manned spaceflight program, when ICBMs in the US inventory had to be made more reliable to make them safe enough to carry manned spacecraft. By necessity, this process involved the spacecraft and launch vehicle development team gaining an intimate familiarity with a very sensitive military system, i.e., a long-range ballistic missile. After going through such a process, it would have been very difficult to discern whether spacecraft systems had been modified to work with a ballistic missile or whether specific techniques useful in ballistic missiles had been incorporated in to the spacecraft.

Therefore, it may be that the language of the proposed revision of USML Category XV is literally correct as is, only requiring clarification. Perhaps it is not the intention of the proposed rule to place all spacecraft carrying crew or other persons on the USML, but only those spacecraft that have been through a “man-rating” process by NASA in accordance with NPR (NASA Procedural Requirements) 8705.2B ([http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal\\_ID=N\\_PR\\_8705\\_002B](http://nodis3.gsfc.nasa.gov/displayDir.cfm?Internal_ID=N_PR_8705_002B)). If so, clarifying language should be added to Category XV(a)(11) specifically referencing NPR 8705.2B.

We agree that such a spacecraft may deserve a higher level of scrutiny prior to an export decision and may therefore belong on the USML. In this case, if the final rule clarifies that the restriction is limited to “spacecraft that are subject to the NASA ‘man-rating’ process during their development”, that would properly define those manned spacecraft that would remain on the USML as “defense articles.” Note: As discussed below, the FAA launch licensing and permitting process for suborbital reusable spaceplanes like Lynx does not have the same character as “man-rating” by NASA.

3) If neither of the above options is acceptable to US Government agencies, XCOR believes that national security concerns can be protected without imposing significant barriers to the nascent space tourism industry if paragraph XV(a)(11) were to include the following carve-out:

(11) Are man-rated sub-orbital, orbital, lunar, interplanetary or habitat, except for human piloted “suborbital rockets” used as “reusable launch vehicles” as defined and whose launches are licensed or permitted by the FAA under Title 14 CFR, Chapter III— Commercial Space Transportation, Federal Aviation Administration, Department of Transportation”; or....

The terms “suborbital rockets” and “reusable launch vehicles” are defined in Subchapter A – General, Part 401 — Organization and Definitions, Part 401.5 – Definitions:

SUBORBITAL ROCKET - Suborbital rocket means a vehicle, rocket-propelled in whole or in part, intended for flight on a suborbital trajectory, and the thrust of which is greater than its lift for the majority of the rocket-powered portion of its ascent.

REUSABLE LAUNCH VEHICLE - Reusable launch vehicle (RLV) means a launch vehicle that is designed to return to Earth substantially intact and therefore may be launched more than one time or that contains vehicle stages that may be recovered by a launch operator for future use in the operation of a substantially similar launch vehicle.

Perhaps this alternative revision of USML XV(a)(11) would benefit from some detail about the FAA licensing process for launches of manned suborbital rockets or launch vehicles. Under Subtitle IX of Title 49 of the U.S. Code, the Secretary of Transportation is responsible for licensing and permitting the operation of launch systems and launch operations except those that are performed by and for the US Government. That authority is delegated to the Federal Aviation Administration's Office of Commercial Space Transportation (FAA/AST). As summarized in 49 U.S.C. 70105, in order to issue a license or permit, AST is responsible for ensuring:

- Public health and safety
- Safety of property
- Consistency with the national security interests of the United States
- Consistency with the foreign policy interests of the United States

Under the regulations promulgated by FAA/AST, public health and safety are primarily protected by ensuring that the operator has a system safety process, by quantitative safety analysis of risks to the uninvolved public, and by an environmental review. Safety of property is protected by quantitative risk analysis and by ensuring that the operator carries insurance sufficient to cover the maximum probable loss as assessed by FAA/AST. FAA/AST does not provide "behind closed doors" design direction to the vehicle developers (as is the case with "man-rating" by NASA and/or DOD), and any technical standards that FAA/AST wishes developers to use are in the public domain.

More important for this discussion, to ensure that the national security interests of the United States are protected, the Department of Defense reviews all FAA launch applications to ensure, inter alia, that the vehicle is not a weapon system or carries a payload with controlled capabilities. We understand from the Office of the Deputy Assistant Secretary of Defense for C3 and Cyber, which manages DOD coordination of these FAA license applications, that such applications are routinely reviewed by eight or nine different elements of the armed services and the Office of the Secretary of Defense. Moreover, to ensure that the foreign policy interests of the United States are protected, the State Department reviews all FAA launch applications to ensure that they are consistent with US foreign policy objectives, including nonproliferation.

Therefore, before the FAA can license the launch of a manned spacecraft or grant a permit for a test, the relevant US Government agencies have already determined that the operation of such a spacecraft by private parties will not jeopardize the national security and foreign policy interests of the United States. Moreover, the FAA will only license spacecraft for private entities, not those of a foreign government. As a result, manned spacecraft or suborbital rockets that receive an FAA license or permit can be meaningfully distinguished from militarily significant manned spacecraft.

XCOR believes that the carve-out described above is so narrow that it will accommodate any national security concerns regarding the export of reusable manned suborbital space vehicles or the applicable technology (particularly given that such an export would require a Commerce license anyway). It will at the same time allow XCOR and other US companies to develop the growing market for space tourism without the inhibiting effects of having their products designated as “defense articles.” As US Government agencies are well aware, other countries are also trying to capture the international market for space tourism, and we are confident that their governments are not subjecting those countries’ companies to export controls that are properly directed toward military technologies.

If, on the other hand, the type of spacecraft used by US space tourism companies continue to be controlled on the USML, those companies, such as XCOR, would face significant obstacles and costs that our foreign competitors would not. These would probably include the cost of 24/7/365 security at sites outside the United States (XCOR, for example, is in the process of arranging a space tourism operation in Curacao). Host governments may raise concerns and restrictions on the hosting of a spacecraft designated as a “defense article.” The ITAR would also require more costly and burdensome information security protections, independent audits of ITAR compliance, ITAR compliance training, greater licensing problems and delays for parts and spares, etc.

Although it is difficult to estimate with any certainty the increased cost of ITAR compliance on XCOR and companies like it, a conservative estimate of lost revenue and increased costs on our company alone would be in excess of \$2 billion for the period 2014 through 2018. We estimate the overall cost to the US economy at \$5 billion in this period, with the loss of about 1,000 high-tech jobs. These estimates are arrived at on the following basis:

As noted above, XCOR is already in the process of negotiating “wet lease” arrangements to operate the Lynx from foreign locations (initially Curacao, but also South Korea and several other overseas destinations). We anticipate that over the five years beginning 2014, XCOR will, conservatively, sign ten to fifteen such “wet lease” international agreements, which should result in approximately \$400-500 million in payments prior to delivery of the vehicles and wet lease crew. If Lynx is subject to ITAR controls, it is very likely that many, if not all, of these international contracts will not reach fruition or even be initiated, and XCOR will be able to operate only from the customs territory of the United States.

Second, XCOR’s recurring revenues from operations and maintenance (O&M) for these Lynx vehicles (one or more at each of the overseas locations) would be reduced by an estimated \$1.15 billion over the same period (assuming a certain amount per vehicle per year (proprietary information), but phased in over time because not all would commence in 2014).

Third, XCOR anticipates that its sales revenue from these international “wet lease” operations (e.g., ticket sales) would be an estimated \$575 million over this period (again, assuming a certain amount per year per vehicle, phased in as per above).

In addition to the direct loss to XCOR (an estimated \$2.125 billion as per above), it is worth noting that we anticipate about 60% of XCOR's projected revenue will be re-spent in the US economy (e.g., paying suppliers), for roughly \$1.2 billion over the 2014-18 period. Using a conservative multiplier factor of 1.5, this amounts to an overall economic loss to the US economy of \$5 billion (\$2.125 billion + \$1.2 billion times 1.5). Finally, XCOR estimates that about 1,000 direct high-tech jobs in the United States will be lost if Lynx remains subject to the controls of the ITAR.

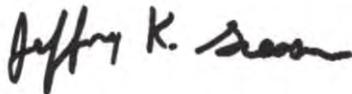
In summary, there seems to be no reason why manned suborbital spacecraft should be subject to ITAR controls if they lack all the characteristics that would place some satellites on the USML. This is particularly true because all exports of such manned spacecraft (and the associated technology) would require a Commerce license for all destinations other than Canada. If the intent of the proposed rule is to distinguish "manned" spacecraft from "man-rated," as discussed in the second option proposed above, this should be clarified in the proposed regulation. Finally, if some additional factor is necessary to separate those manned spacecraft that require ITAR control from those that can be subject to the EAR, then the FAA licensing carve-out described in the third option above should suffice.

In conclusion, we note that in the June 17, 2013 edition of Defense News, Deputy Assistant Secretary of State Beth McCormick is quoted as saying, "when we make decisions about items that must remain on the ITAR, we are making a conscious decision that those technologies still deserve the kind of protection under the jurisdiction of the Department of State that they need. As we are looking at things to move over to the Commerce Department, to their commerce control list, people need to remember that it's not decontrol either."

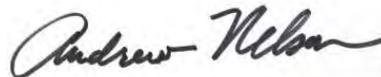
We cannot conceive a "conscious decision" that a vehicle like the Lynx, which is exclusively designed and built for commercial operations and useful only for such purposes, and involving no sensitive technology, needs "the kind of protection" afforded by the ITAR, rather than the broad license requirement under the Commerce Department.

XCOR thanks you in advance for your serious consideration of this proposal, and we look forward to continued interaction with you on this issue. Should you have any questions or wish to contact us on this matter, please feel free to contact the undersigned at your earliest convenience.

Sincerely,



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July 3, 2013

*Via electronic mail (DDTCResponseTeam@state.gov)*

Ms. Candace M. J. Goforth, Director  
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Directorate of Defense Trade Controls  
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Washington, DC 20522-0112

*Re: Comments Concerning Proposed Changes to U.S. Munitions List Category XV and the Definition of Defense Service (RIN 1400-AD33)*

Dear Ms. Goforth:

The University of Minnesota's Office of Sponsored Projects Administration (the "University") respectfully submits these comments to the Directorate of Defense Trade Controls ("DDTC") in response to the proposed rule (the "Rule")<sup>1</sup> that would amend the International Traffic in Arms Regulations ("ITAR") to (a) remove certain satellites and other space-related items from the U.S. Munitions List ("USML"), and (b) revise the definition of defense service. We applaud the U.S. Government's hard work on the Export Control Reform initiative, and appreciate the chance to provide input that we hope is useful in further rationalizing the system to focus resources on transactions of genuine concern while reducing undue constraints on the global exchange of ideas, international commerce, and cooperation with our strategic allies.

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<sup>1</sup> Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of "Defense Service," 78 Fed. Reg. 31,444 (May 24, 2013).

## **I. Revised USML Category XV**

As a general matter, the University supports the shift of many satellite and space-related items from the USML to the Commerce Control List (“CCL”). Our comments on specific items follow.

### Subcategory XV(e)(13)

We recommend that DDTC consider not identifying control moment gyroscopes (“CMGs”) as defense articles. Many CMGs are in normal use in commercial and scientific systems. Honeywell, for instance, offers the M50 CMG for “worldwide scientific and commercial markets.”<sup>2</sup> In addition, several CMGs are used in the International Space Station,<sup>3</sup> which is on the CCL under Export Control Classification Number 9A004.

If DDTC decides to retain CMGs on the USML, the University recommends that subcategory XV(e)(13) be narrowly tailored to include only CMGs providing a critical military or intelligence advantage to the U.S. We also recommend that DDTC consider revising this subcategory to exclude (a) reaction and momentum wheels, which are cheaper and less sophisticated attitude control devices in common use that may be confused with CMGs; and (b) nautical CMGs, which are used in anti-roll stabilization systems for yachts and fishing, commercial, and research vessels.

### Subcategory XV(e)(16)

Many non-military scientific satellites and spacecraft, such as NASA’s Hubble Space Telescope and the European Space Agency’s Solar Orbiter, contain sophisticated star trackers or star sensors, which generally do not provide any critical military or intelligence advantage to the U.S. We recommend that these items be removed from the USML, or that subcategory XV(e)(16) be carefully crafted to include only those star trackers and star sensors that are uniquely suitable for military uses, especially in missile, rocket, or other launch vehicle applications.

## **II. Definition of Defense Service**

### Subsections 120.9(a)(1), (2), (5), and (6)

The University supports the approach DDTC proposes to take in excluding all assistance (including training) in the mere operation/use, repair, organizational-level maintenance, and installation of defense articles from the revised definition of defense service. Such assistance does not involve the transfer or application of information or know-how that is of genuine military, intelligence, or proliferation concern. In fact, eliminating the need to obtain Technical Assistance Agreements for these activities will actually contribute to U.S. national security by allowing U.S. exporters to respond

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<sup>2</sup> Honeywell Aerospace, Control Moment Gyros, [http://www.honeywell.com/sites/aero/Pointing-Momentum-Control3\\_C80E53B46-7939-1874-4273-9D8809AFB783\\_H5272A765-312A-85E0-512C-FABAE1120A9C.htm](http://www.honeywell.com/sites/aero/Pointing-Momentum-Control3_C80E53B46-7939-1874-4273-9D8809AFB783_H5272A765-312A-85E0-512C-FABAE1120A9C.htm).

<sup>3</sup> See The Boeing Company, Space Exploration: Motion Control Subsystem, (Nov. 2006), <http://www.boeing.com/assets/pdf/defense-space/space/spacestation/systems/docs/ISS%20Motion%20Control%20System.pdf>.

more nimbly, efficiently, and effectively to the basic service needs of friendly military forces than is currently possible.

We also applaud the move to exclude most assistance that is furnished using solely public domain information from the scope of defense services. The U.S. academic community relies heavily on the fundamental research category of public domain information in complying with the ITAR. There has always been risk, though, that a university faculty member or researcher could accidentally furnish a controlled defense service simply by applying non-controlled fundamental research data or related public domain information to a specific military-related situation subject to the ITAR. For example, a professor might present a fundamental research paper on a novel composite materials problem at a seminar in France, and then be approached by an audience member from a French defense contractor with a technical question relating to an armored vehicle in development. Under current law, if the professor responds innocently using just fundamental research data or other public domain information, he or she is likely furnishing a defense service—which, in the absence of DDTC authorization, is a violation of the ITAR. Removing most assistance using solely public domain information from the definition of defense services substantially reduces the possibility of such violations, at very little risk to U.S. national security.

On a related point, the University recommends that DDTC revisit the possibility of extending the “using other than public domain information” qualifier to the activities described in subsections 120.9(a)(2), (5), and (6), for three reasons. First, it is our sense that assistance with defense article integration (subsection 120.9(a)(2)), as well as launch vehicle integration (subsection 120.9(a)(5)) and failure analysis (subsection 120.9(a)(6)), could on occasion “be effected only with public domain information.”<sup>4</sup> For instance, a professor of rocket science could apply solely fundamental research about propellant mixtures in the investigation of a launch vehicle failure. Or a professor of aerospace engineering could assist with the integration of a university-developed gyroscope into a military unmanned aerial vehicle, using just the technical specifications about the gyroscope that appear on his or her department’s official website, in the scientific literature, or in patent filings, and that are therefore in the public domain. As DDTC indicated with the first proposed redefinition of defense service in 2011, “the ‘integration’ of items . . . into USML controlled defense articles” can occur “even if ITAR-controlled ‘technical data’ is not provided to a foreign person during the provision of such services.”<sup>5</sup>

Second, we cannot discern a compelling policy justification for treating assistance with nearly every aspect of a defense article’s development, testing, and production differently from assistance with the far narrower activities of integration and launch failure analysis. Put another way, we are unable to reconcile (a) the implicit understanding that assistance with each of the myriad and often sensitive activities listed in subsection 120.9(a)(1) (including design, development, engineering, manufacture, production, and testing) in some cases can be “effected only with public domain information,” with (b) DDTC’s current contention that assistance with mere integration in all cases cannot. Neither the Rule nor the 2011 proposal explains precisely what it is about integration and

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<sup>4</sup> *Supra* note 1, at 31,446. In other words, we respectfully disagree with the statement that “integrating an item into a defense article . . . necessarily involves the use of technical data” subject to the ITAR. *Id.*

<sup>5</sup> International Traffic in Arms Regulations: Defense Services, 76 Fed. Reg. 20,590 (Apr. 13, 2011).

launch failure analysis that renders them uniquely and inherently unsuitable for the application of assistance using solely public domain information.

Third, the current text would lead to incongruous results. For example, given proposed subsection 120.9(a)(1), it would not be a defense service to furnish assistance using only public domain information to a non-U.S. defense contractor in various aspects of the actual development, testing, and production of a new directed-energy weapon system. Yet under proposed subsection 120.9(a)(2), it would be a defense service to provide assistance using only published manuals and schematics in the mere integration of an EAR99 commercial power supply into that same system. If DDTC has determined there is no reason for the ITAR to govern the former, it is not apparent why they should govern the latter.

#### Subsections 120.9(a)(5) and (6)

For consistency's sake, and to preserve a critical element of the current definition of defense service, the phrase "to a foreign person" should be inserted after "(including training)" in subsections 120.9(a)(5) and (6).

#### Subsection 120.9(b)

It is helpful that DDTC states in the Rule's preamble that subsection 120.9(b) is not meant to be an exhaustive list of activities that are not defense services.<sup>6</sup> We recommend, however, that this be made clear in the regulation itself to prevent possible future misunderstandings. The beginning of subsection 120.9(b) could be revised to read: "The following is a non-exhaustive list of example activities that are not defense services."

#### Subsection 120.9(b)(1)

##### *Organizational-Level Maintenance Training*

We find subsection 120.9(b)(1) puzzling when read in light of subsection 120.9(a)(1). Subsection 120.9(b)(1) appears to state that training in organizational-level maintenance is not a defense service, but only if the training (a) relates to a defense article that has been approved for export, reexport, or retransfer to an end-user; and (b) is furnished to an end-user that not is restricted by section 126.1 (proscribed destinations) or section 126.7 (ineligible parties). The implication here is that it *is* a defense service to furnish organizational-level maintenance training either (a) when relating to a defense article that has not been approved by DDTC for export to the same end-user, or (b) to restricted countries or ineligible parties.

If that is the case, then certain organizational-level maintenance training should be covered by subsection 120.9(a), which purports to affirmatively describe everything that a defense service is. Yet that subsection—120.9(a)(1) in particular—on its face does not encompass organizational-level maintenance training at all. With respect to maintenance training and assistance, subsection 120.9(a)(1) explicitly includes only "intermediate- or depot-level" activities.

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<sup>6</sup> *Supra* note 1, at 31,447.

Two examples may illustrate the potential for confusion. Let's suppose an Australian manufacturer supplies remote weapon stations first to the U.S. military, and later directly to Mexico's armed forces. Then the Australian company subcontracts with a U.S. service provider, which has developed expertise with the U.S.-owned systems, to send U.S. technicians to Mexico to provide organizational-level maintenance training on the equipment. The defense articles in question were never licensed by DDTC for export to Mexico, so subsection 120.9(b)(1) leads to the conclusion that the training is a defense service. But the U.S. contractor can point to subsection 120.9(a) and reasonably contend that organizational-level maintenance training is clearly not a defense service, because it is not included within the scope of any of subsection 120.9(a)'s provisions (especially subsection 120.9(a)(1)).

Now let's suppose a U.S. university wishes to train a visiting Chinese zoology student in the organizational-level maintenance of a repurposed ITAR-controlled night vision system being used to observe the nocturnal behavior of golden gophers. The end-user in this case is from a proscribed section 126.1 country. Subsection 120.9(b)(1) suggests that the maintenance training is therefore a defense service. But again, the university can invoke subsection 120.9(a)(1) for the proposition that defense services do not include organizational-level maintenance training at all as a threshold matter.

In other words, the current texts of subsections 120.9(a) and 120.9(b)(1) set up an interpretive conflict that ought to be avoided. If, on the one hand, as subsection 120.9(a)(1) indicates, DDTC wishes to exclude all organizational-level maintenance training entirely from the scope of defense services, then subsection 120.9(b)(1) should be removed or, perhaps for clarity's sake, revised to state categorically that organizational-level maintenance training is not a defense service. That was essentially how subsection 120.9(b)(1) of the first proposed redefinition of defense service appeared in April of 2011.<sup>7</sup> The University recommends that DDTC revive this approach, which has the benefits of being consistent with subsection 120.9(a)(1), of clearly deregulating a common and low-sensitivity type of assistance, and of establishing a comparatively simple, bright line—organizational-level maintenance training is not a defense service subject to the ITAR.

If, on the other hand, as the latest version of subsection 120.9(b)(1) suggests, DDTC wishes to control organizational-level maintenance training as a defense service in certain circumstances—*i.e.*, when furnished in connection either with defense articles not the subject of DDTC authorization or with restricted destinations and end-users—then subsection 120.9(a) should articulate those parameters. For instance, there could be a subsection 120.9(a)(7), stating something along the following lines:

- (7) The furnishing of training to a foreign person in the organizational-level maintenance of a defense article, whether in the United States or abroad, when—
  - (i) the defense article was not authorized for export, reexport, transfer, or retransfer to the same foreign person pursuant to this subchapter;
  - (ii) the foreign person is located in, organized to do business in, a national of, or a government agency of a country proscribed in section 126.1 of this subchapter; or

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<sup>7</sup> Specifically, the version of subsection 120.9(b)(1) proposed in 2011 stated that “[t]raining in the basic operation (functional level) or basic maintenance (see § 120.38) of a defense article” would not be a defense service. *Supra* note 5, at 20,592.

(iii) the foreign person is ineligible under section 126.7(a)(4) or (6) of this subchapter.

Subsection 120.9(b)(1) could be deleted or perhaps slightly revised to align clearly with the affirmative description set forth in subsection 120.9(a)(7).

*Actual Performance of Organizational-Level Maintenance*

In a similar vein, we are perplexed by the following language in the Rule’s preamble, in which DDTC responds to public comments concerning the inclusion of actual organizational-level (*i.e.*, basic) maintenance services, rather than just training, in subsection 120.9(b)(1):

[DDTC] notes that for certain countries, there are licensing exemptions for the performance of basic maintenance (*see* ITAR § 124.2). This is the extent to which [DDTC] wants to exempt from the licensing requirement actual performance of basic maintenance on a defense article on behalf of a foreign person.<sup>8</sup>

The suggestion is that by omitting the “actual performance of basic maintenance on a defense article” from subsection 120.9(b)(1), DDTC is therefore maintaining jurisdiction over such actual performance as a defense service. That suggestion is inconsistent with our reading of both the first and second proposed versions of subsection 120.9(a), which do not encompass that sort of assistance. As noted above, with regard to maintenance, proposed subsection 120.9(a)(1) includes only “assistance (including training)” in the “intermediate- or depot-level maintenance” of a defense article. Conspicuously and wholly absent are organizational-level maintenance activities—not just training specifically, but also assistance generally, including actual performance. Given this proposed definition, a U.S. person performing organizational-level maintenance on self-propelled artillery systems belonging to the armed forces of India, for example, would *not* be engaged in a defense service.

If a type of assistance is not delineated anywhere in subsection 120.9(a), it is not a defense service, regardless of whether it is called out in subsection 120.9(b). Subsection 120.9(a) would therefore need to be revised if the intent is to control the actual performance of organizational-level maintenance as a defense service. The Rule, however, contains no detailed policy justification for doing so. To borrow from the old proverb, actually performing organizational-level maintenance is akin to merely giving a person a fish to eat for a day, whereas furnishing training on such maintenance is like teaching that person how to fish so he or she can eat for a lifetime. It is not clear why the former warrants control as a defense service when DDTC has determined that the latter does not.

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<sup>8</sup> *Supra* note 1, at 31,446.

### **III. Conclusion**

Again, the University is grateful for this chance to make a contribution to your Export Control Reform efforts, and looks forward to future proposed rulemakings from DDTC. We also appreciate the work involved in balancing the complicated and often competing interests of Congress, various Executive departments, industry, academia, and foreign allies. We understand this process is not easy, but it is important to many of us.

Please don't hesitate to contact me with any questions regarding these comments at [bris0022@umn.edu](mailto:bris0022@umn.edu) or 612-625-3860. Thank you.

Respectfully submitted,

/s/

J. Patrick Briscoe

Export Controls and International Projects Officer



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4<sup>th</sup> July 2013

Office of Defense Trade Controls Policy  
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Dear Sir,

### **ITAR Amendment--USML Category XV and Defense Services**

As part of the President's Export Control Reform (ECR) Initiative, on 24<sup>th</sup> May 2013 in the US Federal Register (78 FR 31444-31451), the U.S. Department of State's Director of Defense Trade Controls (State/DDTC) issued a request seeking public comment on the proposals relating to the changes to ML Category XV and the definition of "Defense Services" under the International Traffic in Arms Regulations (ITAR) proposed implementation plan for defense articles and defense services that will transition from the jurisdiction of the Department of State to the Department of Commerce. The intent of this plan is to provide a clear description of Commerce/BIS's and State/DDTC's proposed policies and procedures for the transition of items to the jurisdiction of the Department of Commerce. The revisions to this rule are part of the Department of State's retrospective plan under E.O. 13563, completed on August 17, 2011. It was requested that any interested parties feed any comments into the US State Department on the proposed regulatory changes, for their consideration, by Monday 8<sup>th</sup> July 2013.

This response is provided by the Export Group for Aerospace and Defence (EGAD), on behalf of UK Industry. EGAD ([www.egad.org.uk](http://www.egad.org.uk)) is a not-for-profit-making special interest industry group focusing exclusively on all aspects of export and trade control matters, and is the only dedicated national industrial body in the UK dealing exclusively with export control issues. EGAD operates under the joint auspices of the ADS Group Ltd (ADS), the British Naval Equipment Association (BNEA), INTELLECT and the Society of Maritime Industries (SMI).

UK Industry have been monitoring the US Export Control Reforms with great interest. We strongly support the plans for the proposed reforms, from the viewpoint of UK Industry, and are aware that other Industry trade bodies in other EU Member States (and, we are convinced, even further afield) have equally been watching the US reforms with great interest.

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EGAD welcomes the opportunity to comment on the proposed changes, as well as the fact that the US Department of State is so actively seeking to amend the ITAR rules.

The draft purports to address the criticism that the present definition is 'overly broad'. In our view, it achieves some success in that aim; in particular, the DDTC appear to have reconsidered (with exceptions - see below) the doctrine that "Defense Services" may involve only public domain information.

Nonetheless, the draft contains a number of features which are of concern. This still overly-broad definition of "Defense Services" has the potential to undermine many of the intended benefits of reform.

For foreign (ie non-US) companies and governments, this is a more serious issue than might at first appear, in view of the consequences of ITAR 125.8(5), which states that "any defense article which may be produced or manufactured from a defense service will be subject to ITAR retransfer rules". Thus, the new rule is likely to continue to offer an active deterrent to the use of US-origin components and their associated technical data, as well as the employment of natural US persons by foreign companies in any engineering or technical role.

Our first concern relates to the phrase 'using other than public domain information' in the new 120.9(a)(1). Several comments on the previous draft pointed out that this would control any kind of intellectual property and we suggested the use of amended text 'using technical data', which the DDTC has apparently rejected on the grounds that they want to control other things as well as technical data (TD), such as tactical training.

This unfortunately leaves companies in the situation where the new rule purports to apply not only to technical data controlled by the ITAR, but also to EAR 'technology' associated with the export of EAR controlled items, but even more importantly, company proprietary information, such as cost models, which are not controlled at all. We believe that it is essential that the new rule, in conformity with the principles of ECR, positively identifies the specific types of information which are to be controlled.

Secondly, we believe that, for the avoidance of doubt, the new rule should explicitly state that it applies to the furnishing of assistance by US persons, or foreign persons inside the United States.

Thirdly, the relationship between the broad terms of the new 120.9(a)(1) and the narrower scope of 120.9.(a)(2) requires clarification. Please confirm if 120.9(a)(2) is intended to exclude certain activities controlled in (a)(1), or is intended to include more activities?

Fourth, we are concerned about the terms of (a)(2) as it relates to 'integration' of EAR-controlled items into foreign defense articles, which, we believe, may go beyond the scope of the AECA. We note that the DDTC has stated (Initial Implementation of Export Control Reform) that the jurisdiction of the technical data follows the jurisdiction of the related commodity or item. It follows, in our view, that in the example offered in the new draft rule, of the integration of a civil engine into a destroyer the export of technical data associated with the engine will be EAR-controlled, while technical data required for modification of the destroyer will be furnished by the foreign warship builder, over whom the ITAR has no jurisdiction. We, therefore, suggest that (a)(2) should be amended to clarify that a defense service is only furnished if ITAR-controlled US origin technical data is exported.

Fifth, we believe similar arguments apply to (a)(5) and (a)(6). Again, we believe it desirable to clarify that a defense service is only furnished if ITAR-controlled US origin technical data is exported, **and** the article in question is a defense article. This would include integration of a commercial satellite only if technical data relating to the launch vehicle were exported, and launch failure analysis only if it related to the launch vehicle, and not from an ITAR-free, foreign-designed and produced item to a commercial satellite vehicle.

Sixth, we are concerned that ambiguity as regards the 'use' as opposed to the 'export' of technical data could adversely affect the employability of US natural persons by foreign entities, since, with the rule as drafted, such persons could be held to be providing a defense service if using technical data generated by their own foreign employers. This, for the reasons stated earlier, could constitute a major deterrent to the foreign employment of US persons.

Lastly, (b)(5) excludes services provided by US persons 'drafted into' foreign military forces. We suggest clarification to ensure that US persons serving as volunteers are covered by this provision.

In summary, we recommend that the objective of narrowing and clarifying the scope of the new rule would be best met, at least as regards defense articles (as opposed to training) if 'defense services' were defined in terms of satisfying three conditions:

'The furnishing of assistance;

1. by a US person (see ITAR 120.15), or a foreign person (see ITAR 120.16) within the United States (see ITAR 120.13), to a foreign person
2. involving the export (see ITAR 120.17) of US origin ITAR controlled technical data (see ITAR 120.10)
3. applied to defense articles (see ITAR 120.6) at any stage and regardless of origin.'

Yours faithfully

Regards  


Brinley Salzmänn - Secretary, EGAD

**From:** Murphy Marie-France [<mailto:marie-france.murphy@cnes.fr>]  
**Sent:** Thursday, July 04, 2013 2:06 PM  
**To:** DDTC Response Team  
**Subject:** ITAR Amendment—USML Category XV and Defense Services

Dear Sirs,

The French Space Agency, Centre national d'Etudes Spatiales (CNES), acts as a public procurement organization for the purpose of realizing its public (non-commercial) Space projects on a national or intergovernmental framework basis. CNES is also affected by EAR/ITAR rules in its governmental mission of assessing the technical compliance of Space systems under its national Space legislation (The Technical Regulation of 31st march 2011 under the Space Operating Act of 3rd June, 2008).

CNES appreciates the opportunity to provide comments on the proposed revisions to 22 CFR Parts 120, 121, and 124 related to Spacecrafts Systems and Related Articles.

After reviewing the proposed rule, we would be grateful for clarification on the following issues.

- cf. p.31448 of the ITAR proposed rules:

“§ 120.9 Defense service.

(a) A defense service means:

(1) The furnishing of assistance (including training) using other than public domain information (see § 120.11 of this subchapter) to a foreign person...”

### Comments

We understand that the definition of “Public Domain” (ITAR §120.11) might be revised.

Will it still include:

“Information... which is generally ...available to the public:

(7) Through public release (i.e. unlimited distribution) in any form (e.g. not necessarily in published form) after approval by the cognizant U.S. government department or agency”?

- General comments
- Timing for the final rules:
- We understand that after the interagency review process following the reception of the public comments, there will be a notification to Congress and then the publication of the Final Rules.

What is the expected date for this publication in the Federal Register?

- We understand that these Final Rules will take effect 180 days after their publication.

Could you please confirm?

- Under the current ITAR rules are controlled:
- US-origin items listed on the USML, and
- Foreign-origin items listed on the USML (hardware and technical data) that have been imported into the US or transferred to a US person.

We understand that this will still be the case under the new rules.

Could you please confirm?

Thank you for your consideration.

Sincerely,

**Marie-France Murphy**

Export Control Senior Counsel - Legal Sub-directorate  
Centre National d'Etudes Spatiales (CNES) Headquarters  
2 place Maurice Quentin, 75039 Paris Cedex 01, France  
Tel +33 1 44 76 75 74 / Fax +33 1 44 76 76 21

[marie-france.murphy@cnes.fr](mailto:marie-france.murphy@cnes.fr)

## *Spaceport Associates*

PO Box 614  
17 West Lewis Point Road  
Damariscotta,  
Maine 04543  
USA

4<sup>th</sup> July, 2013

Ms Candace M J Goforth  
Director, Office of Defense Trade Controls Policy  
Directorate of Defense Trade Controls  
US Department of State  
2201 C Street NW  
Washington DC 20520

VIA Email: [DDTCResponseTeam@State.gov](mailto:DDTCResponseTeam@State.gov)

### **Re: ITAR Amendment – USML Category XV and Defense Services**

Dear Ms Goforth,

We appreciate the opportunity to offer comments on the proposed changes to USML Category XV. Spaceport Associates has been associated with efforts to create a new appropriately regulated industry of space tourism for many years. We are active participants in various working groups of the Federal Aviation Administration's COMSTAC advisory committee, and are looking to see a major step forward when the first paying passengers start flying into space next year – probably either on a Virgin Galactic or an XCOR sub-orbital space tourism vehicle. It has taken many years to reach this point (over a decade) and the operating companies and their associated terrestrial counterparts providing spaceport and training services are about to see their first revenues after having undertaken considerable financial, technical, business and regulatory risk.

However, a backwards step now seems to be contemplated with the proposed inclusion of “man-rated sub-orbital, orbital, lunar, interplanetary or habitat” under Category XV of the USML. At its most recent meeting on May 14<sup>th</sup>, 2013 in Washington DC, the COMSTAC Advisory Group to the FAA-AST encouraged its members to “evaluate current export controls on space technologies, including those related to commercial space transportation, in order to strike the appropriate balance between national security and supporting a strong and competitive domestic space manufacturing industry.” The proposed change would we believe not achieve the desired balance because it would make it more difficult for the new manufacturing firms to carry out plans to sell and operate their vehicles outside the US, while having no impact on security concerns – these vehicles are lightweight craft designed specifically to transport space tourists for a short trip into space (usually less than 10 minutes). The new potential \$1B industry of

space tourism is a global business, with possibly more than half the potential private space travelers coming from countries other than the US, and there is strong interest from abroad in setting up spaceports (which might ultimately make it possible for this technology to be used for point-to-point sub-orbital space transportation – travel anywhere in the world in less than 90 minutes). The existing regulatory regime has thus far been supportive of such developments, and the US is well placed in the vanguard in making this new industry happen, but the proposed new changes would we believe send out a different message – just at a critical time when the first revenue earning flights are about to take place. We would therefore recommend that this text be removed from the final ruling.

A second area of concern is the text “space-based logistics, assembly or servicing of any spacecraft” which is also proposed in the draft Category XV. This language would we feel certainly create problems for a new commercial sector which would provide satellite servicing and refueling services, while the potential security risk is not clear. This new commercial sector would also be by its nature a global business, and there will be a need for all global players to agree on standard connections and interfaces to enable in-orbit refueling to take place. It is hard to see how this could happen while this area remains under USML Category XV. We therefore respectfully suggest that consideration should be given to removal of this category from the List because otherwise this nascent business will be prevented from taking place.

In general, we believe we are at the beginning of a major change in the space sector with commercial operations taking important initiatives which will lead to benefits for all in terms of efficiencies of operation. There will be new jobs created, and the motivation is not military. These systems are not being designed as weapons. We respectfully request that you give consideration to removing the space tourism and spacecraft servicing text from the USML Category XV.

Yours sincerely,  
Derek Webber  
Executive Director  
[www.SpaceportAssociates.com](http://www.SpaceportAssociates.com)

VIRGIN GALACTIC, LLC  
65 Bleecker Street, 6<sup>th</sup> Floor  
New York, NY 10012



July 5, 2013

Via E-Mail ([DDTCResponseTeam@state.gov](mailto:DDTCResponseTeam@state.gov))

Directorate of Defense Trade Controls  
Office of Defense Trade Controls Policy  
U.S. Department of State  
PM/DDTC, SA-1, 12th Floor  
Washington, DC 20522-0112

ATTN: ITAR Amendment - U.S. Munitions List Category XV and Defense Services,  
Bureau of Political Military Affairs

Re: Comments on proposed revision to U.S. Munitions List Category XV  
(Spacecraft Systems and Related Articles) to describe more precisely the  
articles warranting control on the USML  
RIN: 1400- AD33

Dear Sir or Madam:

On behalf of Virgin Galactic, LLC (“Virgin Galactic”), I respectfully submit these comments concerning the proposed rule on changes to U.S. Munitions List Category XV under the International Traffic in Arms Regulations (“ITAR”), as issued by the Department of State and published in the Federal Register on May 24, 2013 (78 Fed. Reg. 31444).

The future growth of commercial space tourism globally could hinge largely on how export controls, especially those implemented by the United States, are applied and implemented relative to this industry. It is our view that a strong domestic industry in this emerging field will support the overall strategic and economic standing of the United States.

## **1. General Comments**

Virgin Galactic appreciates the opportunity to comment on the proposed revisions to U.S. Munitions List (“USML”) Category XV contained in the proposed rule referenced above. We strongly support the President’s Export Control Reform effort and more broadly the Administration’s National Export Initiative. We also applaud the labors of the

VIRGIN GALACTIC, LLC  
65 Bleecker Street, 6<sup>th</sup> Floor  
New York, NY 10012



Department of State to revise the USML and appropriately shift jurisdiction for certain commercial space items to the Commerce Control List. A key beneficiary of this effort will be the U.S. commercial satellite industry which should again be competitive in the international market once the proposed rule is implemented.

We are also pleased that the proposed rule, when viewed in conjunction with the companion Commerce Department rule (78 F.R. 31431) would clarify that the “technology required for passenger participation in space travel for space tourism, research or scientific endeavors, or transportation from one point to another for commercial purposes” is not controlled under USML Category XV. The revised Defense Service definition as contained in the proposed rule also supports that determination. For this we again applaud the U.S. Department of State.

However, in our view the proposed rule does not go far enough in addressing the broader concerns of the emerging commercial space industry, and specifically the new commercial manned suborbital spaceflight businesses like our own that will soon be taking private persons into sub-orbital space. U.S. Government support for the development of this industry is codified in the Commercial Space Launch Act and the Congressional finding contained therein that “...providing launch services and reentry services by the private sector is consistent with the national security and foreign policy interests of the United States and would be facilitated by stable, minimal, and appropriate regulatory guidelines that are fairly and expeditiously applied...” 49 U.S.C. §70101.

We recognize that the proposed rule reflects the recommendations contained in the so called “Section 1248 Report” to Congress which mandated, as required by the National Defense Authorization Act for Fiscal Year 2010, that the Secretaries of Defense and State carry out an assessment of the risks associated with removing satellites and related components from the USML. As such, manned sub-orbital spaceflight vehicles and systems were not of central focus in the aforementioned report, and this is apparent from reviewing the proposed rule, as all man-rated spacecraft would remain ITAR controlled under USML Category XV(a)(11).

That said, we believe that the intent of Export Control Reform, focusing on higher walls around fewer items, should include lessening controls on items designed and developed for the commercial space tourism industry and moving commercial space items off of the USML, especially when those items were developed commercially, wholly with private funding and without a defense application in mind.

## **2. Specific Comment on the Proposed Revisions to Category XV**



The proposed rule published in the Federal Register stated that “the U.S. Government does not want to inadvertently control items on the ITAR that are in normal commercial use” and we support that aim. In the very near future Virgin Galactic will be routinely taking people into sub-orbital space as tourists and researchers. Over 630 people have made deposits and over the next couple years we will take all of them to space. This by itself would seem to fit squarely within the meaning of “normal commercial use” and as such the spaceflight systems designed specifically for this purpose should not fall under ITAR control.

As to the specifics of the proposed rule, paragraph (a)(11) of Category XV would capture all “man-rated” spacecraft using *man-rated* as the sole control parameter. We do not understand what generic aspects of “man-rated” spacecraft make them defense articles by default. (Importantly, we note that the term “man-rated” is not defined in the proposed rule, or elsewhere.) Additionally, USML Category XV paragraph (a)(11) is not consistent with paragraphs (a)(1) through (a)(10), and (a)(12) of that same category, as each of those paragraphs appear to identify capabilities and design features that have specific military applications which should probably remain ITAR controlled.

It should further be noted that paragraph XV(a) already captures “manned or unmanned space vehicles” that would meet one or more of the control parameters identified in the other sub-paragraphs so it seems unnecessary to have a separate sub-paragraph that would capture all “man-rated” spacecraft. If there are specific aspects of man-rated spacecraft that are uniquely military such that control under the ITAR is warranted or that “provide the United States a critical military or intelligence advantage” (ref. 78 F.R. 31445 of the proposed rule), then those technical features should be specifically identified in USML Category XV. **We would thus urge that paragraph (a)(11) be removed in its entirety, but barring that, it would seem appropriate to remove man-rated “sub-orbital” spacecraft so that they may be more appropriately controlled on the Commerce Control list.**

### 3. Conclusion

The revision of U.S. Munitions List Category XV is an essential element in the Administration’s efforts to reform U.S. export controls. A key element of this reform is the modernization of controls to take into consideration the commercial realities facing affected businesses, including the developing commercial space industry.

Virgin Galactic greatly appreciates the hard work of the Government to achieve this objective and we would welcome the opportunity to discuss the foregoing comments in more detail with DDTC.

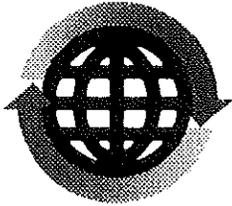
VIRGIN GALACTIC, LLC  
65 Bleecker Street, 6<sup>th</sup> Floor  
New York, NY 10012



Sincerely,

A handwritten signature in black ink that reads "Bruce Jackson".

Bruce Jackson  
VP, Trade Controls & Export Strategy



# rocky mountain export council

June 27, 2013

To: U.S. Department of State

22 CFR Parts 120, 121 and 124

RINs 1400-AC80 and 1400-AD33

Public Notice: 8329

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of "Defense Service."

Good Day:

The Rocky Mountain District Export Council, per its mission, convened a Space Industry Forum on Monday June 24, 2013 to discuss the above proposed rule and then to take, record and transcribe official comments from space industry executives and leaders in Colorado's economic development community. Because of the dominant presence of military and civilian space activity, this proposed rule is of great interest within the State of Colorado.

The RMDEC is pleased to submit the attached transcribed comments for the record as well as written comments that were brought to the Forum.

If there are questions, please feel free to contact myself or Mr. Kip Cheroutes, RMDEC's Legislative Chair, at 303.382.4054.

Thank you for the opportunity to submit these comments.

Sincerely,

A handwritten signature in cursive script that reads "Kristy Schloss".

Kristy Schloss, Chair  
Rocky Mountain District Export Council

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6 US EXPORT ASSISTANCE CENTER'S

7 ROCKY MOUNTAIN DISTRICT EXPORT COUNCIL

8

9 Monday, June 24, 2013

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12 IN THE MATTER OF THE  
13 COLORADO SPACE INDUSTRY OPEN COMMENT FORUM

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The above-entitled matter came on for an Open Comment  
23 Forum on June 24, 2013, at 10:10 AM at South Metro Chamber of  
Commerce, 2154 East Commons Avenue, Suite 342, Centennial,  
24 Colorado, before Martha Loomis, Certified Shorthand Reporter and  
Colorado Notary Public, 5418 South Foresthill Street, Littleton,  
25 Colorado.

2

1 DISTRICT EXPORT COUNCIL:

- 2 Kristy Schloss  
Louis X. (Kip) Cheroutes  
3 Frank Schuchat  
John Anderson  
4 Monisha Merchant

5 ATTENDEES:

- 6 Paul Bergman  
Danielle Blakely  
7 William Bolton  
John Brackney  
8 Paul Deadrick  
Stephanie Dybsky  
9 Brian Emmet  
Jonathan Goff  
10 Ryan Kelly  
Christi Lee  
11 Stanley Kennedy  
Albert Lepore, Jr.  
12 Maureen O'Brien  
Joe Rice

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2 Whereupon the following proceedings were had:

3 MS. SCHLOSS: Good morning. I'm Kristy Schloss, Chair  
4 of the US Department of Commerce Rocky Mountain District Export  
5 Council. The District Export Council, an advisory group under  
6 the International Trade Administration, is convened on this  
7 date, Monday, June 24, 2013, for open comment for us to tape

8 record, transcribe, and submit comments made pursuant to the  
9 following proposed rules: US Department State Amendment to the  
10 International Traffic and Arms Regulations, Revision of the US  
11 Munitions List Category XV and Definition of "Defense Service,"  
12 and US Department of Commerce Export Administration Regulations,  
13 Control of Spacecraft Systems and Related Items the President  
14 Determines No Longer Warrant Control Under the United States  
15 Munitions List.

16       Because the new law and proposed rules have potential  
17 beneficial impact on Colorado's strong space-based economy, the  
18 Rocky Mountain District Export Council, following the lead of  
19 the President's National Export Initiative, invited space  
20 executives and economic development leaders to comment for the  
21 record. The following comments come in from them.

22       Our first speaker today will be Frank Schuchat, who is  
23 going to represent the Colorado Space Coalition.

24       MR. SCHUCHAT: Thank you, Kristy. I'm here reading a  
25 statement on behalf of the Colorado Space Coalition. I

1 participate in that group. This was drafted by the Coalition

2 staff, in particular Vicky Lea.

3           The Colorado Space Coalition thanks the US Export  
4 Assistance Center's Rocky Mountain District Export Council for  
5 the opportunity to submit comments on the Proposed Rules for the  
6 International Traffic in Arms Regulations and Export  
7 Administration Regulations

8           By way of background, the Colorado Space Coalition  
9 membership represents more than 40 aerospace and defense  
10 companies. Together with the Coalition's small and midsize  
11 company members, these partners represent the full supply chain  
12 in the military, civil, and commercial space markets. Other  
13 Colorado Space Coalition partners include higher education  
14 institutions, the Colorado Space Business Roundtable, and  
15 several regional chambers of commerce and economic development  
16 agencies. Our goal is to further grow Colorado as a center for  
17 excellence for space, and the best place for aerospace companies  
18 to locate and thrive.

19           Colorado is a leading aerospace state, ranking first  
20 in terms of private aerospace employees per capita, and is home  
21 to the second largest number of private aerospace employees in  
22 the nation. Colorado has seen space employment grow by  
23 19 percent in the past decade, and close to

24 167,000 space-related jobs currently bring in nearly \$3 billion  
25 in annual payroll to the state.

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1 ITAR continues to challenge the ability of Colorado  
2 space companies to compete in the global marketplace, and the  
3 reduction of unnecessary licensing and export restrictions for  
4 the aerospace industry has long been a top recommended  
5 legislative priority for the Colorado Space Coalition.

6 Colorado is a national hub for the satellite industry,  
7 and the Colorado Space Coalition therefore views the recent  
8 passage of satellite export control reform legislation, and the  
9 subsequent proposed rules for the ITAR and EAR, as an extremely  
10 positive development, with significant economic benefits to the  
11 region development with significant economic benefits to the  
12 region.

13 Colorado's satellite manufacturing industry directly  
14 employs approximately 860 workers in nearly 20 companies, with  
15 an average wage of just over \$104,000, and a total annual  
16 payroll of approximately \$85.7 million. These companies are at  
17 the forefront of developing next generation satellite systems,

18 and have a deep technical expertise and an inherent global  
19 competitive edge. The Proposed Rules for the ITAR and EAR will  
20 enable our companies to capitalize on their expertise to become  
21 more competitive internationally, and increase high skilled jobs  
22 and economic impact here in Colorado.

23 Individual Colorado Space Coalition members will  
24 submit separate comments on the Proposed Rules reflecting their  
25 respective business and technical needs. In the meantime, the

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1 Colorado Space Coalition would like to take this opportunity to  
2 provide the following comments on the way in which the Proposed  
3 Rules impact Colorado's university-based space research.

4 While the Proposed Rules are a welcome step toward  
5 much needed export control reform, their focus is on commercial  
6 aspects, and they remain restrictive for space research  
7 conducted by universities, where class attendance may include  
8 non US citizens.

9 Research institutions such as CU Boulder's Laboratory  
10 for Atmospheric and Space Physics are increasingly working on  
11 hosted payloads. If the Department of Defense funds a hosted

12 payload, it remains subject to the ITAR, even if the payload is  
13 completely unclassified.

14 Infrared sensing remains under ITAR control. Manned  
15 Earth observation science missions use shortwave infrared,  
16 midwave infrared, and longwave infrared technology, and so will  
17 remain subject to ITAR restrictions.

18 Spacecraft that track ground, airborne, missile, or  
19 space objects using imaging, infrared, radar, or laser systems  
20 remain ITAR controlled. Much of the same technology is utilized  
21 for spacecraft that perform climate and weather science.

22 Our universities play a critical role in advancing  
23 cutting edge space research, training the next generation of  
24 aerospace workers, and ensuring the United States' leadership in  
25 space. The Colorado Space Coalition acknowledges the necessity

1 of balancing the needs of space-based research institutions with  
2 national security interests, and suggests further consideration  
3 be given to ways in which the Proposed Rules can provide a less  
4 restrictive environment for space-related research, particularly  
5 with regard to the issues described above.

6           On behalf of its members, the Colorado Space Coalition  
7 wishes to thank you for the opportunity to comment on these  
8 important Proposed Rules. Please do not hesitate to contact us  
9 if you have any questions about those comments.

10           MS. SCHLOSS: Thank you, Frank.

11           Our next speaker will be Stanley Kennedy with Oakman  
12 Aerospace.

13           MR. KENNEDY: I would like to start by thanking the US  
14 Export Assistance Center's Rocky Mountain District Export  
15 Council and the South Metro Chamber of Commerce, the Metro  
16 Denver Economic Development Corporation, Senator Michael Bennet  
17 and Staff, and Congressman Mike Coffman and Staff for the  
18 invitation to be included in the discussion of new federal law  
19 and proposed regulations regarding spacecraft systems and  
20 related articles.

21           I personally have spent over 28 years in the  
22 aerospace/defense sector and have had the opportunity to work  
23 for large, midsize, and small aerospace companies providing  
24 products and services to both commercial and government  
25 customers. I am currently serving as the President of Oakman

1 Aerospace, Inc., headquartered in Littleton, Colorado.

2 OAI is a veteran-owned small business focused on rapid  
3 and responsive, modular open system architecture space vehicle  
4 designs, components, and mission payloads. OAI is heavily  
5 involved in both domestic and international space program  
6 efforts that are directly impacted by the National Defense  
7 Authorization Act for fiscal year 2013 and the proposed  
8 regulation changes posted in the Federal Register from both the  
9 US State Department and the US Commerce Department.

10 The first Federal Register notice has been issued by  
11 the US Department of State Directorate of Defense Trade Controls  
12 on May 2, 2013, and is entitled Amendment to the International  
13 Traffic in Arms Regulations: Revision of the US Munitions List  
14 Category XV and Definition of "Defense Services."

15 The second Federal Register notice, also issued on  
16 May 24, 2013, by the US Department of Commerce's Bureau of  
17 Industry and Security is entitled Export Administration  
18 Regulations: Control of Spacecraft Systems and Related Items  
19 the President Determines No Longer Warrant Control Under the  
20 United States Munitions List.

21 Before I comment on the specifics of these proposed  
22 rules and potential issues and concerns of the current language,  
23 I would like to state for the record a few general observations  
24 that I have developed over the last several years as the Export  
25 Control Reform process has played out. These observations and

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1 suggestions are not focused at the specific rules and  
2 regulations, but rather are guideposts the government, industry,  
3 and academia should consider as Export Control Reform moves into  
4 implementation details.

5 First, any resulting rules that eventually are  
6 implemented should address the need for the US to attract and  
7 retain technology qualified foreign students studying Science,  
8 Technology, Engineering, and Math, or STEM, that graduate from  
9 US institutions. As the technical chair of the American  
10 Institute of Aeronautics and Astronautics Utah State  
11 University's Small Satellite Student Competition, I am  
12 continually impressed by the caliber of students competing on  
13 the international stage, and we should work diligently to  
14 attract and retain these talents in the US to maximize our

15 global competitiveness.

16 Two, the proposed rules should allow small and medium  
17 sized companies the ability to quickly support new startups and  
18 ventures with companies residing in countries identified in EAR  
19 Section 740.20(c)(1) and (c)(2) of the Department of Commerce,  
20 Bureau of Industry and Security final ruling entitled Export  
21 Control Reform Initiative and Strategic Trade Authorization  
22 License Exception published via the Federal Register on June 16,  
23 2011. This would encourage innovation, entrepreneurship, and  
24 potential new ways of doing business.

25 Three, any new rule or regulation should bolster and

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1 streamline international cooperation and collaboration through  
2 the US State Department, US Commerce Department, and  
3 military-to-military project agreements with approved, eligible  
4 destinations.

5 Specific to the Department of State proposed rule, I  
6 have the following comments. First, I believe USML Section  
7 121.1 Category XV paragraph a(2) is overly broad, and will  
8 disadvantage US companies working on international efforts

9 associated with rules of the road for safe and responsible uses  
10 of outer space, as well as debris tracking and identification  
11 efforts being worked in the United Nations Committee on the  
12 Peaceful Uses of Outer Space, or COPUOS, working groups on the  
13 long-term sustainability of outer space activities.

14 Next, I am concerned that 121.1 Category XV paragraph  
15 e(2), limiting the largest lateral dimension for space qualified  
16 optics greater than 0.35 meter from transfer to Commerce Control  
17 is overly restrictive. There are many domestic and  
18 international optics suppliers who provide 0.50 meter and  
19 larger products today. The technology for large optics will  
20 quickly outpace the regulatory environment and potentially  
21 continue to disadvantage US suppliers.

22 Finally, 121.1 Category XV paragraph e(17) states  
23 secondary or hosted payloads or specially designed parts and  
24 components that perform any of the functions described in  
25 Section 121.1 Category XV paragraph (a) would remain on the

1 USML, even if developed commercially and on internal or venture  
2 funding. This will significantly hamper innovation and

3 entrepreneurial ventures, and should be re-examined in light of  
4 paragraph e(18), and national security implications and impacts.

5         With respect to the Department of Commerce proposed  
6 rule, the following comments apply. One, the four new proposed  
7 ECCN categories for spacecraft under 9x151 are broad, but  
8 appropriate for commercial space activities.

9         Two, there is concern regarding the definitions of  
10 "space qualified" and "specially designed." If a commercial off  
11 the shelf (COTS) part is successfully tested to operate in  
12 space, then it becomes space qualified. This could impact small  
13 business trying to extend terrestrial and airborne parts and  
14 components to the space domain.

15         Three, further clarification regarding eligibility,  
16 use, and implementation of Strategic Trade Authorization (STA)  
17 License Exceptions for items described in ECCNs 9x515 is  
18 requested, specifically 9D515 and 9E515. Many small businesses  
19 are working with foreign companies providing technical services  
20 and support that would greatly benefit from these types of  
21 exceptions.

22         Four, most companies will not avoid future DDTC  
23 licensing fees because one or more products will remain on the  
24 Category XV list while many may move to the new CCL 500 Series.

25 This is a minor point that should not diminish the potential

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1 upside of these significant ITAR/ECR efforts.

2 In summary, building a successful and sustainable  
3 ITAR/ECR implementation strategy is critical to National  
4 Security, economic growth and job creation, and to maintain US  
5 competitiveness in the global aerospace and defense sector.  
6 Forums like these enable small business inputs and allow issues  
7 and concerns to be addressed early in the process.

8 Again, I would like to thank the hosts for the  
9 opportunity to discuss these important issues, and I look  
10 forward to continued dialog on this most important subject.

11 Thank you.

12 MS. SCHLOSS: Thank you, Stanley.

13 Our next speaker will be Brian Emmet, Lockheed Martin.

14 MR. EMMET: Good morning. My name is Brian Emmet.  
15 I'm the manager for the International Trade Compliance Office  
16 for Lockheed Martin Space Systems Company in Colorado.

17 Lockheed Martin has been a strong supporter of the  
18 ongoing comprehensive export control reform initiative. We

19 applaud the Administration's efforts to create a new system that  
20 makes controlled trade more effective, efficient, and  
21 predictable.

22         We welcomed the publication on May 24 of the draft  
23 rules that, once finalized, will reform export controls for  
24 commercial satellites and related items. As a general matter,  
25 the content of the draft regulations, which closely mirror the

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1 content included in the 2012 Department of Defense and State  
2 1248 report, is a positive step forward.

3         In particular, I'd like to commend the Departments of  
4 State, Commerce, and Defense for their outstanding work drafting  
5 these regulations.

6         I'd also like to recognize the members of the Colorado  
7 Congressional delegation, some of whom are with us here today,  
8 whose efforts made these reforms possible. I'd like to  
9 particularly recognize Senator Bennet and Congressman Coffman,  
10 and Senator Bennet's senior business advisor Monisha Merchant,  
11 who is here today.

12         Without the satellite export control provisions

13 contained in the FY 2013 National Defense Authorization Act  
14 passed by Congress in December 2012 and signed by President  
15 Obama in January 2013, we would not be here today having this  
16 conversation. Thanks also go to Governor Hickenlooper and the  
17 Office of Economic Development and International Trade for their  
18 support and attention.

19 Combined, the new law and regulations will help to  
20 strengthen the US satellite industry, restore US competitiveness  
21 abroad and create new jobs here in the United States.

22 Before we get into the substance of the proposed  
23 controls, I should mention that Lockheed Martin, in close  
24 consultation with our suppliers, is still in the process of  
25 renewing the specific provisions of the proposed rules. As you

14

1 know, public comments are due before July 8, 2013.

2 Accordingly, my comments here today should be  
3 considered preliminary, and the Lockheed Martin public comments  
4 submitted to the Departments of State and Commerce will provide  
5 the final position on these matters.

6 On International Opportunities and Jobs, Lockheed

7 Martin Space Systems designs, develops, tests, manufactures, and  
8 operates a full spectrum of advanced technology space systems  
9 for national security, civil and commercial customers. We work  
10 with thousands of suppliers and component manufacturers to build  
11 our systems.

12         Export sales are more important than ever to the  
13 success of US commercial satellite manufacturers and to the  
14 overall health of the US space industrial base, which provides  
15 thousands of high quality jobs in research and development,  
16 engineering, and manufacturing throughout the United States and  
17 here in Colorado.

18         The more we can do to streamline export controls on  
19 commercial satellites and related programs the more competitive  
20 we can be in the international marketplace.

21         To take advantage of the proposed rule changes,  
22 Lockheed Martin Space Systems is investing in new commercial  
23 communications satellite technologies and systems for our long  
24 legacy of the A2100 satellite bus.

25         On remote sensing, we are pleased that the draft rules

1 include proposed changes to controls on commercial remote  
2 sensing satellites. This is an exciting and growing  
3 international commercial opportunity for Lockheed Martin and the  
4 US commercial space industry.

5         We are still in the process of determining whether the  
6 specific control parameters proposed in the draft rule reflect  
7 the current global market for commercial systems. For example,  
8 we know that there are currently electro-optical visible, and  
9 near infrared systems with an aperture greater than 0.35 meters  
10 available in the foreign marketplace.

11         In order for US companies to be competitive, it is  
12 important that the US export controls reflect these commercial  
13 market realities.

14         It is also important to remember that controlling  
15 these capabilities as commercial item is not decontrolling the  
16 technologies; regardless of whether an item is controlled as a  
17 munitions or commercial item, Lockheed Martin will remain deeply  
18 committed to working with the US government to prevent the  
19 unauthorized release of sensitive capabilities and technologies.

20         On space exploration, LMSS has designed, assembled,  
21 and tested the Orion human spacecraft here in Colorado, and we

22 control several interplanetary missions from our mission control  
23 center again here in Colorado, for example, MRO currently  
24 operating in Mars orbit, and Juno, which is sailing out for a  
25 2016 rendezvous with Jupiter.

16

1 With the heritage of these exciting programs, we  
2 support increased international cooperation in interplanetary  
3 and human space exploration.

4 To further these goals, we will be providing some high  
5 level feedback on how the proposed rules might be enhanced to  
6 further accelerate these goals.

7 We would like to see all interplanetary spacecraft  
8 moved to the EAR regardless of the other technologies or system  
9 capabilities onboard the spacecraft. We understand the national  
10 security implications, and would, if necessary, prefer to see  
11 specific sensitive technologies and instruments controlled  
12 rather than the entire interplanetary spacecraft.

13 We would also like to see human spaceflight services  
14 to low Earth orbit and beyond into the solar system clearly  
15 identified as EAR controlled instead of an ITAR defense service.

16 This will ensure that America once again becomes the world  
17 leader in human spaceflight operations.

18 Those are my prepared comments. I thank you very much  
19 for the opportunity to present them here today.

20 MS. SCHLOSS: Thank you, Brian.

21 Our next speaker will be Kip Cheroutes with LXC  
22 Strategies.

23 MR. CHEROUTES: Thank you, Kristy.

24 My name is Kip Cheroutes. I am President of LXC  
25 Strategies, a corporation licensed in the state of Colorado.

17

1 I wish to focus my comments on specifically the  
2 Department of Commerce notice found on page 12, the paragraph  
3 relating to the new ECCN 9E515 and to passenger participation in  
4 space travel such as suborbital, orbital, lunar, interplanetary,  
5 or habitat, for space tourism, research for scientific  
6 endeavors, for transportation from one point to another for  
7 commercial purposes.

8 I applaud this provision, and I applaud the conclusion  
9 that the Department of Defense and the Department of State have

10 made that no proposed inclusion of such technology as a general  
11 matter in either the proposed USML Category XV or the proposed  
12 ECCN 9E515.

13 Despite my applause for the inclusion of this  
14 paragraph, I wish to make the three following comments. The  
15 reason I make these comments is because the State of Colorado is  
16 actively vying for Spaceport, a Federal Aviation Administration  
17 endeavor to promote and advance the commercial passenger space  
18 business.

19 Colorado is keenly eager to advance and promote and  
20 develop this new space related technology and the jobs that are  
21 created by this technology.

22 Front Range Airport in the state of Colorado in the  
23 county of Adams County, Colorado, is the designated spaceport  
24 location for the State to operate commercial passenger space  
25 travel.

18

1 The three comments I have would be this. No. 1, more  
2 precisely define the technologies not per se now subject to the  
3 USML Category XV. No. 2, when in doubt, err on the side of

4 keeping such technologies off the UML list unless the Department  
5 of State can make a compelling national security case. And  
6 No. 3, communicate with the Federal Aviation Administration  
7 Office of Commercial Space Transportation for ongoing  
8 concurrence of the definitions of the technologies to keep off  
9 the USML list.

10 Thank you for the opportunity to submit comment.

11 MS. SCHLOSS: Thank you, Kip.

12 Our next speaker will be Jonathan Goff with Altius  
13 Space Machines.

14 MR. GOFF: Thank you.

15 I'm Jonathan Goff, President and CEO of Altius Space  
16 Machines.

17 I do not have prepared comments, but I did want to  
18 submit some oral comments about the notice of proposed  
19 rulemaking for the Category XV of the US Munitions List.

20 First off I'd like to echo the comments made. Altius  
21 sees this as a very positive step forward compared to the  
22 current status quo in export control.

23 We did have a few comments on specific items that are  
24 explicitly left on the US Munitions List that we did not feel  
25 fit well as defense articles or defense services. Some of these

1 have already been mentioned in the other comments.

2           Specifically I would like to mention three of them.

3 One of them in Category XV (a)(11) refers to man rated  
4 suborbital, orbital, lunar, interplanetary or habitats.

5           According to the ITAR regulations, my understanding of  
6 them, in Section 120.3 it describes the policy on designating  
7 and determining defense articles and services. The official  
8 policy is that an article or service may be designated or  
9 determined in the future to be defense article or defense  
10 service if it, A, is specifically designed, developed,  
11 configured, adapted, or modified for a military application and  
12 i, does not have predominant civil applications, ii, does not  
13 have performance capability to these articles or services for  
14 civil applications or, B, is specifically designed, developed,  
15 configured, adapted, or modified for a military application, and  
16 has significant military or intelligence applicability such that  
17 control under the subchapter is necessary.

18           In both of these examples, the policy states that the  
19 US Munitions List is supposed to cover items that are

20 specifically designed for a military application. This does not  
21 match the items listed in USML Category XV (a)(11), almost every  
22 example of manned suborbital, orbital, lunar, interplanetary, or  
23 habitats that were currently under development. None of them  
24 fit under this description; none of them are being, or almost  
25 none of them that I know of are being developed for the

20

1 military. Most of them are being developed commercially or for  
2 civil agencies such as the National Aeronautic and Space  
3 Administration. Additionally, they have predominantly civil  
4 applications.

5       It's been many decades since the Defense Department  
6 has been focused on human space flight applications as most  
7 Earth observation and other applications are better served by  
8 robotic satellites, not by manned spaceflight.

9       I feel keeping manned spacecraft on the USML does not  
10 seem to fit with the officially stated policy on designated  
11 services and determining defense articles and services.

12       There are two other items I'd also like to discuss  
13 that are slightly grayer areas, but I still feel that would be

14 in the interest of US national security and US industry to  
15 remove these items from control under the ITAR export control  
16 regime to control under the Commerce control regime.

17       These two other items are currently explicitly left on  
18 the US Munitions List under the proposed rule as USML Category  
19 XV (a)(4) that says, Vehicles that provide space-based  
20 logistics, assembly, or servicing of any spacecraft (e.g.  
21 refueling) and USML Category XV (a)(2), spacecraft to track  
22 ground, airborne, missile or space objects using imaging,  
23 infrared, radar, or laser systems.

24       I will first address XV (a)(4).

25       For spacecraft servicing, this is an area that has

21

1 seen some military development. In fact, Altius is currently  
2 participating in the DARPA Phoenix technology program that could  
3 be described as an assembly or servicing of a spacecraft;  
4 however, a significant fraction of the development work going on  
5 today for this class of missions is being pursued by civil space  
6 agencies or commercially.

7       I would like to cite two examples of space servicing

8 orbital life extension applications where a spacecraft  
9 rendezvouses and captures an existing spacecraft, for instance a  
10 communication satellite, and then takes over propulsion services  
11 for it so that the fuel of the life extension satellite can  
12 augment and extend the life of an existing satellite.

13 To date, the two of the three organizations that focus  
14 on these applications were purely commercial endeavors. There  
15 was the DARPA SUMO mission that was a government funded one;  
16 however, there was Orbital Recovery Corporation that was run by  
17 a friend of mine, Dennis Wingo.

18 Interestingly enough, although Dennis is a US citizen,  
19 because of the ITAR regulations, he started the company in  
20 Europe because of the interest in European manufacturers  
21 participating in this, and the fact that they wanted an "ITAR  
22 free" solution.

23 While that company was not commercially successful,  
24 there is a current company, VisiStat, which is a joint venture  
25 of ATK and US Space, LLC, that is actively seeking to develop

1 solutions in that same marketplace. Once again, I think that a

2 case of two out of three could be considered as "predominately  
3 civil applications."

4       If you look at the other areas of robotic servicing,  
5 including refueling, assembly, logistics, many of these are  
6 being developed not by the military but by US civil agencies  
7 such as NASA's Goddard Space Flight Center. The NASA Goddard  
8 "Restore" mission is being developed with the goal of  
9 demonstrating refueling of an unmodified satellite. The Goddard  
10 Restore team did an experiment on the station recently where  
11 they demonstrated the abilities to refuel. These were not  
12 military funded. These were funded by NASA.

13       But more importantly, these technologies are also  
14 being developed in other friendly countries like Canada, Japan,  
15 and Germany, countries that for many technology areas there is  
16 apparently this "STA 36" exception that allows you to more  
17 easily share certain EAR controlled technology with those  
18 countries.

19       But many of these countries are developing these  
20 capabilities. In fact, MDA-Canada specifically had been  
21 offering a service, and even signed a contract with Intel Sat  
22 General to dock with and refuel satellites. They temporarily

23 suspended that because they saw the DARPA Phoenix mission and  
24 other DARPA missions as competing with the commercial service  
25 that they were trying to offer; however, I see this as clear

23

1 evidence that space based logistics, assembly, and servicing of  
2 spacecraft is dual use; it's clearly something that is being  
3 developed commercially, non militarily.

4       There are military versions, but there are  
5 significant and even predominant, in many cases, non military  
6 uses of these technologies, and therefore I feel it is a better  
7 fit under the Commerce Control List than the USML.

8       The last item, Category XV (a)(2), spacecraft to track  
9 ground, airborne, missile or space objects using imaging,  
10 infrared, radar, or laser systems I can completely understand  
11 the military sensitivity of space-based tracking. I do not have  
12 perfectly clear examples of how to split military and civil uses  
13 of space tracking apart. Obviously this technology is being  
14 used by the military, for instance, for detecting launches of  
15 missiles or other things like that which are clearly defense  
16 related.

17           However, I feel that this item is a little too broad.  
18 It's impossible to bring two objects together to rendezvous and  
19 dock in space even for a completely commercial application  
20 without having the ability to track space objects using some  
21 form of imaging, infrared, or radar systems.

22           Once again, I should mention that if you look at the  
23 commercial cargo vehicles that are delivering cargo to the space  
24 station today, many of them use tracking systems such as these  
25 that are not built in the United States.

24

1           The NepTech Corporation of Canada, for instance, that  
2 developed their TriDAR system in cooperation with NASA, their  
3 system is being used on the Orbital Sciences Cygnus spacecraft,  
4 and I do believe they're also baselined for use on some of the  
5 Commercial Crew vehicles under development.

6           This is a LIDAR system that's used for allowing one  
7 spacecraft to detect the space facilities it's trying to dock  
8 with, and provide the relative navigation information that would  
9 allow it to maneuver to and dock with that object.

10          I think that some sort of more specific division needs

11 to be made for this category that separates out applications  
12 needed for rendezvous and docking, which is clearly dual use  
13 technology, and not explicitly or predominantly military  
14 technology, and for things like detecting missile launches or  
15 other things like that.

16         One possible suggestion on how to delineate that might  
17 be setting a distance and a relative velocity capability for the  
18 sensors, for instance stating that a capability to track these  
19 objects at a distance of greater than, say, 100 kilometers and  
20 at a relative velocity between the spacecraft and the target of  
21 greater than, say, one kilometer per second or something like  
22 that would I feel adequately separate out the defense specific  
23 items that should be controlled under the US Munitions List, and  
24 technologies that are generally civilian in applications for  
25 things like rendezvous and docking.

25

1         I should state, as Brian Emmet stated earlier, that  
2 these are preliminary comments. Altius still plans to submit  
3 its own official final written comments at a later date. But we  
4 wanted to include this in the record.

5           And I thank the DEC, Rocky Mountain DEC for setting up  
6 this forum, and we're grateful to see that there is progress  
7 happening in export control, and we wanted to provide our  
8 additional comments.

9           Thank you.

10          MS. SCHLOSS: Thank you.

11          The next speaker will be John Brackney, South Metro  
12 Denver Chamber.

13          MR. BRACKNEY: Thank you, Madam Chair. I'm John  
14 Brackney, the CEO of the South Metro Denver Chamber. On behalf  
15 of our Board of Directors, our 1,300 clients, our 132,000  
16 employees, we deeply appreciate the US Export Assistance Center  
17 and the Rocky Mountain District Export Council being here at the  
18 South Metro Denver Chamber today for this testimony.

19          I have five simple points. First is to recognize  
20 that you're even doing this noble work in this field. Thank you  
21 to the Council, thank you to Paul Bergman of the US Commercial  
22 Services here today, specifically to the Chair Kristy Schloss of  
23 Schloss Engineering, our three subject matter experts, Kip  
24 Cheroutes, Frank Schuchat, John Anderson, as well as Monisha  
25 Merchant from Senator Bennet's office and Brandon Rattiner from

1 Senator Udall's office, who's here today.

2 I'd also like to recognize the expertise of one of our  
3 major employers in Colorado, and that's Lockheed Martin Space  
4 Systems. Please do not underestimate the importance of experts,  
5 who have just spoken here earlier today, in reaching out to the  
6 broader business community.

7 If you think about the history of space, much of it is  
8 military background or military related items, and therefore  
9 necessarily elements of confidential and national security  
10 assets. And that difficulty of translating the importance of  
11 things that can't be talked about to culture or to population,  
12 and it just cannot be underestimated how important it is to have  
13 taxpayers and citizens understanding the importance of aerospace  
14 when they can't fully know the complete picture.

15 Lockheed Martin specifically has had dozens of experts  
16 from their company at various political and economic development  
17 meetings throughout the year. I encourage all of you, no matter  
18 how small, medium, or large, if you can, to talk appropriately  
19 about your industry and about your company so we can remain or  
20 regain our excellence in space and our worldwide recognition.

21 Four other simple points. This area is the highest  
22 economic development sector priority of our Board of Directors  
23 of the Chamber. All businesses are important, whether you're a  
24 small retailer or a restaurant or professional service, but  
25 without primary jobs, people that actually manufacture,

27

1 companies that build something from nothing and sell it to  
2 others outside of our own economy, none of the rest of the jobs  
3 exist.

4 The primary employment of the aerospace industry is  
5 one of the highest priorities of any society. And we must work  
6 off our strengths. And in Colorado this is one of our  
7 strengths, not only for our local economy but for our national  
8 influence.

9 It also remains one of our top three public policy  
10 priorities; therefore, when asked if we'd host this today, the  
11 enthusiastic answer is, Yes. And we extend the invitation as  
12 often as you or any of your colleagues would like to use this  
13 facility. We built this facility to host events like this.  
14 Please come back often.

15 I think it's important to note the speed of business.  
16 We see it every day. There are tiny entrepreneurs that can  
17 start a business and literally have dozens or hundreds of  
18 employees in a matter of months.

19 Even in this sector, it's possible to have retired, or  
20 folks that decide they want to be their own boss, to start a new  
21 company. And if we wish to remain economically competitive, we  
22 need to make sure that all our other cultural and political and  
23 social norms follow how fast and easy it is to start a new  
24 business. So in all your deliberations, keep in mind that it's  
25 not just the tech companies that can start up overnight.

28

1 Other countries often don't have the burdensome  
2 bureaucracy, and I say that in a kind way. When you build a  
3 massive system such as the world's largest economy, it creates  
4 processes and procedures that often aren't conducive to business  
5 startups as other societies may not have that same burden.

6 Keep in mind that small and medium sized businesses  
7 are likely the most important that we all can reach out to, and  
8 we have to have our elected officials and our appointed

9 officials and our appropriate trade organizations have processes  
10 like today's where a small company has an asset and a resource  
11 to come and have a conduit of information for reviewing rules.

12         We heard discussion today how difficult it is to read  
13 federal regulations and whether that really applies, and of  
14 course with government affairs and lobbyists and lawyers you can  
15 solve anything unless you're a small company trying to start up  
16 your business.

17         We have to culturally understand that we need to work  
18 together on this and streamline processes and communication  
19 channels.

20         Finally, another one of our public policy issues that  
21 has been essential is STEM. We've had a committee for five  
22 years working on that with Lockheed Martin and the Gates  
23 Corporation, et cetera. And to take from our earliest childhood  
24 memories what inspired you, and usually it's something as simple  
25 as a kite or an SS rocket or maybe watching a plane overhead, to

1 the time when you don't understand why you're taking the math  
2 course in middle school, and then the difficulty in high school,

3 and then for some of you or many of you in this audience today,  
4 actually starting to understand complex problem solving,  
5 mathematical equations, for all of us to talk about the  
6 importance of innovation and inspiration.

7         We usually, as humans, do what we talk about. And if  
8 we don't talk about the importance of exploration and the  
9 importance of future problem solving, and what else is out in  
10 the great grand universe, we might just end up doing other stuff  
11 not so noble as continuing our yearning as the human species to  
12 explore.

13         So as you pursue these rules, it's hard to explore  
14 without money. It's hard to explore without the resources of  
15 having a job. And in this global economic competitive  
16 environment we're in, we need to ensure that all our companies,  
17 small, medium, and large, have all the tools and resources  
18 available to inspire our youngest children and our middle aged  
19 engineers and scientists to continue to reach the higher ground  
20 not only for national security reasons, which we obviously want  
21 to safeguard, but whenever possible, to sell our extraordinary  
22 science to the appropriate entities that may wish to buy it.

23         Again, thank you for being here today.

24 MS. SCHLOSS: Thank you, John.

25 Is there anybody else who would like to speak on the

30

1 record? Seeing none, I hereby declare the proceedings closed.

2 Thank you.

3

4 (Whereupon the within proceedings adjourned at

5 10:54 AM.)

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1                    C E R T I F I C A T I O N

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3

4            I, Martha Loomis, Certified Shorthand Reporter,

5 appointed to take the within proceedings hereby

6 certify that the proceedings was taken by me, then reduced to

7 typewritten form by means of computer-aided transcription; that

8 the foregoing is a true transcript of the proceedings had

9 subject to my ability to hear and understand, and that I have no

10 interest in the proceedings.

11

12 IN WITNESS WHEREOF, I have hereunto set my hand.

13

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15

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16 Martha Loomis

17 Certified Shorthand Reporter

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20 Proofread by E. Williams

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These comments are submitted by EADS North America Inc., on behalf of itself, of the EADS Group Export Compliance Office and of the EADS entities in France, Germany, Spain, The Netherlands and United Kingdom which constitute Airbus, Astrium, Cassidian and Eurocopter.

**Comments to the State proposed rule**

RIN (1400-AD33)

ITAR Amendment USML Cat XV and Defense Services

To the Attention of DDTCResponseTeam@state.gov

**Part 120 – Defense Services 120.9 (a)(2)**

The definition of Defense Services captures the assistance provided by a US person to a foreign person for the integration of any EAR item into an end item or component controlled as a defense article, whatever the origin of the defense article.

With respect to items controlled on the CCL, we propose to limit the definition of defense services to the integration into foreign Defense Articles of “500 series” and “600 series” items only. We make this suggestion because of the inherent ambiguities in the definition of “integration”, and the resulting likelihood that parties will conclude that a TAA is required for any discussion of the use of an EAR item on a new product. For example, if a U.S. supplier of a paint classified under EAR99 or controlled only for AT reasons gives recommendations for how a surface should be treated prior to application of the paint, would that be treated as a defense service? We believe that the regulations should focus on EAR items with a genuine military or space focus, specifically the items classified under the 500 and 600 series.

§ 120.9 (a)

(2) The furnishing of assistance to a foreign person, whether in the United States or abroad, for the integration of any item controlled on the U.S. Munitions List (USML) (*see* § 121.1 of this subchapter) or items subject to the EAR’s ECCN “500 series” or “600 series” into an end item (*see* § 121.8(a) of this subchapter) or component (*see* § 121.8(b) of this subchapter) that is controlled as a defense article on the USML, regardless of the origin.

Alternatively or in addition, we propose that the definition of “integration” expressly exclude the provision of basic “form and fit” information. To use the example in the proposed rule, the manufacturer of a military vehicle will need to know the dimensions and electrical requirements of the dashboard radio



when designing the vehicle. If the provision of such information is “integration” and not “installation,” the term “installation” will be largely meaningless for all new products.

“Integration” is distinct from “installation,” which means the act of putting something in its place and does not require changes or modifications to the item in which it is being installed (e.g., installing a dashboard radio into a military vehicle where no changes or modifications to the vehicle are required). “Integration” does not include the provision of basic form and fit information.

Under the Proposed Rule, a U.S. applicant, who provides a defense service related to the integration of an EAR item into a foreign-origin Defense Articles will be required to have a license or qualify for a License Exception under the EAR, and as well have a Technical Assistance Agreement under the ITAR. To avoid this redundant licensing, we propose the following be included in §120.22.

§120.22 Technical Assistance Agreement

.....

Where Defense Services are based on the integration of items subject to the EAR, export of the related EAR Technology (technical data) maybe authorized as part of the Technical Assistance Agreement authorizing the Defense Service, in accordance with §120.5(b).

**Part 120 – Defense Services 120.9 (b):**

§ 120.9(a)(1) defines “defense service” to include intermediate or depot level maintenance. By its plain terms, therefore, it does not include organizational-level (basic) maintenance. § 120.9(b)(1) expressly excludes from the definition of defense service “Training in organization-level (basic-level) maintenance” (emphasis added), but does not mention the provision of basic-level maintenance. Commenters on the April 2011 version of the proposed regulations pointed out this inconsistency. In the notice published on May 24, 2013, DDTC noted these comments but did not clearly resolve them. DDTC seemed to indicate that basic-level maintenance should be treated as a defense service, but did not address the language of the regulation. We suggest that not only the training in basic maintenance, but the basic maintenance itself be excluded from the definition of defense service. This adjustment would reduce the burdens of TAA maintenance for activities that are low-level and routine.

(b) The following is not a defense service:

(1) Training in and provision of organizational-level (basic-level) maintenance of a defense article .....



The proposed rule references § 120.38 for the definitions of maintenance levels, but that proposed regulation was not published. We suggest that “basic maintenance” be defined in §120.38 with minor modifications to the definition proposed previously in April 13, 2011:

§ 120.38

Organizational-level maintenance (or basic level maintenance) is the first level of maintenance performed by an end user unit or organization ``on-equipment" (directly on the defense article or support equipment) assigned to the inventory of the end user unit or organization. Its phases consist of repair, inspecting, servicing, or calibration, testing, lubricating and adjusting equipment, as well as replacing minor parts, components, assemblies and line-replaceable spares or units.

§120.9 (b) (2) excludes from the definition of defense service the “*mere employment of a natural U.S. person by a foreign person*”. But the definition of defense service in 120.9 (a) (1) captures the furnishing of assistance without distinguishing whether this assistance is technical in nature or not. A U.S. scheduler or U.S. accountant, or a U.S. translator, employed by a foreign person in a production plant of a foreign military aircraft could be deemed as rendering a defense service by furnishing assistance to the production of a defense article”.

We believe that the requirements for licensing the provision of defense services by U.S. persons employed by foreign person should be limited to “assistance” which is technical in nature and when the technical know-how is of U.S. origin.

We suggest clarifying the exclusion by qualifying the nature of the assistance in the definition of defense services and by adding a clarification note to 120.9 (b) 2 as follows:

§ 120.9 Defense Service

(a)

(2) The furnishing of technical assistance to a foreign person, whether in the United States or abroad, for the integration of any item controlled on the U.S. Munitions List (USML) (*see* § 121.1 of this subchapter) or items subject.....

Note to 120.9 (b) (2): A U.S. person employed by a foreign person is not providing a defense service if this employee is not providing assistance derived from U.S.-origin technical data controlled on the U.S. Munitions List (USML).

The furnishing of a defense service related to the integration of an EAR article into a foreign defense article may create an ambiguity as to whether technical data is subject to the ITAR or the EAR. To resolve this ambiguity, we propose to amend 120.9 (b) 3 to read:

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§ 120.9 (b)

The following is not a defense service:

(3) Provision of technical data or servicing of an item subject to the EAR that has been integrated or installed into a defense article.

Nonetheless, where there is considered to be a defense service based on the integration of items subject to the EAR, the option should remain of having exports of the EAR technical data authorized under the technical assistance agreement authorizing the defense service, in accordance with §120.5(b),

**Cat XV (11)**

*(11) Are man-rated sub-orbital, orbital, lunar, interplanetary or habitat; or*

This description seems to capture the International Space Station which is covered under the EAR proposed rule under 9A004 a) , We suggest to specifically exclude the International Space Station.

We are available to further discussion and provide further information, please contact Corinne Kaplan via telephone at 703-466-5741 or via email at [Corinne.Kaplan@eads-na.com](mailto:Corinne.Kaplan@eads-na.com).

Respectfully,



Pierre Cardin  
Senior Vice President  
EADS Group Export Compliance Officer



Corinne Kaplan  
Vice President, Affiliate Trade and Export Compliance  
EADS North America

5 July 2013

To: DDTC Response Team

Subject: Comments to Federal Register/Vol. 78, No. 101/Friday, May 24, 2013/Proposed Rules

In response to the subject Federal Register notice, International Rectifier (IR) is providing the following comments regarding the proposed revisions to the ITAR for your review and potential inclusion into the Final EAR revisions to be published in the future

**Commodity Jurisdiction Determinations**

78 FR 22749 states, "Previously issued commodity jurisdiction (CJ) determinations for items deemed to be subject to the EAR shall remain valid...".

This concept is not specifically carried forward into the subject FR.

IR has CJs, from 2003, that determined some of our parts, which were subject to the ITAR at that time, to be subject to the EAR, either as EAR99 or ECCN 9A004. With the impending issuance of these revised rules for USML Category XV, it is possible that a determination review of these now EAR items might result in them being determined to be subject to the ITAR again, unless the current CJs remain valid.

Assuming that it is intended that CJs of this kind are meant to remain valid, even should the underlying ITAR/USML descriptions be revised, we recommend that the language from 78 FR 22749 also be included in the final version of the FR to be issued that will finalize revised Category XV descriptions.

You may direct any questions or comments regarding these comments to William G. van Amerongen or International Rectifier by e-mail at [wvaname1@irf.com](mailto:wvaname1@irf.com) or by phone at 310-252-7020.

William G. van Amerongen  
Director, International Trade Compliance  
International Rectifier Corporation

**From:** [paul.werbos@gmail.com](mailto:paul.werbos@gmail.com) [<mailto:paul.werbos@gmail.com>] **On Behalf Of**  
Paul Werbos  
**Sent:** Friday, July 05, 2013 2:36 PM  
**To:** DDTC Response Team  
**Subject:** ITAR Amendment—USML Category XV and Defense Services.

The National Space Society has just completed a comprehensive evaluation of these proposed new regulations, drawing on inputs from many sources, posted at [nss.org/itar](http://nss.org/itar).

While I agree with all of these NSS positions, I have an additional personal concern. It is good that we relax restrictions which get in the way of new industry based on old strategic conditions, I can think of two or three cases where new strategic situations require consider tight new measures.

For example -- perhaps it is too loose to say that an object sent into space is not an "export" if it is initially controlled and operated by a US entity.

I would propose serious consideration of:

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For purposes of ITAR regulation, any object inserted into earth orbit or deep space will be deemed to be an export, even if it is owned and controlled by a US entity, unless the computer operating system for this object is either: (a) a version of SE-Linux meeting the NSA standards for proper installation, without back doors; or (b) a new operating system, openly published, certified by NSA to be unbreakable by the same mathematical principles used to validate SE Linux, with computer validated verificaton of compliance for unbreakability without back doors.

Comment: Objects which would not be classed as munitions under section XV would still be unrestricted. The effect here would be to restrict the insertion of objects which can be used as weapons into a situation where they are unnecessarily vulnerable to being captured and used as weapons by ill-intentioned hackers. Unlike many historical worries, the threat of cyberwarfare now appears more realistic than it did in the past. The NSA development of SE

Linux was grounded in a serious and rigorous mathematical analysis of how to construct unbreakable operating systems, grounded in sources such as their "orange book" and the earlier mathematical literature which led to the development of the Multics operating system. Some have noted that Apple OS.X. \_\_ operating systems also lived up to those standards, but have recently experienced a few severe viruses (such as Maccontrol); however, the severity of those viruses was largely due to the presence of back doors. As the threats of virus and hacking grow, critical infrastructure and systems usable as weapons require a level of protection beyond what is necessary in ordinary personal computers.

=====

This sounds hardwired to Linux -- but really, it is hard-wired to NSA's competence, which is appropriate, and it uses SE Linux as an example of a class of systems.

=====

=====

I also am nervous about the guy in NASA Langley who recently tried to visit the Middle East and sell them cold fusion...  
how to bring radioactive material production to all over the place... From what I have seen, I believe it really is objectively dangerous,  
but putting it on the munitions list would just be free advertizement which it does not need.

Best of luck,

Paul

Dr. Paul J. Werbos

Not representing NSS, IEEE or NSF -- but grateful to all for inputs.

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

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July 5, 2013

To: DDTC Response Team

Subject: ITAR Amendment – USML Category XV and Defense Services [RIN 1400-AD33]

Exelis Inc. is pleased to respond to the Department of State’s request for comments on the proposed amendment of USML Category XV and revision of the definition of “Defense Services.

Regarding the proposed Category XV re-write, Exelis appreciates the years of work that has gone into the Section 1248 Report and this amendment. Exelis believes the recommendations set forth by DDTC offer a vast improvement to the current rendering of USML Category XV. DDTC and its interagency partners have done an admirable job identifying critical technologies for continued ITAR-control in creating the enclosed positive list. DDTC has successfully set functional thresholds to exclude commercial meteorological and communications satellites; however, some areas of potential contradiction and question remain. Exelis has sought to provide thoughtful and constructive comments that are consistent both with the aims of Export Control Reform and the commercial interests of Exelis Inc.

Exelis likewise believes that the proposed definition of “Defense Services” is a significant improvement over the existing definition. It would remove from the jurisdiction and licensing requirements of the ITAR services that have no impact on national security and thus do not merit control under the Arms Export Control Act. However, Exelis believes that modifications to some of the provisions of this definition and or additional guidance would be helpful in effecting what we perceive to be the intent behind the proposed rule.

### **§120.9 Defense service.**

*§(a) A defense service means*

*(1) The furnishing of assistance (including training) using other than public domain information (see § 120.11 of this subchapter) to a foreign person (see § 120.16 of this subchapter), whether in the United States or abroad, in the design, development,*

*engineering, manufacture, production, assembly, testing, intermediate- or depot-level maintenance (see § 120.38 of this subchapter), modification, demilitarization, destruction, or processing of defense articles (See Sec. 120.6 of this subchapter);*

Request DDTC reconsider the request to align the definition of fundamental research to that articulated under the EAR §734.8. While DDTC states in the public comments that fundamental research as defined is not controlled by the ITAR, the ITAR definition effectively excludes research conducted at universities from being considered “fundamental research” via Sec. 120.11(a)(8)(i), which states that certain information is not fundamental research if the university accepts “other restrictions on publication”. This is easily interpreted to exclude the accommodations made by BIS for patent and proprietary prepublication reviews as set forth in EAR §734.8 (b)(2-5) to allow for agreement on some level by a corporate or industry sponsored pre-read to ensure the lack of proprietary or technical data. It is highly unlikely that any university research, even for commercial purposes, would be without the restrictions such as those accommodated for in the EAR and excluded from the definition of fundamental research under the ITAR Sec. 120.11(a)(8)(i). The ITAR definition of fundamental research is excessively broad and seems to require omniscience with respect to potential resultant commercial patents at the inception of a research project.

DTC could also consider an extrapolation of the “specially designed” concept as set forth in 120.41(b)(4)-(5) where the intent of the research, if known to be fundamental, could be documented at the initiation of the project regardless of later prepublication restrictions.

*(2)The furnishing of assistance involving the use of technical data to a foreign person for the integration of any item controlled on the United States Munitions List ... or an item ~~items~~ subject to the EAR into an end item or component that is controlled as a defense article on the USML, regardless of the origin.*

In several places in the guidance accompanying this proposed definition DDTC notes that integrating an item into a defense article “necessarily involves the use of technical data”. Exelis believes it would be helpful to specifically set this out in the definition, as we can conjure up several hypotheticals where the integration of items classified as EAR 99 (which are *subject to the EAR*) into a defense article could be accomplished without the use of technical data. Alternatively, or in conjunction with this change, DDTC may want to go back to its initial proposed definition which covered only integration activities involving items *controlled* under the EAR. It is difficult to conceive of any situation involving the integration of a controlled item that would not entail the use of some technical data. Exelis also believes that the *word items* immediately preceding the phrase *subject to the EAR* should be changed to *item* to make it clear that the integration of a single item subject to the EAR into a defense article is all that is required to render integration activities a defense service.

*(3)The furnishing of assistance ...to a foreign person regardless of whether technical data ... is transferred, including formal or informal instruction in the United States or abroad by any means , in the tactical employment (not basic operation) of a defense article.*

Exelis has a general appreciation of the difference between *tactical employment* and *basic operation*, but it is difficult to divine where the former ends and the latter begins. Guidance on this subject in the form of explanatory notes or exclusions under subsection (b) would be greatly appreciated.

*(5)The furnishing of assistance (including training) to a foreign person in the integration of a satellite or spacecraft to a launch vehicle ...*

*(6)The furnishing of assistance (including training) to a foreign person in the in the launch failure analysis of a satellite...*

Exelis believes the phrase *to a foreign person* should be added to both of these definitions to make them consistent with the language used in the other subsections of the proposed rule and to dispel any notion that assistance which does not involve a foreign person could under some set of facts conceivably constitute a defense service.

### **§121.1 General. The United States Munitions List.**

\* \* \* \* \*

#### **Category XV— Spacecraft Systems and Related Articles**

*\*(a)(7) Have any of the following electro-optical remote sensing capabilities or characteristics:*

*(i) Electro-optical visible and near infrared (VNIR) (i.e., 400nm to 1,000nm) or infrared (i.e., greater than 1,000nm to 30,000nm) with less than 40 spectral bands having an aperture greater than ~~0.35~~ 0.70 meters;*

Exelis respectfully proposes an increase in the aperture threshold for remote sensing satellites in XV(a)(7)(i) from 0.35 meters to 0.70 meters. It is the position of Exelis that this increase will have no negative impact to national security and will provide a more relevant threshold for U.S. industry. The underlying technology for a 0.70 meter system is essentially the same as the technology found in a 0.35 meter system, the only discriminating difference being the physical size of the optics. 0.70 meter aperture systems have been utilized in U.S. commercial remote sensing systems since the mid-1990's when Exelis developed and produced the imaging system for the IKONOS satellite. By contrast, today's U.S. commercial electro-optical systems are operating with 1.1 meter aperture systems and have been since 2009.

Exelis has also observed that a 0.70 meter threshold is relevant to current market conditions as numerous foreign competitors have provided or have been contracted to provide 0.70 meter-class systems for foreign customers as shown in Figure 1 below<sup>1</sup>.

Finally it is the understanding of Exelis that electro-optical remote sensing systems that move to 9A515 would remain subject to a Presidential Directive requiring a Satellite Cooperation

<sup>1</sup> Exelis has attached a white paper as Addendum 1 to this letter with additional information regarding the proposed aperture change.

Agreement (SCA) be executed by the Department of State and the prospective foreign government of any country seeking to acquire an applicable U.S. remote sensing system. This SCA requirement further protects national security in a manner consistent with this recommendation.

*Figure 1. Open Source International EO Satellite Systems with Aperture 0.65m or Greater*

<i>Country</i>	<i>System</i>	<i>Aperture (m)</i>	<i>Launch</i>	<i>Optics Company/Organization</i>
<i>India</i>	<i>CartoSat-2A</i>	<i>0.70</i>	<i>2007</i>	<i>Indian Space Research Organisation (ISRO)</i>
<i>India</i>	<i>CartoSat-2B</i>	<i>0.70</i>	<i>2010</i>	<i>Indian Space Research Organisation (ISRO)</i>
<i>France</i>	<i>Pleiades-1A</i>	<i>0.65</i>	<i>2011</i>	<i>Thales Alenia Space</i>
<i>France</i>	<i>Pleiades-1B</i>	<i>0.65</i>	<i>2012</i>	<i>Thales Alenia Space</i>
<i>Korea</i>	<i>Kompsat-3</i>	<i>0.72</i>	<i>2012</i>	<i>Thales Alenia Space</i>
<i>Israel</i>	<i>Ofeq 10</i>	<i>0.70</i>	<i>2013</i>	<i>Elbit Systems Electro-Optic (Elop)</i>
<i>Turkey</i>	<i>Gokturk-1</i>	<i>0.65*</i>	<i>2013</i>	<i>Thales Alenia Space</i>
<i>Italy</i>	<i>OPTSAT 3000</i>	<i>0.70</i>	<i>2015</i>	<i>Elbit Systems Electro-Optic (Elop)</i>
<i>Japan</i>	<i>ASNARO-1</i>	<i>0.70</i>	<i>2013</i>	<i>NEC Corporation</i>
<i>Japan</i>	<i>ASNARO-2</i>	<i>0.70</i>	<i>2014</i>	<i>NEC Corporation</i>

*\* Based on reporting that the Gokturk-1 imager is based on Pleiades*

*(e)(2) “Space-qualified” optics (i.e., lens or mirror), including optical coating, having active properties (e.g., adaptive or deformable), or having a largest lateral dimension of the clear aperture greater than 0.35 0.70 meters;*

Exelis recommends the insertion of the phrase “of the clear aperture” in regards to the lateral dimension requirement in this paragraph. Typically optics utilized in a given system will be manufactured to a larger dimension than the useful clear aperture and should be controlled by the latter, not by the actual size of the optic. Without this addition, the threshold for USML control is inconsistent with the stated system aperture requirement of (a)(7)(i) i.e. a 0.35 meter aperture payload would be controlled as 9A515, but the primary mirror of the system would be subject to XV(e)(2) because the optic will be manufactured at least fractions of an inch larger than the 0.35 meter clear aperture.

Exelis also proposed an increase the aperture threshold from 0.35 to 0.70 for consistency with our recommendations in (a)(7)(i).

Finally Exelis proposes the insertion of quotation marks around the term “space-qualified” for consistency with other paragraphs, as “space-qualified” is a defined term in Note 2 to paragraph (e).

*(e)(3) “Space-qualified” focal plane arrays (FPA) having a peak response in the wavelength range exceeding 900nm for items in paragraph (a) of this category and readout integrated circuit (ROIC) specially designed therefor;*

Exelis requests clarification of paragraph (e)(3) as it is unclear from the language if focal plane arrays having a peak response in the wavelength range exceeding 900nm that do not utilize readout integrated circuits are intended to be retained on the USML or controlled elsewhere.

*(4) “Space-qualified” mechanical cryocooler, active cold finger, and associated control electronics : “specially designed” therefor for items in paragraph(a) of this category ;*

Exelis suggests the inclusion of a reference to paragraph (a) of this category for both paragraphs (e)(3) and (e)(4) respectively. Exelis makes this suggestion due to concerns regarding the implementation of DDTC’s previously proposed §126.19 “Policy on the export and re-export of defense articles incorporated into commodities ‘subject to the EAR<sup>2</sup>.’” Exelis-produced meteorological instruments are excluded from ITAR control under paragraph (a)(7), which Exelis believes is a great success of the proposed amendment. These instruments do, however, utilize key components controlled by paragraphs (e)(3) and (e)(4) respectively. These components each make up substantially more than 1% of the end item value, a proposed requirement of §126.19(a)(4), which would result in meteorological instruments remaining subject to ITAR control.

As an alternative to the suggestion to include a reference to “paragraph (a) of this category,” in paragraph (e)(3), Exelis suggests an increase of the de minimus content percentage as proposed in §126.19(a)(4) from 1% to 10% for each individual component.

*(e)(5) “Space-qualified” active vibration suppression, including active isolation and active dampening, and associated control electronics therefor;*

Exelis proposes the addition of “active” as a qualifying description given that isolation and dampening can both be done through passive means that are not intended for control in this paragraph.

*Paragraph (6) Optical bench assemblies, for items in paragraph(a) of this category and the multi-aperture assemblies, fast steering mirrors assemblies (i.e., greater than 300 rad/sec<sup>2</sup> acceleration), pushbroom assemblies, flexure mounts, beam splitters, mirror folds, focus or channeling mechanisms, alignment mechanisms, inertial reference unit (IRU), black body cavities, and baffles and*

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<sup>2</sup> This proposed addition of §126.19 was published in the Federal Register on Tuesday, March 15, 2011, yet no final rule has been implemented.

*covers, for items in paragraph (a) of this category and control electronics specially designed therefor;*

Exelis requests that the term “optical bench assemblies” and “multi-aperture assemblies” be defined or clarified with a note in the paragraph as the terms are used in the commercial industry to refer to many different things. It is unclear if the intent of this section is to capture telescopes, specific bench assemblies within a telescope, or some combination of both. It is also unclear if the items listed after “optical bench assemblies” are intended to be an inclusive list of items within an “optical bench assembly” or if each item is separate and distinct in the list.

Exelis proposes also moving the phrase “for items in paragraph (a) of this category” to the end of the paragraph to alleviate confusion about individual items listed after the phrase in the current wording.

Exelis also proposes several edits to the list of items in paragraph (e)(6) to provide additional clarity. It is the position of Exelis that neither “flexure mounts” nor “covers” should be considered critical national security technologies warranting ITAR-control. Flexure mounts are a commonly used optical mount utilized in both space and ground telescopes and do not seem to warrant control under the ITAR regardless of end application. Additionally “Fast steering mirrors,” “beam splitters,” and “mirror folds” are optical components subject to paragraph (e)(2) depending on their properties and lateral dimensions. The current phrasing creates the potential for conflicting controls between the paragraphs. Exelis has, however, proposed the addition of the word “assemblies” in reference to fast steering mirrors to exclude the optic yet maintain control of the active assembly that controls the optic under paragraph (e)(6).

*(7) Non-communications “space-qualified” directed energy (e.g., lasers or RF) systems and specially designed for a spacecraft in paragraph (a) of this category;*

Exelis requests clarification of this paragraph as it is unclear whether this paragraph is intended to include space-qualified LIDAR, which is currently excluded from USML Category XV<sup>3</sup>.

Exelis proposes the insertion of quotation marks around the term “space-qualified” for consistency with other paragraphs, as “space-qualified” is a defined term in Note 2 to paragraph (e).

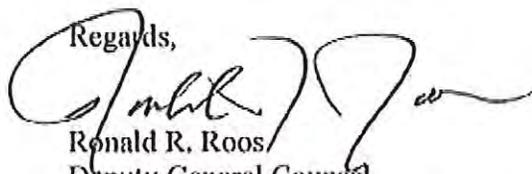
*\*(18) Department of Defense funded secondary or hosted payload, and specially designed parts and components therefor;”*

Exelis proposes the full deletion of paragraph (e)(18). The source of funding for a specific payload or satellite should not be a factor in determining the jurisdictional control of an item, as it is contrary to the publicized intent of the Export Control Reform initiative as a whole.

<sup>3</sup> “Space qualified laser radar or Light Detection and Ranging (LIDAR) equipment” is currently excluded by paragraph (e)(9) of USML Category XV

Paragraph (e)(17) appropriately controls hosted and secondary payloads that perform functions of paragraph (a) of this category. Should the U.S. DOD ever provide even partial funding to a foreign hosted payload program it would, according to (e)(18), alter the export classification of an otherwise 9A515-controlled U.S. payload. This would result in a company having one payload subject to both export control regulations simultaneously, which unnecessarily creates problems for a company's internal compliance infrastructure.

Regards,



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

Addendum 1

CC: Mike Watson  
Trade Compliance Manager, Empowered Official  
Geospatial Systems

Andrea Quercia  
Vice President & General Counsel, Corporate Responsibility  
Geospatial Systems



## Export Modernization for Electro-Optical Satellite Components

**ISSUE:** Exelis recommends that electro-optical (EO) satellite systems with apertures of 0.70 meters or below\* be controlled by the Department of Commerce via the Export Administration Regulations (EAR), rather than the Department of State via the International Traffic in Arms Regulations (ITAR). A rapidly growing set of international competitors are supplying EO systems with apertures much larger than the proposed threshold of 0.35 meters, putting U.S. economic and security interests at a disadvantage. Failure of the U.S. to appropriately control the export of earth observation satellite technology under modernized Department of State and Department of Commerce controls will likely have continued dire implications for U.S. leadership in remote sensing technology, and will ultimately impact our national security industrial base.

**BACKGROUND:** The unintended consequences of ITAR have been chilling. Multiple trade associations and government studies have conveyed the devastating impact; in 1995, U.S. companies held 73% of the worldwide share of satellite exports, falling to a staggering 25% by 2005. And despite U.S. leadership in earth observation satellite capability (and projections of stable global demand [Figure 1]) **no** U.S. supplier has built an earth observation system for a foreign purchaser. Today, that market is served primarily by French, British and South Korean companies.

The imperative for U.S. manufacturers to compete on a level playing field internationally has only increased in recent years. In 2012, after the release of the Section 1248 Report to Congress, cuts to U.S. government commercial imagery purchases resulted in the consolidation of the U.S. commercial remote sensing industry. The remaining provider has announced plans to shrink its constellation and to delay its next satellite start, making it all the more imperative for satellite and payload manufacturers to turn internationally to sustain production capabilities.

The first commercial EO satellite system, IKONOS, was developed in the U.S. in the 1990's with a telescope aperture of 0.70 meters. By comparison, today's U.S. commercial EO satellites have a much greater aperture size of 1.1 meters. Exelis believes that moving systems with an aperture of 0.70 meters or less – the size Exelis developed for commercial use in the 1990's – to the Commerce Control List (CCL) would allow U.S. firms the ability to better compete in key international markets.

**DISCUSSION:** Currently, foreign EO satellite systems are available commercially and sold internationally with apertures of 0.65 meters or greater, and countries are developing their own larger systems for purely government use. In many cases, companies from these nations are competing against U.S. firms to win business, often successfully leveraging ITAR controls against U.S. manufacturers. Exelis has compiled a chart based on open source data (Figure 2) detailing foreign systems with 0.65 meter or greater mirror aperture to demonstrate the foreign availability of such systems.

Clearly, the U.S. is no longer the sole developer of 0.65 to 0.70 meter EO systems. Foreign competitors are aggressively bolstering their own industries through sales of so-called "ITAR free" satellites, which provide other nations with satellite capacity without U.S. oversight or control. Rather than stopping foreign governments from acquiring high-resolution earth observation systems, ITAR has encouraged nations to acquire this capability from foreign competitors with no benefit to U.S. security. As a result, U.S. firms are forced to rely on shrinking U.S. budgets.

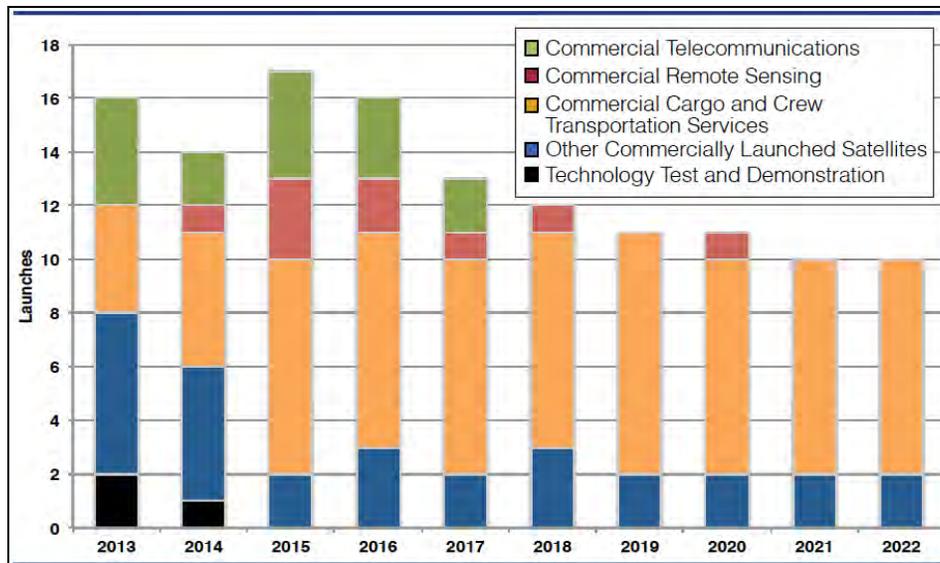
*In addition, the underlying technology for a 0.70 meter system is essentially the same as the technology found in a 0.35 meter system proposed for Commerce control under the Section 1248 Report; thus Commerce control of 0.70 meter systems would not include more advanced technology than currently proposed.*

**IMPACT:** As federal budget constraints impact the U.S. EO satellite industry, now is certainly the time to allow U.S. firms the ability to compete on a level playing field internationally and help the U.S. maintain our leadership role in remote sensing technology. The right reforms would ensure our most sensitive capabilities remain protected while also allowing U.S. earth observation satellite builders to continue to push the envelope on technology and stay ahead of our foreign competitors. Revenue from international sales would help ensure U.S. industry's viability to produce high-end commercial EO systems that provide vital support to our warfighters, allies and first responders.

**RECOMMENDATION (Figure 3):** Commercial-level EO satellite systems with an aperture of 0.70 meters or less\* should be considered for EAR control in order to allow U.S. industry to compete successfully (*in the current market*) while ensuring appropriate protection of U.S. national security capabilities. This recommendation would have no impact to the Presidential Directive requiring a Satellite Cooperation Agreement be executed by the State Department and EO satellite purchasing country, which places additional U.S. government national security limitations on the foreign use of the EO system.

*\*If the U.S. government is interested to set EAR controls for commercial EO aperture systems – based on international competitiveness over the long term – Exelis recommends consideration of an aperture size of 1.1 meters. See Attachment for additional background.*

**Figure 1. FAA Projected Non-Geo Launches from 2013-2022**



Source: [2013 Commercial Space Transportation Forecasts, May 2013, FAA Commercial Space Transportation \(AST\) and the Commercial Space Transportation Advisory Committee \(COMSTAC\)](#)

**Figure 2. Open Source International EO Satellite Systems with Aperture 0.65m or Greater**

Country	System	Aperture (m)	Launch	Optics Company/Organization
India	CartoSat-2A	0.70	2007	Indian Space Research Organisation (ISRO)
India	CartoSat-2B	0.70	2010	Indian Space Research Organisation (ISRO)
France	Pleiades-1A	0.65	2011	Thales Alenia Space
France	Pleiades-1B	0.65	2012	Thales Alenia Space
Korea	Kompsat-3	0.72	2012	Thales Alenia Space
Israel	Ofeq 10	0.70	2013	Elbit Systems Electro-Optic (Elop)
Turkey	Gokturk-1	0.65*	2013	Thales Alenia Space
*Estimate based on <a href="#">reporting</a> that Gokturk-1 imager similar to Pleiades				
Japan	ASNARO-1	0.70	2013	NEC Corporation
Japan	ASNARO-2	0.70	2014	NEC Corporation
Italy	OPTSAT 3000	0.70	2015	Elbit Systems Electro-Optic (Elop)

**Figure 3. Suggested Category XV Modifications:**

CATEGORY XV – SPACECRAFT SYSTEMS AND RELATED ARTICLES...\*

- (a) \*(7) Have any of the following electro-optical remote sensing capabilities or characteristics:
  - (i) Electro-optical visible and near infrared (VNIR) (i.e., 400nm to 1,000nm) or Infrared (i.e., greater than 1,000nm to 30,000nm) with less than 40 spectral bands having an aperture greater than ~~0.35 meters~~ **0.70 meters**;
- (e) Spacecraft systems, subsystems, components, parts, accessories, attachments, or associated equipment as follows:
  - (2) **“Space-qualified”** optics (i.e., lens or mirror), including optical coating, having active properties (e.g., adaptive or deformable) or having a largest lateral dimension **of the clear aperture** greater than ~~0.35 meters~~ **0.70 meters**;

\*Exelis Note: International aperture size expected to continue to increase. See [Attachment](#) for additional details on recommendations to ensure industrial competitiveness over longer term.

## Attachment: Maintaining Commercial EO Skills over Next Decade

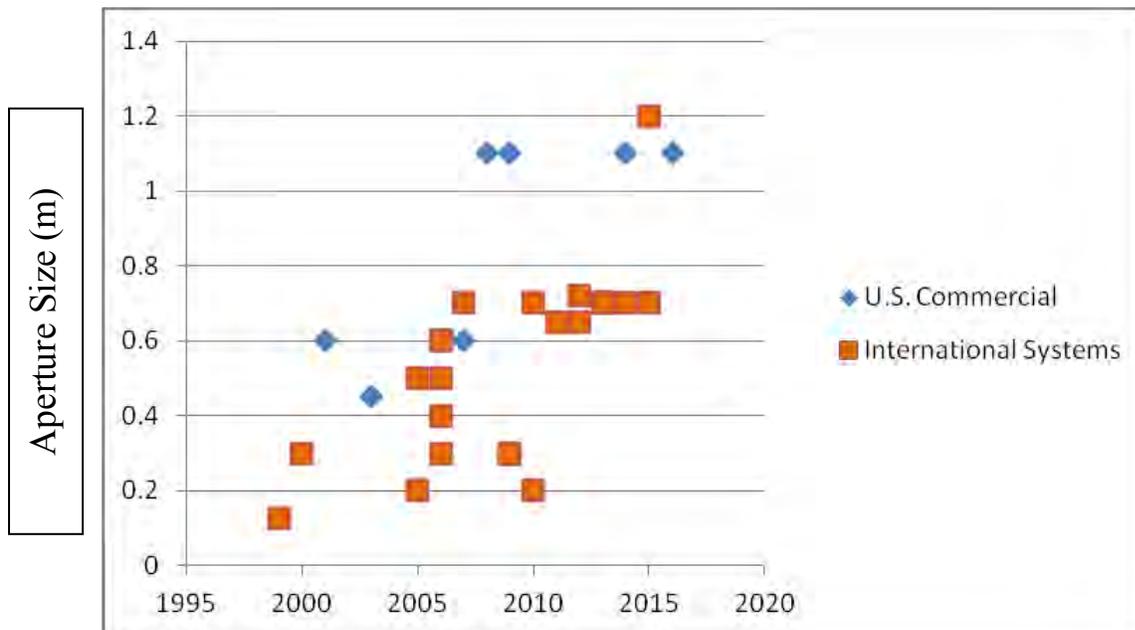
Even if the U.S. decides to move 0.70 meter aperture systems to the EAR, international competitors will continue to push the envelope on technology and eventually catch up with that level. If the U.S. is interested in modernizing USML and EAR controls with regards to the long term competitiveness of U.S. manufacturers, Exelis advises that systems with apertures up to 1.1 meters move to the EAR. This would allow U.S. firms to compete with systems based on what is manufactured commercially today; allowing U.S. suppliers to be more competitive against current and future foreign offerings.

Consideration of such would be in line with the [U.S. Commercial Remote Sensing Policy](#), which states that a fundamental goal of the Policy is “sustaining and enhancing the U.S. remote sensing industry.” In addition, to support that goal, the Policy states that “remote sensing exports that are currently available or are planned to be available in the global marketplace also will be considered favorably” by the U.S. government.

While U.S. policy may reflect support for ensuring industrial competitiveness and technology leadership, other steps may be needed – such as export reform – to ensure implementation of U.S. policy.

A report prepared for the U.S. Department of Commerce by NorthRaven Consulting titled “[Leadership in the Remote Sensing Satellite Industry](#)” states that “**The U.S. is overly protective of capabilities and technologies, with the result that foreign governments and firms develop independently the capabilities that they cannot readily acquire from the U.S. The U.S. treats essentially all components and technologies for remote sensing (and all) satellites as munitions items, and those munitions export controls are applied too stringently.**”

### Commercial Remote Sensing Aperture Outlook:



Launch Year of U.S. Commercial and International EO Systems

*Aperture Size Expected to Continue to Increase over Next Decade*



July 6, 2013

DEPARTMENT OF STATE  
Office of Defense Trade Controls Policy  
RINs 1400-AC80 and 1400-AD33 (Public Notice: 8239)  
“ITAR Amendment-USML Category XV and Defense Services”

The Radio Amateur Satellite Corporation (AMSAT), a not-for-profit scientific and educational 501-(c)-(3) organization chartered in the District of Columbia in 1969, wishes to make comments and suggestions relative to the Referenced Dockets.

We ask that the Directorate of Defense Trade Controls (DDTC) explicitly confirm that satellites, ground equipment, and associated technical data for items pertaining to the Amateur Satellite Service are not subject to the ITAR when the new Category XV provisions are implemented.

### **Background**

We wish to make clear that our comments and suggestions reflect our members experience and are not created by legal counsel. AMSAT is composed of a dues paying membership of about 3,000 mostly American citizens with a smaller cadre of volunteers who manage the organization and a team of engineering volunteers who design/build amateur radio spacecraft. We have a single paid employee, our Office Manager. Legal advice and assistance, normally employed by for profit organizations, is normally beyond our financial means.

AMSAT is a unique organization, as reflected in our Mission Statement:

**“AMSAT is a non-profit volunteer organization which designs, builds and operates experimental satellites and promotes space education. We work in partnership with government, industry, educational institutions and fellow amateur radio societies. We encourage technical and scientific innovation, and promote the training and development of skilled satellite and ground system designers and operators.”**

We employ technology that once developed, is made freely available in the public domain, to design and build small satellites to promote space education and provide two-way communications for licensed amateur radio operators. All of the software associated with amateur radio “ground control systems” as well as most of the flight software is open source and freely available. All of AMSAT’s spacecraft development programs have been paid for by donations from AMSAT members, other individuals, other amateur radio organizations, and foundations.

Since its inception, AMSAT has designed, constructed, tested, and launched 15 communications satellites for use by licensed radio amateurs, either on its own or in cooperation with individuals associated with AMSAT-type organizations from other countries, such as Germany, the UK and Japan. Such international cooperation mostly took place prior to 1999, when commercial satellites were returned to ITAR. However, AMSAT did self-disclose in 2009 to DDTC when we recognized that we may have been in violation of the ITAR deemed export rules.

All AMSAT satellites, past, present, and future, are licensed by the Federal Communications Commission (FCC) in the amateur-satellite service, which is established by Treaty. See International Telecommunication Convention and annexed radio regulations, ART1, RR 1.56 and 1.57.<sup>1</sup> The same language is repeated domestically in 47 USC 153(3) and 47 CFR 2.1(c).

Essentially, all AMSAT projects must be for self-training by licensed *persons* who are interested in radio technique for personal purposes and *without compensation* of any kind. (Emphasis supplied.)

AMSAT is currently building four “CubeSat” spacecraft that will host educational and scientific payloads as well as equipment for two-way amateur radio communications plus telemetry to downlink science data and provide satellite status information. As a result of AMSAT’s non-profit status plus the technical merits of our proposals, two of the CubeSats have been accepted by NASA for launch in its Educational Launch of NanoSatellites (ELaNa) program. These CubeSats, because they commenced under the post-1999 ITAR restrictions, are designed and built entirely by US citizens, without any consultation with foreign nationals. This limits us in our efforts as many of those non-U.S. person amateur radio enthusiasts who we have consulted with prior to ITAR were very helpful to us in adding to our design ideas.

Amateur radio spacecraft provide not only communications facilities for amateur radio operators, but also unique opportunities for supporting Science, Technology, Engineering and Mathematics (STEM) in the classroom. AMSAT is currently collaborating with several organizations to develop classroom-based education opportunities utilizing amateur radio spacecraft as the basis for focusing on communications, earth sciences and physics. Analysis of spacecraft telemetry, for example, allows students to understand how spacecraft function and how telemetry can be used to determine spacecraft status. Determination of spacecraft spin rates, power generation and system status provides students with a better understanding of how spacecraft behave in orbit. The sharing of non-proprietary amateur radio spacecraft telemetry data allows students to evaluate the data obtained from a payload onboard the spacecraft. Clearly, this is an exciting approach towards bringing STEM into the classroom based upon “real” satellites.

Another difference between AMSAT, which uses volunteers to design/construct amateur radio spacecraft, and commercial for-profit firms with paid employees, is that we follow an “open source” approach to software development. All of satellite development efforts have been and will be placed in the public domain through publication in AMSAT’s bi-monthly magazine ([AMSAT Journal](#)), our annual [Proceedings of the AMSAT Space Symposium](#), and various amateur radio publications. We also publish these materials on our website ([www.amsat.org](http://www.amsat.org)).

## Summary

Over the past 43+ years AMSAT has been integral to the development of amateur radio communications spacecraft based upon the model of an all-volunteer organization that follows “open source” practices and creates spacecraft that are very low cost which also reflects relatively low levels of sophistication compared to commercial satellites.

Given these significant constraints, we ask that the Directorate of Defense Trade Controls (DDTC) explicitly confirm that satellites, ground equipment, and associated technical data for items pertaining to the Amateur Satellite Service are not subject to the ITAR when the new Category XV provisions are implemented.

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<sup>1</sup> **RR 1.56** *amateur service*: A radio communication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

**RR 1.57** *amateur-satellite service*: A radio communication service using space stations on earth satellites for the same purposes as those of the amateur service.

We appreciate the significant effort by DDTC personnel to implement the important changes to Category XV.

A handwritten signature in black ink that reads "Barry A. Baines". The signature is written in a cursive style with a large, looping initial 'B'.

Barry A. Baines, WD4ASW  
President

**From:** James Blodgett [<mailto:bjames1@nycap.rr.com>]

**Sent:** Sunday, July 07, 2013 7:49 AM

**To:** DDTC Response Team

**Subject:** ITAR Amendment—USML Category XV and Defense Services

We are entering an era where citizens may have meaningful involvement in space. Inexpensive 3D printers in space that use lunar regolith or asteroid material or elements derived from them will enable normal garage inventors and teams of students and faculty advisors to design tools that could be printed in space. Advanced 3D printers and small numerically controlled machine tools may be able to produce most of their own parts, the seeds of an industrial revolution in space that could grow exponentially. It could grow a lot before it hits limits. Studies estimate that there is enough material in the asteroid belt to build O'Neill habitats for trillions of people.

ITAR has a chilling effect on involvement of US citizens in such things, because it is difficult to draw the line between science fiction dreams and working blueprints. Examples are the many space drives that have been discussed in science fiction. Some might actually work, given advances in technology. Does this make space-based science fiction an ITAR violation? ITAR regulations talk of space craft "intended for use by the armed forces of any foreign country." Is this intention demonstrated when science fiction shows space ships being used by Klingons, or pictures them in a space opera involving the Chinese military? Suppose that the genre changes from science fiction to a speculative proposal that might possibly be implemented. If we say that a proposed space station might be visited by a French military aviator, does that proscribe us from any further public specification of the space station, since a visit would constitute use? Another example of the difficulty in identifying ITAR limits can be seen in the well known fact from basic science that water can be dissociated by electricity to produce hydrogen and oxygen, gasses that can be used for rocket fuel. Plans for making rocket fuel in space by dissociating water using solar power are posted on the Internet. Presumably mentioning the existence of these plans is not an ITAR violation. However, suppose one develops a slight modification of these plans, and therefore has information that is not in the public domain. Exactly how meaningful would the modification have to be before its disclosure to foreign nationals would be improper? These days, teams of garage inventors often work over the Internet, and often consist of folks of multiple nationalities, and teams of students often include foreign nationals. Are teams of this nature prohibited from building anything that might be flown in space? Regulations that might be interpreted to restrict science fiction or to restrict trivial modifications of well

known technology do very little to protect us from weapons, but when taken seriously they have a chilling effect on space research and on citizen participation in space research. Perhaps the examples I have given are not really ITAR violations, but they could be interpreted as such given the text of ITAR regulations. A citizen without recourse to a large legal department has no easy way to determine the precise meanings and the exceptions and the working interpretations. Sometimes even large legal departments keep things simple by telling members of their organizations to say nothing to foreign nationals about space. The folks most able to navigate ITAR appear to do so by assuming that it does not mean what it appears to say at key points.

The Chinese developed a great navy under Emperor Zhu Di, but then destroyed it. If they had followed a different path they might have sailed into Europe rather than the other way around. We are on the cusp of going into space. We are also on the cusp of possible civilization-destroying disasters like run-away global warming, nuclear war, or financial collapse--the list goes on-- disasters that could eliminate our ability to go into space. If we throw away expensively-developed US knowledge, other nations may not have time to replicate that knowledge, and humans may never get into space on a large scale at all.

Protecting us from weapons is a good idea. However, the best protection would be if fish had never evolved to live on land, so that we would never have evolved the ability to develop technology that can be used to produce weapons, a technology that also produces all of the commodities of the modern world. ITAR may accomplish similar protection by preventing us from moving into space on a large scale. I advocate being careful with technology. However, I also advocate carefully focusing this care so that it does not do lots of collateral damage and so that it has minimal impact on scientific freedom and on our constitutionally protected freedom of speech. I applaud the directive "to describe more precisely the articles warranting control."

From: Ute Marita Meissner [<mailto:u-m.meissner@t-online.de>]  
Sent: Sunday, July 07, 2013 11:42 AM  
To: DDTC Response Team  
Subject: ITAR-USML Category XV-Suborbital Vehicles

Directorate of Defense Trade Controls

Office of Defense Trade Controls Policy

U.S. Department of State

6 July 2013

SUBJECT: ITAR -- USML Category XV – Suborbital Vehicles

As a potential customer for a suborbital vehicle, I believe that there is global demand for manned suborbital vehicles that would be dampened by remaining on the USML.

At the moment there is a big interest because we see the need for these vehicles in the commercial marketplace. Suborbital flights close a gap concerning space flight research that will positively impact the world (upper atmospheric environmental research, biotechnology research, etc.). We also see them representing an important step in future aviation-like spaceflights that would enable a commercial passenger to go from Europe to America in 1-2 hours instead of 6-10 hours as today. Suborbital reusable spaceflight marks a new era and it will be a benefit in our global world if it is allowed to flourish in countries that are allies of the United States, like NATO countries.

Scientific research would be severely impacted if American suborbital vehicles like Spaceship 2 and Lynx would be unnecessarily constrained from temporary export. A lot of scientists would be happy to use such a flight possibility, but a precondition is the proximity between payload implementation and flight. It will

not be possible to send some sensitive experiments thousands of miles or it will be prohibitively expensive to send the team to the United States, versus flying locally.

New cooperation between the US and other countries will occur because of the flying of these vehicles in friendly countries.

Not to open this market means an inhibition of external investment and US export revenues and hence damage the creation of US jobs and jobs where the vehicles will fly. The technical development of this technology in the US has a great lead versus the rest of the world, but there are now serious international competitors in Switzerland and France for reusable suborbital launch vehicles. At the moment we prefer to use the US vehicles because the time line of availability, but if we are not allowed to use them in Germany and other places in Europe due to challenges in export licensing (and there is a stigma of having a „Defense Article“ in Germany) the others will catch up to the US and surpass the US manufacturers and operators.

Further I want to express that as a customer, we are ultimately concerned with safety. And safety comes from flying many many flights. The safety of US-manufactured vehicles for suborbital flights will be impacted if suborbitals will be placed on the USML. Because learning will be inhibited by fewer flights because of the limiting of the export of suborbital vehicles.

Best regards

Ute Marita Meissner



General Contractor providing design, engineering & assembly of space complexes.

July 5, 2013

Via E-mail to [DDTCResponseTeam@state.gov](mailto:DDTCResponseTeam@state.gov)

Directorate of Defense Trade Controls  
Office of Defense Trade Controls Policy  
U.S. Department of State  
PM/DDTC, SA-1, 12<sup>th</sup> Floor  
Washington, DC 20522-0112

**Comments Regarding ITAR Amendment – USML Category XV and Defense Services**  
*RIN (1400-AD33)*

First and foremost, we would like to applaud the work of the Directorate of Defense Trade Controls (“DDTC”) and your colleagues at the Defense Technology Security Administration (“DTSA”) to reform and improve the export control process. Even before the passage of the 2013 National Defense Authorization Act (“NDAA”), the DDTC, via Commodity Jurisdiction requests, General Correspondence letters, and other legal vehicles, have made huge strides to support commerce, security, and common sense. Additionally, we would like to take this opportunity to praise the DDTC’s former Managing Director, Robert Kovac, a strong leader and innovator who will be sorely missed by public and private officials alike.

Although you’re certain to receive a variety of suggested changes and even criticisms, we want to emphasize just how important the proposed regulations and the export control reform movement in general is not only to Bigelow Aerospace but the commercial space industry as a whole. For example, at its most recent meeting on May 15<sup>th</sup>, the Commercial Space Transportation Advisory Committee (“COMSTAC”, the Federal Advisory Committee to the FAA’s Office of Commercial Space Transportation which is comprised of individuals representing a broad spectrum of the commercial space industry) unanimously approved the following observations:

*“COMSTAC applauds the passage of the National Defense Authorization Act for Fiscal Year 2013 restoring authority to the President to transfer satellites from the United States Munitions List (“USML”) to the Commerce Control List (“CCL”) to allow for the appropriate control of technology and promote the competitiveness of the domestic space industry. COMSTAC strongly encourages the timely implementation of the provisions in the FY2013 NDAA and the transfer of certain defense articles on Category XV of the USML to the CCL as proposed by the Departments of Defense and State Report to Congress pursuant to Section 1248 of the NDAA for Fiscal Year 2010 (“Section 1248 Report”).”*

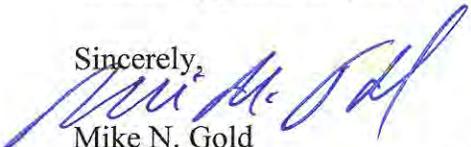
Additionally, we would also like to express our strong support for the manner in which the ‘passenger experience’ is being treated by the DDTC and the Department of Commerce’s Bureau of Industry and Security (“BIS”). The export control demands on passengers for commercial space operations have always been a grave concern for Bigelow Aerospace, and led to our filing a Commodity Jurisdiction request in late 2007. The response to our request, received in 2009, stated that the passenger experience for foreign nationals was still under the International Traffic in Arms Regulations but that specific aspects of the experience (internal and external exposure to Bigelow spacecraft, training to live and work on the spacecraft, etc.) were deemed to be non-licensable activities. Although there were minor limitations (such as a caveat excluding 126.1 countries and a mutually acceptable prohibition on foreign nationals operating or maintaining our spacecraft), the relief granted by this response to our Commodity Jurisdiction request allowed Bigelow Aerospace to continue to invest in developing its technology confident in the knowledge that our business plan could be implemented without facing any problematic export control issues.

Under the rules proposed by the DDTC and BIS, it’s our understanding that the relief that we (and later Virgin Galactic) were granted via Commodity Jurisdiction request will in essence be extended out industry-wide, specifically, that the ‘passenger experience’ and any technologies required for passenger participation in space travel will no longer be regulated per se under Category XV or BIS’s new ECCN 9E515. We fully support this determination, and believe it represents an improvement upon the path contemplated within the appendix of the Section 1248 Report.

Finally, while the current rules proposed by DDTC and BIS represent a significant step forward, we believe that it’s important to recognize that technology is not static, and that the U.S. export control regime will always be in need of review and revisions. Therefore, we recommend that a formal, mandatory, and regular process be established to conduct an interagency review of the USML and CCL on an ongoing basis. The Administration was previously considering something akin to this during the push for a single list, wherein twenty percent of the USML was going to be reviewed every year for five years. Without delving into the details of a specific approach, again, we believe that establishing a formal ongoing mechanism for review will ensure that both American security and commerce are supported by the national export control regime.

Thank you for your time and consideration of these comments. Should you require more information or have any additional questions for me either as Director of D.C. Operations & Business Growth for Bigelow Aerospace, or in my role as chair of the COMSTAC, I can be reached by phone at (240) 235-6016 or via e-mail at [mgold@bigelowacrospace.com](mailto:mgold@bigelowacrospace.com).

Sincerely,



Mike N. Gold

Director of D.C. Operations & Business Growth  
Bigelow Aerospace, LLC

Export Control Committee

8<sup>th</sup> July 2013  
HP/lw/26325

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Dear Sirs,

**ITAR Amendment – USML Category XV and Defense Services**

**Response to the Federal Register Notice: May 24, 2013, Vol 78, 8329 Proposed Rules Department of State Public Notice, Revision of U.S. Munitions List Category XV and Definition of “Defense Services”.**

The US Federal Register of May 24 2013 (Vol No. 78 Notice 8329) advised that the Department of State is proposing to amend the International Traffic in Arms Regulations (ITAR) to revise U.S. Munitions List Category XV and the definition of “Defense Services”.

It called for interested parties to provide comment by July 8<sup>th</sup> 2013.

This response is provided by the Export Control Committee of ASD, the AeroSpace and Defence Industries Association of Europe. ASD represents the aeronautics, space, defence and security industries in Europe in all matters of common interest with the objective of promoting and supporting the competitive development of the sector. ASD pursues joint industry actions which require to be dealt with on a European level or which concern issues of an agreed transnational nature, and generates common industry positions.



ASD has 28 member associations in 20 countries across Europe and represents over 2000 companies with a further 80 000 suppliers, many of which are SMEs. The industry sectors employ around 696,000 people, with a turnover of 154.7 billion €.

ASD welcomes the opportunity to comment on the Department of State's proposed rule and will at this time only comment on the Defense Services part of the rule but reserves the rights to make comments on Category XV. The comments are made on the basis on earlier comments provided 13<sup>th</sup> of June 2011.

ASD agrees with the Department that the current definition of defense services is 'overly broad' and welcomes the updated revised rule which we regard as a step forward. However, below we outline some improvements from which the rule, from our perspective, can benefit.

As a general comment we would prefer, and recommend, that the final rule be all encompassing e.g. not make reference to phrases as 'forthcoming rule', 'future guidance' or 'separate rule' since such statements leaves industry very much in doubt and uncertainty. We further recommend that all definitions and information be contained within the Section 120.9 definition of "defence services", and not in multiple sections of the ITAR or further explained by guidance from outside the ITAR.

Regarding 120.9(a) (1) we note that the Department has not included our earlier comments and thus it is to us still unclear if a foreign person (§120.16), furnishing assistance outside the United States (§120.13), on a non U.S. origin item using non U.S. origin technical data is exempt or not. By virtue of legal logic that must be the case but we would appreciate the confirmation from the Department on this issue.

We also request that the rule should explicitly state that it applies to the furnishing of assistance by US persons, or foreign persons inside the U.S. Today it is unclear whether foreign persons in the U.S. performing services (whether to U.S. persons or other foreign persons) are regulated by the ITAR (or, if only U.S. persons can provide defense services).

Like others we still note that the issues of 124.8 (5) still remains and that consequently it is likely that it will still contribute to a reluctance by foreign persons to acquire US origin services, even if not controlled or defence-related;- or to employ US citizens, -both because of the administrative cost of obtaining and controlling the necessary authorizations, and because of the potential implications for "derived data". The current wording raises many issues for a foreign person thus risking sustaining the "ITAR free" issue. A few of these issues are; *Does State really intend to regulate U.S. individuals living overseas and employed by a foreign person? Does these U.S. individuals need to register with State and obtain a TAA? How would the individuals know about this? What liability exists for foreign companies/foreign persons? How would State attempt to enforce this?* Comment made regarding the draft brokering regulation should from our view relate to also this issue *"Global enforcement is impractical and would create inequities. It will be impossible to have full knowledge of or monitor many thousands of companies' activities internationally which may encompass "brokering activities" as proposed. Some companies will submit numerous requests, some companies will decide not to proceed with activities so as not to be ensnared by the proposed regulations, and some companies will either be unaware of the requirements or operate outside the bounds....."*



We still have reservations about the use of the phrase "using other than public domain data" which will still constitute 'overly broad' and in the draft is vaguely defined. Keeping such a definition would seemingly include, for example:

- Any and all classified or restricted information issued by any government;
- Any and all company sensitive information, including programme, scheduling, personal and financial information with no technical content;
- Proprietary technical information with no defence content.

The Department has commented that it rejects comments made for this entry on the grounds that they want to control things other than technical data. We suggest that for the sake of clarity and in line with the ECR intentions, the new rule identifies what is covered on a "positive list basis".

Our second area of concern relates to the 'integration' provision at proposed ITAR Section 120.9(a)(2) in relation to 120.9(a)(1). It is not clear if (a)(2) should be understood as controls in addition to activities in (a)(1) and therefore asks for the Departments clarification.

The example provided on 'integration' also fails to provide clarity over the case where maintenance of an EAR controlled item 'integrated' must be performed while 'integrated'. If it has to be removed and later re-installed would that activity in itself be judged as a "defence service"? We therefore would suggest amending (a)(2) to say that it is only a "defense service" if it includes ITAR controlled U.S. origin technical data that is exported.

The above reasoning is from our perspective also applicable to (a)(5) and (a)(6). Again, we believe it desirable to clarify that a defense service is only furnished if ITAR-controlled US origin technical data is exported, and the article in question is a defense article. This would include integration of a commercial satellite only if technical data relating to the launch vehicle were exported, and launch failure analysis only if it related to the launch vehicle, and not from an ITAR-free, foreign-designed and produced item to a commercial satellite vehicle.

On the issue of US citizens employed by a foreign person we believe that the suggested rule is unclear as to whether it covers both "background" technical data and "foreground" in the course when in the course of their employment, they produce "technical data. We recommend that this should be clarified in the final rule. E.g. that the technical data must be of US origin exported from the US and not derived through the cause of a U.S. individual's employment by a foreign person.

The Department in its comments on comments received states that "The Department agrees activities between two U.S. persons do not constitute a defense service". We are asking for the Department's confirmation that reciprocally the same applies to foreign persons performing activities, covered by this rule, to a U.S. person whether in the United States or abroad.

ASD is looking forward to a continuous dialogue regarding US Export Control reform efforts.

Very truly yours,



Henrik Petersson  
Chairman ASD Export Control Committee



Office of the Vice Chancellor for Research

July 3, 2013

To Whom It May Concern:

REF: RINs 1400-AC80 and 1400-AD33 (ITAR Amendment – Category XV Spacecraft Systems and Related Articles and “Defense Services”)

The University of Colorado Boulder (UCB), an accredited institution of higher learning in the United States, is specifically interested in contributing to the export reform effort in order to ensure that the resulting regulations do not have an adverse impact on academic pursuits. As a result, UCB is providing the following comments in support of U.S. Senator Michael Bennet’s and U.S. Representative Mike Coffman’s working group on aerospace export control reforms and to the U.S. Department of State’s request for public comments on its proposed revision of U.S. Munitions List (USML) Category XV Spacecraft Systems and Related Articles and the definition of “Defense Services”.

UCB is also a member of the Association of University Export Control Officers (AUECO), a group of 28 senior export practitioners with experience at accredited institutions of higher learning in the United States. AUECO members monitor proposed changes in laws and regulations affecting academic activities and advocate for policies and procedures that advance effective university compliance with applicable U.S. export controls and trade sanction regulations. In addition to our comments below, UCB fully endorses the comments and recommendations provided to your office by AUECO.

The development of positive lists with objective parameters to describe controlled items is important for the export community. Clarification whether particular items are subject to the jurisdiction of the International Traffic and Arms Regulations (ITAR) or the Export Administration Regulations (EAR) will improve our ability to comply with the regulations. We strongly support efforts to move some satellites and spacecraft from the USML to the Commerce Control List (CCL). We recommend reconsideration of the appropriate jurisdiction for some of the articles proposed for retention on the USML. We express concern about the inconsistency between parts of the proposed “defense service” rule and the National Security Decision Directive 189 (NSDD189) *National Policy on the Transfer of Scientific, Technical and Engineering Information*, or allied exemptions already present in the regulations which could negatively impact academic collaborations and scientific inquiry

UCB has a strong “hands-on” academic program in the field of space research which involves many of our academic departments such as Aerospace Engineering, Computer Science, Physics, and Astrophysical and Planetary Sciences. In order to train the next generation of science and space

professionals, academic institutions such as UCB must have the freedom to teach specific aspects of space instrumentation without the barriers in the current legislation. We believe the positive changes address some aspects but do not go far enough. The following are a few examples:

- The rules focus on commercial aspects and ignore university space research. The fundamental mission of universities is to be open and not restrict class attendance based on nationality. The proposed rules are still too restrictive for university space research.
- We are working more on hosted payloads. If the DoD funds a hosted payload, even if it's completely unclassified, it is still ITAR controlled. The DoD has been encouraging universities to participate in these unclassified missions, but the ITAR regulations will continue to limit our ability to use foreign students.
- Infrared sensing is still ITAR-controlled. Many earth observation science missions use Short Wave Infrared, Medium Wave Infrared, and Long Wave Infrared which would remain ITAR-controlled. This also includes hyperspectral technologies which are becoming increasingly important for earth observations.
- Spacecraft that "track ground, airborne, missile, or space objects using imaging, infrared, radar, or laser systems" are still ITAR-controlled. Much of the same technology, especially GPS receivers and advanced star trackers, goes into spacecraft that do climate and weather science.
- CubeSats will be an increasingly important scientific and educational tool for university research but with the current restrictions, it is not clear that foreign student involvement is permissible.

The current restrictions also hinder the education of our U.S. students in key aerospace subjects. The examples below highlight these limitations.

- Our inability to openly offer courses which have hands-on space technology makes U.S. students less prepared for the workforce than students educated in other countries.
- The classification of technical information regarding attitude determination and control systems as well as GPS for spacecraft as ITAR seriously limits research and publications, which prevents U.S. students from obtaining advanced degrees in these fields and deters faculty from doing research to advance these fields. Such expertise is critical to the U.S. space industry. Such information is distributed in Europe and Asia without restrictions resulting in students educated there becoming more advanced than our U.S. students, and faculty at such institutions are able to drive the state of the art. If this continues it will cause U.S. aerospace companies and agencies such as DoD and NASA to have to specifically seek out students educated abroad to meet their needs, even though there are U.S. students interested and capable of pursuing work in these fields.

- The research using small satellites such as CubeSats is rapidly growing internationally. The current ITAR restrictions on development of spacecraft and payloads for small satellites put U.S. institutions at a huge disadvantage. International journals and conference proceedings regularly publish papers describing such developments. Since our academic institutions are prevented from freely publishing and distributing such information, the U.S. space capabilities will fall further behind compared to peer institutions around the world.

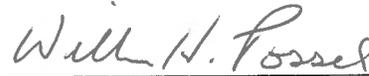
In conclusion, UCB thanks the President's Export Control Reform efforts as well as the efforts by Senator Michael Bennett and Congressman Mike Coffman to remove some satellites and spacecraft technology from the USML. Although these reform efforts will enable some greater involvement in space-related educational and research activities to be conducted at U.S. universities, we request that further steps be taken to re-evaluate the remaining ITAR defense articles and services in light of the crucial role which universities play in educating the next generation.

Sincerely,



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Stein Sture, Ph.D.  
Vice Chancellor for Research  
Huber and Helen Croft Endowed Professor  
College of Engineering and Applied Science



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William H. Possel  
Director, Mission Operations & Data Systems  
Laboratory of Atmospheric and Space Physics

WP:lm

**From:** Lane Haury [<mailto:volaris@gmail.com>]

**Sent:** Monday, July 08, 2013 1:37 PM

**To:** DDTC Response Team

**Subject:** ITAR Amendment—USML Category XV and Defense Services.

I want to commend the Department of State on taking an excellent first step in reducing the legal burden of developing spacecraft and their components. In addition to the enhancing the viability of commercial ventures this opens the door for a number of open source and citizen science projects envisioned by enthusiasts that are currently hampered by ITAR restrictions. Further opening and simplifying the development of the space industry by commercial and private enterprise is the critical next step in maintaining US industrial and scientific leadership.

§120.9 (a) (1)

I support the exclusion of the use of public domain information from being a defense service. This exclusion is particularly beneficial for open source and citizen science projects which tend to be almost exclusively built using public domain information.

§120.9 (a) (5)

This seems overly restrictive and would make helping integrate spacecraft or payloads that are not otherwise covered under USML Category XV a defense service. I believe this should be limited to spacecraft or payloads already covered under USML Category XV. This restriction is particularly burdensome for open source or citizen science projects that typically have extremely small budgets and are just looking for anyone who will take them as a secondary payload.

§120.9 (a) (6)

Like paragraph (a) (5), this seems too restrictive. I believe it should be limited to spacecraft or components otherwise restricted under Category XV (a) or the use of non-public domain data.

§121.1 Category XV (a) (2) & §121.1 Category XV (a) (4)

These should both be removed. My examples run afoul of both, so I will comment on them together. This would restrict all proximity operations. There are many civilian applications of proximity operations that have been developed and are currently in development. Some applications include, automated cargo transfer, refueling/service/life extension, and inspection. Cargo transfer is currently used by craft such as SpaceX's Dragon or Orbital's Cygnus spacecraft to supply the International Space Station. In the future, this could extend to private space stations, mining, manufacturing, materials and products companies like Planetary Resources and Deep Space Industries. Another potential commercial application would be fuel depots that can be used to store rocket fuel for interplanetary missions. Refueling, service and life extension represent an emerging market for

on orbit servicing. The ViviSat mission extension vehicle is an example of this as is the Canadian Space Infrastructure Servicing vehicle built by MDA. Lastly, inspection can provide necessary data for failure analysis and mitigation. While some techniques for tracking are very technical and complex, at its simplest, proximity optical tracking and rendezvous can be done using a simple camera and the freely available OpenCV open source software library. If this isn't removed I can see several less restrictive options. One would be to limit this to craft otherwise covered under Category XV (a). Another could exempt spacecraft or components with only capabilities for proximity operations and rendezvous, leaving more advanced capabilities like long range tracking restricted. Taking that a bit further, another option could be to be more specific with the restricted capabilities like those enumerated in Category XV (a) (7).

#### §121.1 Category XV (a) (11)

I believe this should be removed. This capability is not strictly military. There are several spacecraft in development at several companies in a number of the listed categories that are specifically for commercial or research purposes. Also, "manned" is a little vague. Is this referring to the capability of carrying humans or is it more specifically referring to compliance with certain certifications (i.e. NPR 8705.2B)?

#### §121.1 Category XV (c) (2)

This should be limited to craft otherwise covered in Category XV (a). There are many missions described above that would benefit from this capability that aren't military or intelligence related. In order to prevent military or intelligence applications, more specific restrictions like those found in Category XV (a) (7) could be listed here.

#### §121.1 Category XV (e) (18)

I don't believe the source of funding should be important. I question if any spacecraft or component funded by the DoD should automatically be categorized as munitions, even if its purpose is not directly military or intelligence related. I want to thank the State Department for soliciting comments on this rulemaking. I believe it is critically important to maintaining the United States' lead in space and its worldwide industrial competitiveness to advance the private and commercial space industry as quickly as possible. The only way to maintain our current lead is to unleash the power of the American free enterprise system and the inventive spirit of its citizens. I am available for further discussions should anyone need clarification or help on any of these matters.

-Lane Haury

State Department comments request  
ITAR Amendment—USML Category XV and Defense Services  
July 4th, 2013

Company: United Space Structures, Inc.

United Space Structures, Inc. (USS) has designed robotic equipment for manufacturing and constructing structures in space. We are a startup company that is attempting to open up the space manufacturing and construction market. While the United States market is an important marketplace for USS, we will also need to have access to the international markets to reach our full potential in the market. Our robotic equipment is specifically designed to turn raw material into finished structural elements that are used for building two types of structures in space:

1. Open space frame structures:

- Hosted satellite platform
- Space Based Manufacturing (SBM) platform
- Space Fuel & Supply depot
- Space Mining platform
- Telescope platform
- Space Based Solar Power (SBSP) platform.

2. Pressurized Habitats:

USS believes it has created the most economical way to build large structures in space. These structures are large enough to spin and create artificial gravity which we believe will be required for long term human sustainable life in space. This equipment and their processes is unlike any other in the world based on national and international patent prior art searches. USS has filed a national and international utility patent for our equipment and process.

The world's architectural options in space are limited due to the current state-of-art manufacturing process: Structures are built on Earth, they must fit within a rockets fairing and then launched into space, once in space it is bolted together or expanded. Building artificial gravity habitats using todays construction method is prohibitively expensive and so it limits our use of space. An alternative method is required.

The United States has lead the world in space exploration and space technology for decades and the spin offs that have been derived not only have altered the United States but also the world. This goes beyond the technology directly, it has affected the US workforce and our education system, our entire way of thinking has been altered for the better.

The next step in our exploration of space is very predictable, it is the same process that mankind has always used when exploring the unknown. Once the initial explorers have blazed the trail the next stage of development is the building of infrastructure.

Space infrastructure requires:

- Safe and reliable transportation systems
- Mining operations to extract raw building materials
- Harvesting energy in all forms and distributing it where needed
- Building facilities in space that support human expansion in a sustainable way

United Space Structures believes that it is strategically vital that the United States continues to lead the world in space technology, space exploration and the human settlements in space. To that end we believe that United Space Structures technology will be essential for the next stage of space development in building the infrastructure in space.

The restrictive nature of the ITAR regulations has a detrimental affect to the growth of companies, their products and entire industries. As a result markets like the satellite industry has increasingly been usurped by foreign industry. This has forced United States industry from startup to mature companies to establish overseas operations in order to avoid ITAR. The results are a “flight of capital” in the form of nontaxable overseas income and perhaps even more detrimental is the “brain drain” loss of our knowledge base and high paying jobs and industries of tomorrow.

USS haralds President Obama’s initiative to review and properly classify US industries, products and services so that industry is free to work in the world market and yet continue to keep us safe from the misuse of United States based technology.

United Space Structures robotic systems are not capable of being used as a weapon, nor could it be converted into a weapon system, it is a manufacturing and construction system. The structures that USS can manufacture and construct is fairly limited to structural struts that can be assembled into open space frames or structural hulls for pressurized habitats.

United Space Structures, Inc. requests that its robotic equipment, manufacturing and construction process fall under Export Administration Regulations (EAR) and not under International Traffic in Arms Regulation (ITAR). We look forward to working with the State department to help clarify United Space Structures technology.

Bill Kemp / Founder / CEO

United Space Structures, Inc.

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July 8<sup>th</sup>, 2013

To: DDTC Response Team  
U.S. State Department

Re: Comments on RIN 1400-AD33: "ITAR Amendment—USML Category XV and Defense Services"

Sirs,

I am writing in my capacity as President and CEO of Altius Space Machines, Inc., a Louisville, Colorado-based spacecraft robotics startup company, and would like to provide comments on your proposed revision of Category XV of the US Munitions List, as well as your proposed revised definition of Defense Services.

I would like to begin by stating my company's strong approval of your efforts to begin revising the USML Category XV to transfer commerce and dual-use spacecraft technologies and systems from ITAR controls to the much better-suited Department of Commerce EAR controls. We doubt that Congress would have authorized this USML Category XV revision effort if it hadn't been for many years hard work by your team, and by your colleagues in the Departments of Defense and Commerce, and we commend you and thank you for your hard work.

In this NPRM comment, we would like to provide feedback on both your revised definition of Defense Services as well as on the proposed revised Category XV munitions list. We have some items we'd like to specifically call out for praise, and a few that we think have room for improvement.

#### **Comments on the Revised Definition of Defense Services**

We have two specific things we would like to mention with regards to your proposed revised definition of Defense Services. First, we would like to commend you for clarifying in paragraph 120.9 (a)(1) that the definition of Defense Services do not include furnishing technical assistance to foreign persons using purely public domain information. Altius feels that this is a good, common-sense revision. The existing definition of Defense Services was so overly-broad that merely providing suggestions on good reference books to foreign persons was considered by some to be risking an ITAR infringement.

Our second point regards paragraph 120.9 (a)(5). We feel that this is overly broad, because it controls as a Defense Service, the integration of any satellite or spacecraft to a launch vehicle, even if that spacecraft is no-longer controlled by the USML Category XV. Is the State Department really intending to continue treating as a Defense Service the integration of no-longer-ITAR-controlled spacecraft to launch vehicles? While providing launch failure analysis is clearly something that can be used to improve not only launch vehicles but missiles as well, we feel that payload integration of commercial satellites is now sufficiently commoditized that they can be better regulated under the EAR using the newly proposed 9X515 ECCNs. This would still require an explicit export license for such services outside of Canada and select Strategic Partners (under an STA license exception), and would restrict provision of those services to nations such as China, but would simplify integration of commercial satellites with launch vehicles operated by our close allies and strategic partners.

If the State Department concurs with this logic regarding satellite launch integration for commercial, non-ITAR controlled satellites, we would suggest changing the phrase "integration of a satellite or spacecraft to a launch vehicle" in paragraph 120.9 (a)(5) to read "integration of a satellite or spacecraft controlled under USML Category XV paragraph (a) to a launch vehicle".



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### **Comments on the Proposed Revisions to Category XV of the US Munitions List**

We would like to start by commending the approach taken by the State Department and Department of Defense in coming up with a clearly-defined *positive* list of spacecraft capabilities and component capabilities for items proposed to be left in the revised USML Category XV. This helps cut down on ambiguity, and simplifies the task of aerospace companies in determining whether an item is controlled by ITAR or EAR. Small companies like Altius greatly benefit from clearer and simpler regulatory language like this, especially when combined with solid efforts to make sure that the USML only covers the items that it should cover.

We would also like to commend the State Department both on what it has specifically proposed to remove from the USML Category XV (namely commercial communications satellites, commercial-grade earth observation satellites, planetary landers and rovers, etc.) as well as *most* of the items that have been proposed to remain covered under Category XV. The majority of the items defined in paragraphs 121.1 (a) through (e) are for capabilities that are currently of purely or predominately military or intelligence application, and as such are well suited for ITAR regulation. There are, however, four items listed under paragraph (a) that Altius strongly feels should **not** be left on the US Munitions List. These items, which will be discussed in more detail below include “man-rated” spacecraft (paragraph 121.1 (a)(11)), satellite servicing capabilities (paragraph 121.1(a)(4)), space vehicle tracking used for rendezvous and capture/docking applications (a subset of paragraph 121.1(a)(2)), and DoD-sponsored secondary and hosted payloads (paragraph 121.1(e)(18)).

Before getting into the four specific items we’d like to comment on, I would first like to review our understanding of the criteria that the State Department and Department of Defense use to evaluate if an item should be on the US Munitions List. Between the current ITAR regulations (specifically paragraph 120.3(a) and (b)), the Section 1248 Report, this NPRM and the associated EAR NPRM, Altius has found over a half a dozen descriptions of what belongs on the USML. Based on these various descriptions, it appears that the State Department and Department of Defense feel that the USML should control:

- Items developed for the military that have predominately military or intelligence applications,
- Items developed for the military that do not have predominately military or intelligence applications, if they have significant military/intelligence importance, and if the technologies are exclusively or almost exclusively available from the United States, and
- Items that were not developed for the military that possess parameters or characteristics that provide a critical military or intelligence advantage to the United States and that are almost exclusively available from the United States.

With that in mind, I would like to proceed with a discussion of each of our four areas of concern.

#### ***Comments Regarding USML Category XV Paragraph (a)(2)—Space Tracking***

The revised USML Category XV paragraph (a)(2) proposes ITAR control of spacecraft that possess the capability to “track ground, airborne, missile, or space objects using imaging, infrared, radar, or laser systems.” While we agree that many types of space-based tracking could be considered munitions, we feel this paragraph needs to be narrowed in scope because there is a specific subset of space-based tracking that is of a more clearly dual-use nature—space tracking in support of rendezvous, proximity operations, and capture/docking.

While space rendezvous traditionally uses ground-based tracking and control and recently differential GPS for the “far-field” portion of the rendezvous (at distances typically greater than 5-10km), at some point most if not all current rendezvous techniques require the use of some space-based tracking to provide finer-grained relative navigation inputs. Safely approaching another vehicle typically requires



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matching positions to within meters and relative velocities to within 3-6 cm /s—this almost always requires the use of space-based tracking sensors such as LIDAR, Radar, or Optical/IR imaging. It is important to note however tracking systems for such proximity-operations are typically very different from and shorter-range than sensors that would be used to track ground-based, airborne, missile, or long-distance space objects.

Altius feels that the capability of tracking and providing relative navigation information for space objects over short distances and low relative-velocities, has significant non-military applications, is not a capability that is even close to being uniquely provided by the US, and in many cases has been developed for civilian applications.

Some specific examples US commercial or civil space vehicles that would be controlled by the USML under the proposed phrasing of paragraph 121.1(a)(2) include (but are probably not limited to):

- SpaceX's Dragon Spacecraft (which is used to commercially deliver cargo and eventually crew to and from the International Space Station and eventually to and from commercial space stations such as those under development by Bigelow Aerospace).
- Orbital's Cygnus Spacecraft (which is also used for ISS cargo delivery)
- All of the commercial crew vehicles including SpaceX's Dragon, Boeing's CST-100, Sierra Nevada's Dreamchaser, and Blue Origin's New Sheppard.
- ViviSat's Mission Extension Vehicle (a satellite life-extension spacecraft that is being developed 100% commercially by a joint venture of ATK and US Space)
- NASA's Orion MPCV and their proposed Multi-Mission Space Exploration Vehicle
- NASA Goddard's planned "Restore" satellite refueling mission
- NASA's Mars Sample Return Mission

None of those above listed items are for military or intelligence applications, and most of them are being developed partially or entirely on commercial funding. In fact, just looking at US projects alone, it is clear that space tracking for rendezvous and prox-ops are predominately non-military.

Also, as stated above, this technology is clearly **not** unique to the United States. It's interesting to note that a large number of the above missions, as well as a large number of US military prox-ops missions have or plan to utilize space-based relative navigation tracking sensors built by foreign firms such as the Neptec TriDAR system and LIDAR systems from Optec, both built in Canada. More importantly, the Russians first demonstrated the capability to track objects in space for proximity operations in 1967 using their Igla radar system on their Soyuz spacecraft. There are also several Canadian and EU-based cubesat-based space debris removal efforts that are in development that involve the ability of a cubesat based platform to track a non-cooperative space object well enough for it to be captured and deorbited.

For these reasons, Altius feels that prox-ops focused tracking and relative navigation capabilities are better regulated under the new 9X515 ECCNs under the EAR.

Altius feels that the best way of rephrasing Category XV paragraph (a)(2) in a way that retains ITAR controls where they're appropriate would be to add a note such as:

**"Note to paragraph (a)(2):** This paragraph does not control a satellite or spacecraft which uses tracking solely for rendezvous or docking/capture purposes."



If a quantitative differentiator is preferred, it might be possible to use the sensor's maximum tracking range and maximum relative velocity capability. A sensor that could track space objects at, for instance, no greater than 100km and no greater than 500m/s relative velocity would cover all foreseeable rendezvous and prox-ops applications while still being unsuited for tracking missile launches or ground or airborne targets, as well as for tracking most space objects other than ones that are in nearly identical orbits.

***Comments Regarding USML Category XV Paragraph (a)(4)—Satellite Servicing***

The revised USML Category XV's paragraph (a)(4) proposes ITAR control over spacecraft that possess the capability to "provide space-based logistics or servicing of any spacecraft (e.g. refueling)." While Altius acknowledges that there is and has been definite military interest in spacecraft servicing, including the DARPA Phoenix program of which Altius is a participating member, Altius feels that this capability does not have predominately military or intelligence applications, is not a unique capability of the United States, and in many cases is being developed under civilian or entirely commercial funding. As such, Altius strongly recommends either dramatically narrowing the scope of this paragraph, or removing it entirely from the USML Category XV, and having it be handled under the EAR 9X515 ECCNs along with other dual-use spacecraft and technologies.

Some specific examples of commercial or civilian US spacecraft that are either in operations or in development, which would be covered by this paragraph include:

- The previously mentioned Commercial Resupply Services vehicles—SpaceX's Dragon and Orbital's Cygnus—both of which provide space-based logistics in the form of pressurized cargo and external ORU delivery to the space station and eventually other destinations. SpaceX and Orbital are actively marketing these vehicles as well for satellite servicing/repair missions, such as servicing or providing deorbiting support for the Hubble Space Telescope.
- The previously mentioned Commercial Crew vehicles—SpaceX's Dragon, Boeing's CST-100, Sierra Nevada's Dreamchaser, and Blue Origin's New Sheppard. In addition to providing crew transfer logistics, they also can and will provide cargo logistics, and several of these vehicle developers are also specifically investigating using their vehicles for satellite servicing missions, particularly Sierra Nevada's Dreamchaser.
- The previously mentioned ViviSat MEV which would rendezvous and capture commercial Geostationary Comsats, and then take-over stationkeeping for the satellites, extending their lifetimes as a 100% commercially funded service. ViviSat has also explicitly mentioned that they are investigating adding the capability down the road to provide refueling, inspection, and repairs of satellites, as well as rescuing satellites stranded in the incorrect orbits.
- NASA Goddard's "Restore" satellite refueling mission, and their related and recently completed Robotic Refueling Mission on the ISS.
- My company, Altius Space Machines, is developing robotic manipulators and end-effectors for non-cooperative spacecraft capture. Altius has been in discussions with many of these entities regarding commercial services utilizing their spacecraft and our arms for satellite servicing, life-extension, and "micro-deliveries" to ISS and also to use their spacecraft as unmanned free-flyers. In 2011, Altius won the NASA-sponsored "NewSpace Business Plan Competition" for a plan based on using our robotics technology to enable micro-deliveries of just-in-time payloads (i.e. commercial space-based logistics) to the ISS and other future destinations.



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As discussed before, many of these efforts are entirely commercially funded, and all of them are for non-military, non-intelligence applications. While only some of them are actually flying, there are many of these where commercial companies and/or NASA are clearly spending significant amounts of money on these technologies. In fact, compared to military funded satellite servicing missions, the civil and commercially-funded applications appear to already be predominant.

Equally importantly, space-based servicing is also not a technical area that the US has a unique technical lead in:

- The Russians have been refueling spacecraft (their Salyut and Mir space stations and the International Space Station), and providing robotic space logistics services since 1977.
- In 1998, NASDA (a precursor to Japan's JAXA space agency), launched the ETS-VII spacecraft which demonstrated automated rendezvous and docking, propellant transfer, ORU-exchange, and other robotic satellite servicing tasks—much like the DARPA-funded Orbital Express mission which the US flew almost a decade later in 2007.
- MDA Canada, which has developed the robotic manipulators for the Space Shuttle and the ISS, as well as the robotic manipulator for Orbital Express, in 2010, announced their intention to build and fly a Space Infrastructure Servicing spacecraft to provide commercial refueling services to existing Geostationary ComSats. MDA had developed and ground-tested the tools needed to service existing satellites that lacked intentional refueling features such as quick-disconnect fuel transfer fittings. In 2011, MDA announced a contract with Intelsat for up to \$280M for providing this service to Intelsat satellites. However, MDA has temporarily paused work on this project, due to stated concerns about competition from US government funded satellite servicing projects such as DARPA Phoenix and Goddard's Restore program. But the willingness of Intelsat, the largest commercial satellite operator in the world, to sign a contract with MDA for these services is a strong indicator of both the reality of significant commercial demand for this technology, and their belief in the ability of commercial organizations to deliver this capability.
- In the last decade, Orbital Recovery Corporation proposed development of their Orbital Life Extension Vehicle. Although the entrepreneur who started Orbital Recovery was a US citizen, his team started the company in Europe instead of the US. One reason for starting the company as a European venture rather than a US one was that it was felt that all of the needed pieces including the non-cooperative capture system were in existence in Europe, and that many of his customers wanted an ITAR-free solution. It was easier for him to stay out of the technical work of the company and focus on business development (thus avoiding any ITAR content) than it would have been to start the company in the US and deal with export control licensing. While the Orbital Recovery Corporation eventually failed as a commercial company, primarily due to issues with corporate governance (not technical or market related) it indicates once again that satellite servicing capabilities are possible using entirely non-US hardware.
- As previously mentioned there are also a large number of Canadian and European cubesat-based initiatives designed for orbital debris capture and removal, which is nearly identical in capability to satellite servicing such as orbital life extension.

As with our comment on the previous USML Category XV paragraph, Altius feels that the significant foreign availability of these technologies among several of our close NATO Allies and Strategic Partners, in combination with the wide-scale commercial and non-military applications of these technologies,



evinced in some cases by multi-hundred million dollar commercial contracts, indicate that these technologies should not be controlled by ITAR, but should be controlled along with other dual-use technologies by the EAR, using the new 9X515 ECCNs. Doing so will still protect that technology from export outside of the US's close allies and Strategic Partners, but will enable the US to better leverage foreign expertise, and better compete in the emerging international commercial satellite servicing arena.

Before we continue to the next Category XV paragraph, Altius would also like to address briefly how leaving spacecraft servicing on the munitions list will continue to negatively impact Altius as a small entrepreneurial business. As stated above, spacecraft robotics for satellite servicing is one of our key areas of focus. Unlike large aerospace companies, most entrepreneurial space companies cannot afford the expense of having a large export control compliance staff—typically export control ends up being part of one person's job description with an external legal advisor providing support.

During the ongoing development of our deployable robotics technologies, we have encountered many cases where technical experts on key subsystem technologies, or vendors for key components, were foreign, and where being able to engage in a detailed technical discussion with these foreign experts could help save us substantial amounts of time, expense, and duplicated effort. Unfortunately, because space robotics is still ITAR-controlled, in order to get technical information from them that is useful for our systems, Altius would need to share enough information about our hardware that we are almost certain we will need to get a TAA in place first, which can take half a year and a significant (for small companies) amount of money. For large aerospace companies the cost of cranking-out a TAA Application and waiting half a year for approvals may be relatively minor, but for small startups like Altius the expense is high enough that in many cases we have had to forgo entirely these conversations. This leads to less capable systems, expensive duplication of research being performed by our close allies, and significant delays in bringing products to market. In effect, ITAR controls serve as a huge "anti-subsidy" for entrepreneurial aerospace research being performed in the US, and provide our foreign competitors with a huge competitive advantage at US taxpayer expense. A foreign firm like MDA-Canada does not need an export license from their government to talk with experts in friendly countries like Germany or Japan about satellite servicing technologies, but US firms like Altius do. While this may be a minor inconvenience to a Boeing or a Lockheed, it's a huge, unnecessary barrier to entry for small US firms.

As such, Altius would like to reiterate that due to its clearly dual-use nature, and the clear lack of a technological lead relative to our close allies and Strategic Partners, that US national security interests would be better served by regulating satellite servicing under the EAR than retaining it on ITAR. With the ability to more easily access foreign expertise, US firms would likely be able to deliver more capable and technologically advanced systems than would be otherwise feasible. When combined with the ability to more readily compete internationally in what is likely to be a rapidly growing commercial market segment, moving this paragraph off of the USML would appear to be a clear "win" for the United States.

***Comments Regarding USML Category XV Paragraph (a)(11)—“Man-rated” Spacecraft***

This paragraph would retain ITAR control over all spacecraft that “are man-rated sub-orbital, orbital, lunar, interplanetary, or habitat.” While this paragraph does not affect Altius as directly as paragraph (a)(4) does, Altius still wanted to comment on this paragraph, due to its negative impact to our friends in the commercial spaceflight industry.

A plain reading of the paragraph suggests that by “man-rated”, the State Department doesn't mean just spacecraft that have been certified by NASA as being compliant with NASA's NPR 8705.2b standard



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(which is what the strictest sense of the term “man-rated” would imply), but any spacecraft capable of safely carrying humans safely in outer-space.

Altius feels that the capability to safely carry humans in space has almost exclusively non-military application, and in the case of sub-orbital spacecraft has almost entirely commercially funded to address an almost purely commercial market. Altius strongly recommends removing this entire paragraph from the USML and regulating it via the EAR 9X515 ECCNs, as a commercial or dual-use technology.

To preface my comments on this paragraph, I would like to mention that I was a co-founder of the unmanned suborbital RLV company Masten Space Systems, and was their Lead Propulsion Engineer for their first six years, and that I’ve been involved in the suborbital RLV community for most of my career until I left to start Altius Space Machines. As such, I have detailed knowledge and experience in the suborbital RLV market. While a few of the smaller startups in this industry have bootstrapped at one time or another off of NASA and DoD development contracts, I can state that the vast majority of the funding for actual manned suborbital vehicle development performed by companies including XCOR, Scaled Composites/Virgin Galactic, Blue Origin, and Armadillo Aerospace has been from private sources. In fact, I only know of a single manned suborbital rocket company that received any significant funding from the military to develop their manned suborbital RLV for military/intelligence applications—the now-defunct TGV Rockets and their MICHELLE-B rocket. At least in the case of manned suborbital flight, it is clear from the nearly 1000 customers who’ve at least partially paid for spaceflight tourism tickets, that this is a technology that is predominately commercial in application.

Examples of purely commercial spacecraft that have flown, are in flight-test, or are in development, that would be regulated by this proposed Category XV paragraph include:

- XCOR Aerospace’s Lynx Mk I, MkII, and Mk III manned suborbital vehicles that are being marketed primarily for commercial spaceflight, and secondarily for commercial microgravity science and suborbital astronomy applications. XCOR has presold over 200 Lynx tickets as of last summer, at a price of \$95,000 per seat.
- Scaled Composites/Virgin Galactic and their SpaceShipOne and SpaceShipTwo vehicles manned suborbital vehicles. These are focused on similar markets to XCOR and have entered flight test as of a few months ago. Virgin has already presold well over 500 tickets for their SpaceShipTwo vehicle at a seat price of \$200,000 each.
- Blue Origin’s manned suborbital rocket, which is currently in development, and is a precursor to their planned New Sheppard manned orbital launch system.
- All of the previously mentioned commercial crew vehicles
- Bigelow Aerospace’s inflatable space stations
- Inspiration Mars’ manned spacecraft for their planned 2018 Mars flyby mission
- Golden Spike’s planed manned lunar lander system

This is hardly an exhaustive list, and only includes missions that are entirely commercial or significantly funded by commercial entities. NASA, which is explicitly a civilian space agency, is also obviously interested in development of manned spaceflight systems.

Other than a small investment in TGV Rockets, the military has almost explicitly avoided manned spacecraft development for decades. In the 70s and 80s, as electronics capabilities improved, it became rapidly obvious that most military man-in-space applications could be better performed by unmanned satellites and robotics systems. While there are still occasional niche military applications, like most



other transportation modes, the predominant application for this technology is civilian, and as-such should be handled as a dual-use item, not a munition.

Additionally, manned spacecraft, both suborbital, orbital, and beyond are also being developed actively by our close allies and Strategic Partners:

- EADS Astrium is investing several hundred million Euros in their own suborbital space plane for space tourism.
- Copenhagen Suborbital is a Denmark-based non-profit, open-sourced team that is developing manned suborbital rocket systems. In spite of being basically a rocket club, they've already flight tested many of the technologies they need for their Tycho launch system—in many ways they're comparable to what Armadillo Aerospace has been doing in the US.

There is also ongoing work at ESA, JAXA, and by a few other European and Canadian groups to develop manned suborbital, orbital, and interplanetary systems.

For all of these reasons, Altius feels that “man-rated” spacecraft are clearly of predominately civilian applications, and are not something that the US has a unique technological advantage in. As such, we strongly recommend that paragraph 121.1(a)(11) be removed entirely from the US Munitions List, and control of manned spacecraft be handled entirely via the newly created 9X515 ECCNs under the EAR.

***Comments Regarding USML Category XV Paragraph (e)(18)—DoD-Sponsored Hosted Payloads***

Our comments on this are simpler and shorter than the other three items. Simply-put we feel that if the DoD has sponsored a satellite technology as a hosted payload, that isn't for satellites covered in paragraph (a) of Category XV, that it shouldn't become ITAR controlled just because of where the sponsorship came from. If it is for a technology covered by paragraph (a) of Category XV, then as a hosted payload it's already covered by the preceding paragraph (e)(17), which would make this paragraph entirely redundant. As such, Altius suggests removing paragraph (e)(18) from the USML.

**Conclusions**

Altius is very pleased with the remainder of the proposed USML Category XV items, and want to reiterate our support for the State Department's efforts to refine ITAR to focus on military-specific technologies that require its higher level of export control, and transferring dual-use items to the more suitable EAR regulatory process. We feel that the recommendations we provided will make the revised Category XV even better aligned with the purpose of the ITAR regulations, and better protect US national security interests.

Respectfully,



Jonathan Goff  
President and CEO  
Altius Space Machines, Inc.  
801-362-2310



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U.S. Department of State  
2401 E Street NW  
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July 8, 2013

**References: RIN 0694-AF87 and RIN 1400-AD33**

**Re: Comments Concerning Proposed Rules – Export Administration Regulations (EAR): Control of Spacecraft Systems and Related Items the President Determines No Longer Warrant Control Under the United States Munitions List (USML) and Revision of U.S. Munitions List Category XV and Definition of Defense Services**

Dear Sirs and Madams:

International Business Machines Corporation (IBM) hereby submits these comments in response to the proposed rules outlined in the following Federal Register notices: Control of Spacecraft Systems and Related Items the President Determines No Longer Warrant Control Under the United States Munitions List (USML), 78 Fed. Reg. 31431 (May 24, 2013) and Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service”, 78 Fed. Reg. 31444 (May 24, 2013) (the Proposed Rules).

**IBM appreciates this opportunity to share its views concerning these important rules. As detailed below, IBM strongly supports the Proposed Rules and urges the Commerce and State Departments to implement the proposed changes concerning the treatment of radiation-hardened integrated circuits (ICs) immediately.**

IBM provides information technology products and services to customers in more than 170 countries and employs more than 420,000 persons based in 75 countries. Among its cutting edge products, IBM delivers a range of semiconductor technologies designed for a wide variety of mobile and wired consumer products, commercial electronics and computers. Microelectronic products such as ICs, custom logic chips and other semiconductor chips are designed and manufactured in our facilities in East Fishkill, New York, and

Burlington, Vermont, and with a consortium in Albany, New York, at the College of Nanoscale Science and Engineering of the University of Albany. Design and development activities for these products (as well as the commercial electronics and computers that utilize these products) also occur in a variety of other IBM U.S. locations, supporting many good, high-paying jobs across the United States.

IBM supports the goals of the Export Control Reform Initiative that began more than three years ago. In particular, we strongly agree that there is a need to update controls to make them more relevant to 21<sup>st</sup> century technology while strengthening national security. We agree with former Secretary of Defense, Robert Gates, who stressed the theme of higher fences around fewer items. Given limited resources in both the U.S. Government and the private sector, the overall goal should be to establish an updated framework that is focused on items that truly warrant controls and dispense with outdated legacy controls that consume resources and yield no value in terms of national security.

## **I. Proposed Changes to Treatment of Radiation-Hardened ICs**

Since the development of early ICs, technology has been constantly advancing to make ever smaller and more densely packed ICs. Advances in lithography and the use of new materials have enabled the industry to rapidly reduce the size of advanced ICs. These same advances also have enabled ICs nearly to reach the point of meeting the five criteria in the existing Category XV(d) of the USML, which would subject these ICs to control under the International Traffic in Arms Regulations (ITAR) though they are mass market commercial ICs. The U.S. Government recognized this evolution in the IC manufacturing process in 2007 when one of the radiation hardened parameters in the ITAR was modified expressly to prevent these controls from unintentionally capturing inherently commercial ICs.

Notwithstanding this industry wide semiconductor technology trend, it was never the industry's intent to exceed the ITAR parameters in the designs of ICs. The intent was always simply to provide our customers and internal business units with the latest and most responsive ICs for their products. The overwhelming majority of IBM's business is in the marketplace for ICs in commercial terrestrial devices such as computer systems, routers and other high speed communications products, cell phones and other electronics.

As a result, IBM has a particularly strong interest in the reforms included in the Proposed Rules as they update and clarify the dividing line between conventional dual-use semiconductor products and what will be treated as specially designed ICs either in the new category 9A515(d) or specially designed military ICs that will remain on the USML. **Today we strongly endorse the proposed revisions to the treatment of radiation-hardened ICs. Once finalized, these revisions will add clarity for the civilian**

**semiconductor industry and avoid the improper classification of ordinary dual-use items and the products that use them.**

## **II. Accelerated Implementation of a Final Rule**

While the Proposed Rules will substantively address this critical issue facing the semiconductor industry, the timing of the final implementation is also of crucial importance. IBM is extremely concerned that implementation of the Proposed Rules may occur too late to avoid the inappropriate capture by the USML of many commercial ICs that, due to the rapid advance of semiconductor technologies, meet or exceed all five of the technical parameters contained in USML XV(d) but were developed for civilian applications and not specially designed for defense articles.

Often overlooked is the fact that design and development decisions are made years ahead of actual production runs of a particular IC. Negotiations between partners in the globally integrated semiconductor industry are occurring now, and business decisions on ICs two to three generations ahead of current products are occurring. The lengthy implementation dates of the Proposed Rules will potentially impact business decisions this year, along with design activity for 2013 and 2014, and have negative repercussions for US competitiveness. Absent a rapid adoption of the Proposed Rules, a cascade of negative impacts could affect our company's business. These could include:

- Partners may be hesitant to join with IBM on future designs until regulatory uncertainty is cleared, resulting in lost business opportunity.
- IC designs could be downgraded to avoid the risk of meeting all of the current ITAR technical parameters, resulting in less innovative products brought to market.
- A flood of export licenses could be needed to allow commercial business to proceed, resulting in product delays and loss of competitive position.

In short, the lengthy implementation period for the Proposed Rules likely will have a direct impact on IBM's (and other similarly situated U.S. semiconductor companies') ability to conduct commercial business in the ordinary course, risking our technological edge, revenues and jobs. The expected timeframe which allows for the U.S. Government to review and respond to comments, followed by an informal and finally a formal notification to Congress places the release of a final rule late in 2013. The addition of a subsequent 180 day delay in implementation puts an effective date sometime in mid-2014. For an industry driven by speed and where competitive advantage is sometimes measured in days, this extended implementation creates a high level of uncertainty and risk. **Given this situation, IBM urges the Commerce and State Departments to waive the proposed 180-day implementation period and to adopt**

**immediately the elimination of USML Category XV(d) and the new 9A515(d) provision upon publication of the final rules.**

### **III. Definition of “Successful Testing” for Purposes of Identifying “Space Qualified” Items**

As noted above, IBM strongly supports the immediate adoption of the Proposed Rules as drafted. However, to the extent the Administration considers modifying the proposed definition of "space qualified" to define "successful testing," IBM recommends that any ultimate change reflect the broad set of industries potentially affected by the definition. What "successful testing" means to one industry might be different than what it means to another. This might simply be resolved by making explicit reference to industry-accepted testing standards for items to be used at altitudes greater than 100 km above the surface of the Earth. To that end, the first note concerning the definition of “space qualified” could be revised as follows (with new text underlined):

**Note:** A determination that a specific item is "space qualified" by virtue of testing does not mean that other items in the same production run or model series are "space qualified" if not individually tested. While specific testing criteria vary among industries, for an item to be tested successfully, it must be tested against industry-accepted standards for operation at altitudes greater than 100 km above the surface of the Earth.

### **IV. Conclusion**

The Departments of Commerce, State and Defense, as well as other government stakeholders, have worked extensively to bring well-reasoned Proposed Rules concerning this complex category. IBM believes that the Proposed Rules will address the semiconductor industry’s urgent issues related to radiation-hardened ICs. However, we also need a rapid implementation. It would contravene both common sense and the express purpose of the Administration’s Export Control Reform Initiative if large numbers of commercial products become subject to ITAR control simply due to delay in implementation of the Proposed Rules. Therefore, IBM urges the Administration to prevent that from occurring by waiving the 180-day implementation period and adopting immediately the elimination of USML Category XV(d) and the new 9A515(d) provision upon publication of the final rules.

We thank you for the opportunity to comment.

Edward Bond  
Director Export Regulations  
IBM Corporation  
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Washington DC 20005



July 8, 2013

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

Mr. Kerem Bilge  
Acting Director  
Office of Defense Trade Controls Policy  
U.S. Department of State  
2401 E Street, N.W.  
Washington, D.C. 20037

Re: Control of Spacecraft Systems and Related Items the President Determines No Longer Warrant Control Under the United States Munitions List ("USML") (*Federal Register* Notice of May 24, 2013; RIN 0694-AF87) and Revision of U.S. Munitions List Category XV and Definition of Defense Services (*Federal Register* Notice of May 24, 2013; RIN 1400-AD33)

Dear Messrs. Mooney and Bilge:

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

The Semiconductor Industry Association represents U.S. leadership in semiconductor manufacturing and design. The U.S. semiconductor industry supports more than 1 million American jobs, drives economic growth and leads the global market, but competitors abroad are working hard to attract the world's top innovators and job-creators.

In this regard, it is critical that ongoing export control reform efforts result in export control regulations that not only protect U.S. national security interests, but foster the continued growth of the U.S. semiconductor industry by recognizing that U.S. export regulations should not be applied in a manner that provides incentives resulting in the design-out of U.S. semiconductors by customers located around the world. Importantly,

any such regulatory incentives to design out U.S. semiconductors would directly benefit our competitors abroad.

SIA strongly supports the objectives of the Export Control Reform Initiative (“ECRI”), as stated by the President, to focus resources on the threats that matter most, bring transparency and coherence to this field of regulation, and enhance the competitiveness of our manufacturing and technology sectors. We remain committed to working with the Administration to expeditiously realize these objectives for the treatment of commercial integrated circuits (“ICs”).

SIA is pleased to submit the following public comments in response to the request for public comments issued by the Commerce Department’s Bureau of Industry and Security (BIS) on proposed revisions to the Export Administration Regulations (“EAR”) pertaining to items the President determines no longer warrant control under United States Munitions List (“USML”) Category XV (“Proposed EAR Revisions”),<sup>1</sup> and revisions to the USML Category XV (“Proposed ITAR Revisions”).<sup>2</sup>

## Introduction and Summary

SIA applauds the elimination of USML Category XV(d). However, SIA is quite concerned that the implementation of that USML modification may come too late to prevent the inappropriate and commercially devastating capture by the USML of large numbers of commercial ICs. At a minimum, SIA urges the Administration to waive the 180-day implementation period for the elimination of the USML XV(d) and make the effective date of that USML modification coincide with the publication of the final rule codifying the change.

Given that many of the items included in the new “500 series” ECCNs being created by BIS are, according to BIS itself, “commercial items with no military or intelligence applications,” it is inappropriate for those items to be subject to the same level of controls as are munitions items included in the new “600 series” ECCNs. The controls imposed on “500 series” items that are purely commercial should be significantly less stringent than the controls imposed on “600 series” items. In particular, there is no need for a presumption of export denial for exports of “500 series” items to countries subject to an arms embargo policy.

The proposed definition of “space qualified” provided in the Proposed EAR Revisions is both overly broad and unduly open-ended and ambiguous and therefore merits further clarification. First, it is inappropriate for any item that is not “specially designed” for spacecraft to be deemed “space qualified.” Second, BIS provides no definition

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<sup>1</sup> Export Administration Regulations (“EAR”): Control of Spacecraft Systems and Related Items the President Determines No Longer Warrant Control Under the United States Munitions List (“USML”), 78 Fed. Reg. 31,431 (May 24, 2013) (“Proposed EAR Revisions”).

<sup>2</sup> Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service”, 78 Fed. Reg. 31,444 (May 24, 2013) (“Proposed ITAR Revisions”).

of “qualified through successful testing.” To be “qualified” an item must be rated or certified to operate at altitudes greater than 100 km above the surface of the earth.

### **Proposed USML Category XV Changes**

The proposed revisions to USML Category XV, and, in particular, the proposed elimination of USML XV(d), purports to avoid the capture by the USML of ICs that inadvertently meet certain technical parameters. As such, it would remove from the USML ICs with little or no strategic significance and prevent the application of controls that would cripple the civilian semiconductor industry. For that reason, SIA solidly supports the Proposed USML Revisions.

Nevertheless, SIA is extremely concerned that implementation of the Proposed USML Revisions may occur too late to avoid the inappropriate capture by the USML of many commercial ICs that, due to the rapid advance of semiconductor technologies, meet or exceed all five of the technical parameters contained in USML XV(d), but that were developed for civilian applications that are not specifically or specially designed for defense articles. If such inappropriate capture by the USML of many commercial ICs were to occur, domestic IC producers would be required to obtain munitions licenses not only for exports of such devices, but also for transfers of technology related to such devices to foreign national employees — tasks that would be extremely burdensome for many SIA members.

Accordingly, SIA urges the State Department (“State”) to make the proposed Category XV(d) effective as soon as possible. At a minimum, this would include forgoing the proposed 180-day implementation period for the proposed elimination of USML XV(d).

A delayed implementation of the final rule may be appropriate for elements of the final rule that result in increased administrative burdens, so that exporters are permitted to adjust their practices accordingly. Such is not the case with elements of the final rule that liberalize controls and decrease administrative burdens. Liberalization of controls and lessening of administrative burden should occur immediately. No party is benefitted by a delay in the effective date of such changes, but many parties may be hurt by such a delay. The final rule should be effective as of the date of its publication.

It would contravene both common sense and the express purpose of the ECRI if large numbers of commercial products not subject to ITAR control at the beginning of this year were subjected to ITAR control simply due to delay in implementation of the final rule pertaining to USML Category XV. SIA urges the Administration to prevent that from occurring by making the effective date of at least certain portions of the final rule the same as the final rule’s publication date. That is, State should waive the 180-day implementation period for elimination of USML XV(d) and make the effective date of that change coincide with the publication date of the final rule.

## Proposed EAR Changes

### Comments on the Creation of the “500 Series” Items

In the Proposed EAR Revisions, BIS has indicated that it is creating the new “500 series” of Export Control Classification Numbers (“ECCNs”) to capture spacecraft systems and associated equipment that the President has determined no longer warrant inclusion on the USML.<sup>3</sup> BIS further notes that although the items to be controlled by the “500 series” ECCNs are currently on the USML, “many of them are commercial items with no military or intelligence applications,” and for that reason “[i]t would be inappropriate to include these types of items in the ‘600 series,’ which is, by definition, comprised of munitions items.”<sup>4</sup> Notwithstanding those statements, however, BIS is proposing to impose controls on “500 series” items that are largely identical to those imposed on “600 series” items. SIA objects to such treatment of “500 series” items.

If it is the case, as BIS itself indicates, that many of the items contained within the “500 series” ECCNs are commercial items and not munitions items, then it is inappropriate and commercially damaging for BIS to impose essentially the same level of controls on those items as it is imposing on munitions items controlled by the “600 series” ECCNs. In particular, it is inappropriate for BIS to adopt a policy of denial for exports to countries subject to arms embargoes (such as China) of “500 series” items, many of which are, as BIS states, “commercial items with no military or intelligence applications.”<sup>5</sup>

Those items deemed by the U.S. Government to be “commercial items with no military or intelligence applications” should be controlled to a lesser extent than munitions items contained within the “600 series” ECCNs. While adopting a general policy of denial for exports of such commercial items to government end users in Country Group D countries may be appropriate, it is not appropriate to adopt such a policy for exports to purely commercial operations in Country Group D countries. SIA urges BIS to modify the proposed controls for “500 series” items accordingly.<sup>6</sup>

### New ECCN 9A515.d

As an initial matter, SIA would underscore that if the effective date of the elimination of USML XV(d) is the publication date of the final rule amending the ITAR, then the effective date

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<sup>3</sup> Proposed EAR Revisions at 31,432.

<sup>4</sup> Proposed EAR Revisions at 31,432.

<sup>5</sup> The National Defense Authorization Act of 2013 (“2013 NDAA”) does not impose a general policy of export denial for countries subject to arms controls. On the contrary, section 1261 of the 2013 NDAA imposes a policy of export denial only for exports to government entities and government-owned or controlled entities within embargoed countries. The NDAA does not address exports of “500 series” items to non-government entities. Accordingly, any policy of export denial adopted for “500 series” items should adhere to section 1261 of the 2013 NDAA and pertain exclusively to government entities and government-owned or controlled entities within embargoed countries.

<sup>6</sup> If it is the case that certain spacecraft systems and equipment are deemed to be have military or intelligence applications, then it may be more appropriate to move those items into a “600 series” ECCN. However, purely commercial items, such as ICs that are not “specially designed” for defense articles or for “600 series” items, should not be assigned controls that largely mirror those applied to “600 series” items.

of the creation of ECCN 9A515.d should also coincide with the publication date of the final rule amending the EAR.

SIA applauds the inclusion within proposed new ECCN 9A515.d of the requirement that an IC be “specially designed” if it is to be captured by the ECCN. The inclusion of that additional requirement is long overdue and will ensure that ICs developed for and/or used in commercial applications and products will not be captured by the ECCN and subjected to stringent controls.

While SIA solidly supports the structure of proposed new ECCN 9A515.d, SIA requests that BIS modify the proposed ECCN in two ways.

First, and most importantly, BIS should insert into Note 1 to the ECCN a statement adopting the longstanding definition of “ASIC” put forward by the JEDEC Solid State Technology Association — namely that an ASIC is “an integrated circuit developed and produced for a specific application or function and for a single customer.” This definition captures a custom IC designed particularly to conform to a single customer’s unique requirements. Prime examples of ASICs are the ICs designed and developed exclusively for the Trident missile system. Those ICs were unambiguously application-specific and end item-specific and so were quintessential ASICs. Many other ICs designed and developed by SIA member companies are not customized for a specific use in a specific end item and so do not qualify as ASICs. By utilizing existing industry terminology, exporters will have a clear basis upon which to classify an IC.

Second, SIA notes that the fourth and fifth technical parameters contained within 9A515.d differ from the fourth and fifth technical parameters contained within USML XV(d). It is unclear why those changes have been made, and SIA sees no need for them. The five technical parameters contained within USML XV(d) should be replicated in ECCN 9A515.d.

### **New ECCN 9A515.x**

This new ECCN controls devices that are “space qualified.” Unfortunately, the definition of “space qualified” provided in the Proposed EAR Revisions is both overly broad and unduly open-ended and ambiguous. As an initial matter, SIA solidly supports the precept, apparently adopted by BIS, that if qualification through testing is to occur, then qualification only will apply to those devices actually subject to successful testing, rating and certification. Thus, all devices not so tested, rated or certified will not be deemed to be “qualified through successful testing.”

That overarching point aside, SIA has the following comments on the proposed “space qualified” definition: First, as BIS itself recognizes, the inclusion of “or” in the definition of “space qualified” necessarily means that an IC that is not “specially designed” for spacecraft may still be deemed “space qualified” if it is “successfully tested” for

operation at altitudes greater than 100 km.<sup>7</sup> Second, BIS provides no definition of “qualified through successful testing.”

It is inappropriate to classify a device that is not “specially designed” for spacecraft as being “space qualified” and thereby subject to munitions-like controls. Commercial ICs that are not “specially designed” should not be controlled as if they were “specially designed.” Doing so defeats the entire purpose of having a “specially designed” definition. There is no need for BIS to include within new ECCN 9A515.x any item that is not “specially designed” for spacecraft, and so BIS should modify the second Note to the ECCN as follows:

**Note:** The phrase “designed, manufactured, or qualified through successful testing” in this definition is synonymous with “specially designed.” Thus, for example, an item that is “specially designed” for a spacecraft is deemed to be “designed, manufactured, or qualified through successful testing” for operation at altitudes greater than 100 km and an item that is not “specially designed” for a spacecraft is not deemed to have been so “designed, manufactured, or qualified through successful testing.”

Doing so would not only clarify and simplify the definition of “space qualified,” but also render that definition logical and appropriate.

Alternatively, if BIS does not make this change to the definition of “space qualified,” then, at a minimum, BIS should clarify what “qualified through successful testing” means. A phrase that is central to the control status of many ICs would benefit from some definition or explanation in the EAR.

For an IC to be “space qualified” it is not enough that it is successfully tested; it must also be qualified through that testing. Industry practice is that devices are space qualified only if they are formally certified as being space qualified, regardless of whether the manufacturer or a third party tested the device. BIS should confirm such an understanding of “space qualified.” Specifically, BIS should include at the end of the first Note to the “space qualified” definition the following clarifying language:

For purposes of this definition, “qualified” must be evidenced by an explicit rating or certification to operate at altitudes greater than 100 km above the Earth. Thus, any device certified by the manufacturer to be operative at altitudes greater than 100 km is “qualified through successful testing,” and any device not certified by the manufacturer to be operative at altitudes greater than 100 km is not “qualified through successful testing,” regardless of any testing performed by any party.

If BIS does not make “qualified through successful testing” synonymous with “specially designed,” and does not include the suggested additional clarifying language above at the end of the first Note to the “space qualified” definition, then BIS should at least clarify what “successful testing” means. Testing may be performed not only by the

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<sup>7</sup> Proposed EAR Revisions at 31,434.

manufacturer of an IC, but also by a third party further down the line of commerce, and, if neither of the changes suggested above is made, a common definition of “successful testing” is required. To that end, BIS should include an additional Note to the definition of “space qualified” that states that for a device to be “successfully tested” it must meet the following criteria:

- 1) RHA certified equal to or greater than 500 Krad, and**
- 2) Rated as Class Level S and QML Class V (to be reflected in the part number used by the manufacturer), and**
- 3) Tested via Destructive Physical Analysis (DPA) testing consistent with program technical requirements and MIL-STD-1580, or equivalent testing standard.**

It is noteworthy that where a device undergoes destructive sample testing by a party, the results of that sample test are often imputed to a very small number of physically equivalent, QMLV-certified and RHA rated devices in order to enable them to be certified as space qualified. Accordingly, BIS should ensure that the concept of an “individually tested device” for purposes of 9A515.x encompasses this highly narrow extrapolation procedure, provided it applies solely to the equivalent QMLV-certified and RHA rated items that are intended for space qualification, are in the physical possession of the party responsible for testing and should conform to the sample size specified for DPA testing, *i.e.*, a maximum number of 30 units per Lot Date Code and Part Number combination. Such destructive sample test results must not be imputed to any other items in the same production run or model series in the application of any test requirement under 9A515.x.

In particular, regardless of the definition afforded “qualified through successful testing,” BIS should further emphasize that if an individually tested device is “qualified through successful testing” then that qualification pertains only to the specific device qualified and not to any other device produced with or sharing similar characteristic with the qualified device. It must be clear that if a downstream third party “up screens” a device or a series of devices and qualifies that device or those devices as being “space qualified” through individual testing and certification, the results of that testing and certification will not affect the classification of similar, non-individually tested devices produced by the same manufacturer. SIA understands that this is the intent and meaning of the first Note to the “space qualified” definition, but requests that BIS confirm as much, taking into account the concept of “individually tested device” as recommended by SIA above.

## Additional ITAR Amendments

### Proposed Revised “Defense Service” Definition

The Proposed ITAR Revisions include a new, revised definition of “defense service.”<sup>8</sup> It is apparent from paragraph (a)(1) of that revised definition that the provision of ITAR-controlled technical data to a foreign person qualifies as a defense service.<sup>9</sup> Yet, insofar as ITAR-controlled technical data is already enumerated on the USML, the export of such data already requires State authorization. There is no need for the export of ITAR-controlled technical data to be controlled twice — both as an enumerated defense article and as a defense service. It should be sufficient for technical data enumerated on the USML to be controlled as a defense article, with all of the requisite licensing requirements entailed with such a designation. Controlling such technical data as a defense service constitutes a needless duplication as well as complicating matters and posing an unnecessary burden on exporters of such data without advancing national security interests.

State should modify paragraph (a) (1) of the defense services definition to clarify that the provision of an item already enumerated as a defense article on the USML is not a “defense service.” Specifically, State should insert “or technical data already controlled as a defense article on the USML” after “other than public domain information” in that paragraph.

In addition, with respect to paragraph (a)(2) of the “defense service” definition, State should clarify that the simple provision of an EAR-controlled item to a party for inclusion in a defense article is not a defense service. That is, State should clarify that in order for a defense service to occur, a party must provide guidance and assistance in addition to providing the physical EAR-controlled product. For example, if an IC producer provides an IC controlled by ECCN 3A001 or 3A991 to the producer of a defense article, but does not assist the defense article producer in the integration of that IC into the defense article, then no defense service has been provided.

### “Directly Related”

In the amendments to the ITAR published on April 16, 2013, State provided a revised definition of “technical data.”<sup>10</sup> One element of the “technical data” definition that has not changed is the inclusion of “software . . . directly related to defense articles.”<sup>11</sup> The term “directly related” has never been defined. Such a definition is needed. Indeed, just as a definition of “specially designed” can be useful to clarify and delineate controls on various items, so too could a definition for “directly related” clarify and delineate ITAR controls on software. The meaning of “directly related” is far from apparent and is subject to wide-ranging interpretations.

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<sup>8</sup> 78 Fed. Reg. 31,448-49.

<sup>9</sup> 78 Fed. Reg. 31,448.

<sup>10</sup> Amendment to the International Traffic in Arms Regulations: Initial Implementation of Export Control Reform, 78 Fed. Reg. 22,740, 22,754 (Apr. 16, 2013) (“April 2013 ITAR Amendments”).

<sup>11</sup> April 2013 ITAR Amendments at 22,754.

While it would never advocate a definition as complicated and elaborate as the new regulatory definition of “specially designed,” SIA would support a principled definition of “directly related” based on the natural meaning of the words, *e.g.*, “tied or connected in a specific, dedicated and peculiar manner.”

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



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July 8, 2013

Office of Defense Trade Controls Policy  
U.S. Department of State

By email to [DDTCResponseTeam@state.gov](mailto:DDTCResponseTeam@state.gov)

Subject: ITAR Amendment—USML Category XV and Defense Services  
RINs 1400–AC80, 1400-AD33,

To Whom It May Concern,

MIT appreciates the opportunity to comment on the proposed Revision of U.S. Munitions List Category XV and Definition of “Defense Service”. MIT enthusiastically supports comments being provided by the Association of University Export Control Officers (AUECO), the Council on Government Relations (COGR), and the Association of American Universities.

We continue to applaud the efforts of the Departments of Commerce, Defense, and State to rationalize, clarify, and focus U.S. export controls, and we appreciate the progress so far. MIT supports and appreciates the effort to move some satellites and spacecraft from the U.S. Munitions List (USML) to the Commerce Control List (CCL). However, we recommend that the Department reconsider the appropriate jurisdiction for some of the articles proposed for retention on the USML, and we are concerned that parts of the proposed “defense service” could negatively impact academic collaborations and scientific inquiry.

### **§ 121.1 Category XV Spacecraft Systems and Related Articles**

MIT appreciates the considerable effort DDTC has undertaken to more specifically describe the articles controlled under USML Category XV; we understand that constructing a positive list is challenging. However, as currently constructed the proposed rule would include satellites and spacecraft supporting fundamental research on terrestrial climate, weather, fires and other earth-based natural phenomena, as well as research on planets, exoplanets, and other space objects.

Based upon our review we suggest that the following changes to ensure that satellites, spacecraft and components not containing technologies unique to the United States and critical to national security are controlled appropriately by the EAR.



- “Objects” in § 121.1(a)(2) should be defined or clarified as referring to man-made objects. If intended to include naturally-occurring phenomena such as exoplanets or weather systems it would include many research and scientific satellites.
- § 121.1(a)(9) as written would seem to include most if not all satellites and spacecraft. This needs either a clearer definition of Positioning, Navigation, and Timing, or criteria such as precision (as in § 121.1(e)(10)) to identify what PNT is critical to national security and requires ITAR control.
- § 121.1(e)(1)(ii) specifies antennas that are “actively scanned”, which could include antennas that physically rotate, as used in space and weather research satellites. We believe the intent is to control “actively electronically scanned arrays” and suggest that this clarification be made in the final rule.
- In § 121.1(e)(6), while the optical bench assembly for items in paragraph (a) may require control under the ITAR, we suggest that beam splitters, fold mirrors, and flexure mounts are widely used components without unique US technology and as such would be appropriately controlled under the EAR.
- By omitting any consideration of the purpose or capabilities of DoD-funded secondary or hosted payloads, § 121.1(e)(18) would include payloads funded by DoD components whose mission includes funding basic research, e.g. DARPA or the Office of Naval Research (ONR) whether or not there are national security considerations. The difficulty of controlling ITAR items, technical data, and activities in a campus environment will discourage many universities from performing this research, depriving DoD of access to highly capable researchers and institutions. We suggest that classification of research satellites or spacecraft should be based primarily on their technical capabilities, not their funding source. If DoD determines that additional review or oversight is necessary, we recommend the approach used in Category VIII(f) (*see* final rule published April 16, 2013) be adopted.

The following additional suggestions are offered to improve the readability and clarity of the final rule:

- In § 121.1(a)(7)(i), an “and” may have been omitted, we suggest: “...with less than 40 spectral bands **and** having an aperture greater than .35 meters.”

## **§ 120.9 The Definition of “Defense Service”**

The proposed § 120.9(a)(1) provides the clarification that furnishing assistance (including training) to a foreign person whether in the United States or abroad, in the design, development, engineering, manufacture, production, assembly, testing, intermediate- or depot-level, modification, demilitarization,

destruction, or processing of defense articles does not constitute a defense service, so long as the activities are performed using only public domain information. MIT views the proposed paragraph at § 120.9(a)(1) as a very positive clarification ensuring that institutions of higher learning can perform educational, training and fundamental research activities consistent with NSDD 189.

In contrast, § 120.9(a)(2) specifies that even when only public domain information is used, the furnishing of assistance to a foreign person, whether in the United States or abroad, for the “integration” (as defined in the note to paragraph (a)(2)) of any item controlled on the USML or items subject to the EAR into an end item or component that is controlled as a defense article on the USML, regardless of the origin, is a defense service. This is particularly problematic for institutions of higher learning conducting basic and applied research that involves experimentation with hardware and software. Scientists and engineers routinely create, modify — “integrate” — components and parts using only public domain information to validate designs by means of experimentation, and to advance science and technology through the assembly and testing of prototype hardware and software.

This affects basic and applied research if the definition of “development” in § 120.9 is consistent with its use in the final rule *78 FR 22754 Amendment to the International Traffic in Arms Regulations: Initial Implementation of Export Control Reform (Tuesday, April 16, 2013)*, where “‘development’ is related to all stages prior to serial production.” Hardware and software developed in basic and applied research would be considered “developmental” items, subject to defense services whenever items used in research are “integrated,” thus restricting basic and applied research at institutions of higher learning. Under paragraph (a)(1) these activities (e.g., development, manufacture) are not defense services, but paragraph (a)(2) would result in a defense service taking place (“integration”).

MIT recommends modification of § 120.9(a)(2) to preserve the clarification in § 120.9(a)(1) for educational, training and fundamental research activities using public domain information.

### **§120.3 Policy on designating or determining defense articles and defense services on the U.S. Munitions List**

In its final rule 78 FR 22754 (Tuesday, April 16, 2013), DDTC amended section § 120.3 Policy on designating or determining defense articles and services on the U.S. Munitions List to add the following requirement:

- (a) For purposes of this subchapter, a specific article or service may be designated a defense article (see § 120.6 of this subchapter) or defense service (see § 120.9 of this subchapter) if it:
  - (2) Provides the equivalent performance capabilities of a defense article on the U.S. Munitions List.

This can be done for USML entries that detail the properties peculiarly responsible for achieving the controlled performance levels, characteristics or functions. However, it’s difficult to determine “equivalent performance capabilities” for categories where no positive performance characteristics are provided. MIT recommends that there should be sufficient guidance such as the “Notes” provided in USML Category VIII and in certain CCL ECCNs to clarify the desired bright line between the ITAR and the EAR.

## **In Conclusion**

MIT thanks DDTC for its proposed steps to remove some satellites and spacecraft from the USML; this has the potential to enable a great deal of space-related educational and research activities to be conducted at United States accredited institutions of higher learning without intersection with ITAR defense articles and defense services. We hope that DDTC will be able to implement the comments described above.

Sincerely,

A handwritten signature in blue ink, appearing to read "Michelle D. Christy". The signature is fluid and cursive, with a large, stylized initial "M" and a long, sweeping underline.

Michelle D. Christy



# UNIVERSITIES SPACE RESEARCH ASSOCIATION

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University of Washington  
Washington University in St. Louis  
University of Wisconsin—Madison  
Yale University

July 8, 2013

Directorate of Defense Trade Controls  
Office of Defense Trade Controls Policy  
U.S. Department of State  
Washington, DC 20522

Via email to: [DDTCResponseTeam@state.gov](mailto:DDTCResponseTeam@state.gov)

Re: ITAR Amendment—USML Category XV and Defense Services

22 CFR Parts 120, 121, and 124  
[Public Notice: 8329]  
RINs 1400–AC80 and 1400–AD33  
Amendment to the International Traffic in Arms Regulations:  
Revision of U.S. Munitions List Category XV

The Universities Space Research Association (USRA) welcomes the efforts being undertaken by the Department of Defense to amend the International Traffic in Arms Regulations (ITAR) to revise Category XV (Spacecraft Systems and Related Articles) of the U.S. Munitions List (USML) to describe more precisely the articles warranting control on the USML. USRA is pleased to provide the following comments on the proposed rule:

### 1. Part 121.1 Category XV (a)(2) “Track ground, airborne, missile, or space objects using imaging, infrared, radar, or laser systems”

USRA recommends that the rule read, “Track ground, airborne, missile, or man-made space objects using imaging, infrared, radar, or laser systems.” Scientific and educational satellites are used to observe celestial objects, including near-Earth natural objects, such as asteroids or meteors, as well as deep space objects, including planets and other objects within our solar system and stellar objects. These observations require the ability to track the celestial bodies, which, in relative terms, are often slower moving in comparison to man-made space objects of interest to the Department of Defense. Defining the “space objects” of interest as “man-made” will allow such scientific and educational satellites designed specifically to observe celestial bodies to not necessarily be on the USML, while preserving the inclusion on the USML of satellites specifically-designed to track man-made objects.



**2. Part 121.1 Category XV (e)(18) “Department of Defense-funded secondary or hosted payload, and specially designed parts and components therefor”**

USRA recommends that this paragraph be struck, in its entirety. As proposed, the rule would place restrictions based upon funding-source, not capability or function. The Department of Defense funds or partially funds research and educational satellites that do not perform any of the functions described in paragraph (a), including scientific satellites that engage university faculty and student-built CubeSats. Note that the “parts and components” for such satellites may be “specifically designed” for the payload, but neither the payload nor the parts and components perform any of the functions described in paragraph (a) or elsewhere in paragraph (e). While the proposed rule specifically cites Defense-funded “secondary or hosted payloads,” there is no corresponding similar proposed rule for Defense funded primary payloads. Paragraph (e)(18) is a blanket restriction, solely based upon funding-source and is wholly dissimilar in character from the spacecraft functions listed in paragraph (a) and the spacecraft systems listed in paragraph (e).

USRA very much appreciates the opportunity to provide comments to the Department of State on the proposed rule. The U.S. university community recognizes and supports the need for export controls to protect our national security. U.S. universities also welcome these efforts by the Department of State to bring about careful consideration of what space-related technology must be controlled. This will restore to U.S. universities the ability to teach our students space technology, and to conduct research in space, in a way that will enable the U.S. to remain a leader in the future.

USRA is a nonprofit consortium of 105 universities offering advanced degrees in space- and aeronautics-related disciplines. USRA was established in 1969 by the National Academy of Sciences at the request of the National Aeronautics and Space Administration.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kevin Schmadel", with a stylized, wavy line extending to the right.

Kevin Schmadel  
Vice President,  
University and Government Relations



July 8, 2013

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

Mr. Kerem Bilge  
Acting Director  
Office of Defense Trade Controls Policy  
U.S. Department of State  
2401 E Street, N.W.  
Washington, D.C. 20037

Re: **RIN 0694-AF87:** Control of Spacecraft Systems and Related Items The President Determines No Longer Warrant Control Under the United States Munitions List (USML) (*Federal Register* Notice of May 24, 2013); and  
**RIN 1400-AD33:** Revision of U.S. Munitions List Category XV and Definition of Defense Services (*Federal Register* Notice of May 24, 2013)

Dear Mr. Mooney and Mr. Bilge:

Intel Corporation appreciates the opportunity to provide comments on the above-referenced Notices of Proposed Rulemaking (NPRMs). Our company designs and manufactures high-volume integrated digital technology platforms that are used worldwide in a wide variety of commercial applications spanning such products as PCs, laptops, servers, tablets, smartphones, automobiles, automated factory systems, and medical devices.

Consistent with the comments of the Semiconductor Industry Association (SIA) on the proposed rulemakings, Intel strongly supports proposed regulatory changes within the NPRMS that:

- Replace USML Category XV(d) with the proposed ECCN 9A515.d in the CCL “500 series.”
- Articulate the scope of the proposed ECCN 9A515.d with header language reading “Microelectronic circuits rated, certified, or otherwise specified or described as meeting

or exceeding all the following characteristics and that are “specially designed” for defense articles, “600 series” items, or items controlled by 9A515.”

SIA’s urgent recommendation to waive the 180-day transition rule for implementing the proposed changes for USML XV(d) and ECCN 9A515.d is also vigorously endorsed by Intel. It is unnecessary to delay implementation by six months for these particular changes, given our belief that they will not affect current industry products.

In sum, the proposed changes in this area clearly reflect diligent efforts by the administration to protect its national security interests while creating a more effective and practical regulation. The changes reflect extensive efforts by officials from DOD and other U.S. agencies, national labs, and industry technical experts. We hope the changes can be formally implemented when the rulemakings are finalized and published as opposed to prolonging the effective date for another 6 months.

Thank you for the opportunity to provide our views on this vital matter.

Sincerely,

A rectangular box containing a handwritten signature in blue ink that reads "David W. Rose".

David Rose  
Senior Director, Export/Import Policy  
Intel Corporation

8 July 2013

Ms. Sarah Heidema  
Acting Director  
Office of Defense Trade Controls Policy  
Directorate of Defense Trade Controls  
U.S. Department of State  
SA-1, 12<sup>th</sup> Floor  
Washington, D.C. 20522-0112



**Subject: Amendment to the International Traffic in Arms Regulations:  
Revision of U.S. Munitions List Category XV and Definition of  
"Defense Service"**

**Reference: Proposed Rule RIN 1400-AD33  
Federal Register/Vol. 78, No. 101, May 24, 2013**

Dear Ms. Heidema,

Intelsat Corporation hereby submits comments to the Proposed Rule mentioned above. Intelsat welcomes the Export Control Initiative and appreciates the joint effort of U.S. government agencies to create a more positive list with clearer controls. Intelsat notes with particular appreciation various interactive discussions among Directorate of Defense Trade Controls ("DDTC"), the Department of Defense ("DOD") and the Bureau of Industry and Security ("BIS") officials and industry representatives. These discussions benefited both Intelsat's understanding and its analysis of the proposed rule.

Intelsat wishes to share the following particular comments:

**I. Proposed Paragraph (e)(18) - Hosted Payloads**

*(e)(18) Department of Defense-funded secondary or hosted payload, and specially designed parts and components therefor;*

Intelsat recommends that (e)(18) be deleted, or clarified to limit the scope to hosted payloads with military functionality, for at least three reasons: (1) as written, the language would frustrate the interests and objectives of the DOD and other U.S. Government agencies who plan to use hosted payloads in their business model; (2) the language would capture DOD funding for purely dual-use technologies that DOD would like to implement on hosted payloads; and (3) payloads that have military functions and purposes would likely be captured by other provisions in Category XV, rendering (e)(18) unnecessary.

First, subjecting DOD-funded payloads that do not otherwise have a military function to ITAR control would frustrate the objectives of DOD and harm other

U.S. Government agencies planning to use DOD contract vehicles for non-military hosted payloads. Hosted payloads are a critical part of DOD's business plan.<sup>1</sup> General Ellen Pawlikowski, who commands the Air Force's Space and Missile Systems Center, has stated that "hosted payloads provide an opportunity to deploy capabilities at a fraction of the cost of [DOD's] current systems."<sup>2</sup> One of the key elements to implement this plan includes a contracting vehicle called the Hosted Payload Solutions Indefinite-Delivery-Indefinite-Quantity (IDIQ). This contracting vehicle is a DOD mechanism (awarded and managed by the Air Force)<sup>3</sup> that other government agencies will be able to use<sup>4</sup> to obtain services from commercial satellite providers. For example, one of the first Hosted Payload Solutions mission candidates is projected to be NASA's TEMPO mission.<sup>5</sup> TEMPO will measure atmospheric pollution in North America and create a dataset to provide understanding and improve prediction of air quality and measure effects of greenhouse gases.<sup>6</sup> Similarly, NOAA is considering using DOD-funded payloads for weather monitoring.<sup>7</sup> Both of these missions would be areas where NOAA and NASA would potentially want to coordinate with other international organizations interested in climate change. If DOD-funding alone would require such payloads to be treated as ITAR, the export control restrictions would unnecessarily increase the cost and complexity with those procurements and hamper international cooperation without any national security benefits, contrary to the objectives of export control reform advocated by DOD in the 1248 Report.<sup>8</sup>

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<sup>1</sup> See generally HoPS Industry Day Presentation (Feb 19, 2013) [Excerpt Provided as **Exhibit A**]. The excerpt includes a table of HoPS mission candidates. This table is repeated on the last page, which also includes Intelsat's comments.

<sup>2</sup> See Lt. Gen. Ellen Pawlikowski, et al., *Space: Disruptive Challenges, New Opportunities, and New Strategies*, Strategic Studies Quarterly, Spring 2012, at note 8, at 42 [Provided as **Exhibit B**].

<sup>3</sup> See Air Force Space and Missile Systems Center, Hosted Payload Solutions (HoPS) Performance Work Statement, at 1 (Sept. 17, 2012), <https://www.fbo.gov/utills/view?id=ffa3e08707febbdf3e8f287972af26f4>.

<sup>4</sup> See GAO Rep. 2013 Annual Report: Actions Needed to Reduce Fragmentation, Overlap, and Duplication and Achieve Other Financial Benefits: (Apr. 9, 2013) <http://www.gao.gov/assets/660/653631.txt>.

<sup>5</sup> See **Exhibit A**.

<sup>6</sup> See NASA, NASA Science Missions: TEMPO, at <http://science1.nasa.gov/missions/tempo/>; NASA has expressed excitement at "using commercially available space on geostationary communication satellites to engage in cutting edge science." NASA Press Release, "New Space Sensor as a Hosted Payload to Track Air Pollution Across North America", Nov. 8, 2012, [http://www.nasa.gov/home/hqnews/2012/nov/HQ\\_12-390\\_TEMPO\\_Instrument.html](http://www.nasa.gov/home/hqnews/2012/nov/HQ_12-390_TEMPO_Instrument.html).

<sup>7</sup> See **Exhibit A**; see also <http://www.space.commerce.gov/library/speeches/2011-03-satellite2011.pdf>.

<sup>8</sup> See Rep. on Section 1248 of the National Defense Authorization Act for FY 2010, at 1 ("1248 Report"); see also **Exhibit B** at 39 (Gen. Pawlikowski stated that "export controls limiting competition and partnerships" has been a "[p]rimary cause of disruptive challenges" to U.S. Space Power); see also Gen. Kevin P. Chilton, *Military Space Borne Capabilities*, 2009 Strategic Space Symposium – Commander's Perspective, (Nov. 3, 2009), available at [http://www.stratcom.mil/speeches/2009/26/Omaha\\_Neb/](http://www.stratcom.mil/speeches/2009/26/Omaha_Neb/) (cautioning

Second, making DOD funding the only criteria for ITAR control would also sweep many dual-use technologies requested and funded by DOD under ITAR control. For example, DOD has indicated it is interested in a steerable beam option to allow it to provide wideband communications to mobile DOD assets by adjusting the area covered by the beam in real time. This “steering” of a beam is also desired by commercial customers such as airlines who may want to track their fleet crossing similar but not identical paths simultaneously. This steering technology is useful for cruise ships and naval vessels as well as commercial airlines and military jets. Similarly, DOD may be interested in funding enhancements to the Ku-band transponder which may benefit military unmanned aerial vehicles and also benefit greater broadband use services available on commercial airlines. In light of the interrelated nature of military communications and commercial communications, it is particularly important that the ITAR controls for hosted payloads be specific to the solely military technologies that DOD intends to protect. Subjecting dual-use technology enhancements to ITAR-control simply due to DOD funding imposes licensing costs and delays that would impede the capability of U.S. industry to competitively serve DOD’s interests without a corresponding benefit to national security.

Third, (e)(18) is unnecessary because other clauses in Category XV *would be* sufficient to control critical technologies funded by DOD. Per (e)(17), DOD-funded payloads that perform *any of the* listed functions in paragraph (a) would still be ITAR-controlled. For example, other HoPS mission candidates such as those infrared payloads used on CHIRP for missile warning detection<sup>9</sup> would clearly be covered by missile tracking under (e)(17) and (a)(2). Alternatively, to the extent DDTC and DOD intend to include a ‘catchall’ for future technologies potentially not contemplated by (a), DDTC has potentially less overly broad options than “DOD-funding” to achieve that objective. For example, (a) could include a catch all for experimental technologies developed by DOD for a potential military end use as opposed to scientific experimental technologies.

The changes requested above should permit DOD to ensure national security without negatively impacting its own procurement objectives and commercial benefits it seeks to gain through partnerships on hosted payloads with companies like Intelsat.

## II. Proposed Paragraphs (e)(17) and (e)(18)

Intelsat seeks clarification that an ITAR-controlled hosted payload would not impact the jurisdiction of the entire satellite. For example, prior to Congress’s statutory transfer of commercial satellites to the ITAR, the ITAR excluded general munitions list systems contained on commercial communications satellites.<sup>10</sup>

Without this clarification, this rule could negatively impact companies like Intelsat, which would have their own commercial payloads on the same satellite.

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regarding “gaps” in fragile satellite constellations as old satellites began to die and launches – ever increasing in cost – were less and less available).

<sup>9</sup> See Exhibit A.

<sup>10</sup> See 22 C.F.R. Pt. 121, Cat. XV (1998); 15 C.F.R. Pt. 774, Supp. 1, 9x005 (1998).

Subjecting the entire satellite to ITAR-control increases costs and prevents industry from providing independent services to *both commercial and USG agencies*. This would limit the available satellites for defense use and hinder DOD's pursuit of more cost-effective and increased access to space.<sup>11</sup> Furthermore, diversion risk could still be addressed by licensing requirements for the DOD payload with military functionality.

Moreover, Intelsat requests that data being transferred between the DOD military payload and other satellite-related items, or the equipment transmitting the data, should not be treated as ITAR. Many of the spacecraft hosting military payloads will be subject to the EAR, as will the communications ground equipment (e.g., base band unit) communicating with the commercial and military payload. For example, the Department should ensure that base band units communicating with military hosted payloads are not made subject to the ITAR by virtue of their transmissions to and from the payload. Otherwise, this could cause ground equipment to have different jurisdictions depending on the source of the bytes of information being handled at any given time, which would be extremely difficult to manage from a compliance standpoint. More generally it would create a substantial licensing burden for any aspect of the operations of the satellite communicating with the payload, and diminish the usefulness of transferring commercial satellites to the EAR. Ground equipment for military hosted payloads should only be subject to the ITAR if specially designed for the specific military payload, as opposed to temporarily configured to communicate with it (e.g., by pointing it towards the payload or altering its polarization settings).

### III. Proposed Paragraph (a)(12) Tracking, Telemetry & Control (TT&C) Encryption

Intelsat requests a note clarifying that a satellite containing *non-classified* TT&C encryption, including NSA-approved encryption, is controlled under the EAR when incorporated in a commercial satellite. Through discussions with DTSA, Intelsat understands that DOD/DDTC/BIS intend that COMSEC encryption when incorporated on an EAR-controlled satellite would *not* make the satellite ITAR (i.e., "see-through" rule would not apply here). The regulations need to clearly express this policy.

COMSEC encryption generally is not classified, but potentially controlled under Cat. XIII. However, as noted above, the EAR and ITAR prior to the jurisdictional change in 1999 provided a specific exclusion for such technology from USML control: 1998 ITAR Categories XIII and XV excluded general munitions list systems contained on commercial communications satellites.

Cat XV - *NOTE: Commercial communications satellites are subject to Commerce Licensing jurisdiction even if they include the individual*

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<sup>11</sup> See Exhibit A ("HoPS Top-Level Strategy: Pursue a commercially hosted space capability in order to secure affordable and resilient access to space; Maximize hosting opportunities to provide choices and competitive pricing; Leverage robust commercial base and practices").

munitions list systems, components or parts identified in paragraph (f) of this category.

Cat XIII - *Military cryptographic (including key management) systems, equipment, assemblies, modules, integrated circuits, components or software with the capability of maintaining secrecy or confidentiality of information or information systems, except cryptographic equipment and software as follows:* (i) Tracking, telemetry and control (TT&C) encryption/decryption when embedded in a commercial communications satellite identified in ECCN 9A004a of the Export Administration Regulations; embedded means that the device or system cannot feasib[ly] be removed from the satellite and that it cannot be used for other purposes.<sup>12</sup>

However, Current and Proposed Cat. XIII include Tracking, Telemetry and Control encryption and decryption without such a qualifier:

(1) Military cryptographic (including key management) systems, equipment assemblies, modules, integrated circuits, components, and software (e.g., cryptographic interfaces) capable of maintaining secrecy or confidentiality of information or information systems, including equipment and software for tracking, telemetry, and control (TT&C) encryption and decryption;<sup>13</sup>

It would be inconsistent with ECR deregulation principles to leave these as ITAR when they are embedded in a commercial satellite. Moreover, COMSEC encryption is required for any satellite that will carry US government traffic, so leaving this on the ITAR could restrict DOD commercial satellite use options. The note should clarify that the see-through rule does not apply with respect to commercial satellites containing such encryption.

#### **IV. Proposed Paragraph (a)(4) – Confirmation that Data to Attach be Excluded**

*(a)(4) Provide space-based logistics, assembly or servicing of any spacecraft (e.g., refueling);*

Intelsat is concerned that this clause would create obstacles to refueling and servicing aging spacecraft. Intelsat has already proposed ways to do so with NASA and the Air Force. This paragraph should be revised to exclude both space-based servicing and refueling.

Intelsat understands that DOD is concerned about maneuverability issues related to refueling or servicing. Intelsat recommends that the ITAR be revised to regulate that maneuverability, specifically.

Intelsat proposes the following revisions:

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<sup>12</sup> 22 C.F.R. Pt. 121, Cats. XV, XIII (1998) (emphasis added); see also EAR 771, 9x005 (1998).

<sup>13</sup> DDTC, Proposed Rule on Category XIII, 77 F.R. 29575 (May 18, 2012); see also 22 C.F.R. Pt. 121 Cat. XIII (2013) (similar).

(a)(4) *Provide space-based logistics, or assembly ~~or servicing~~ of any spacecraft (e.g., refueling);*

Secondly, Intelsat is concerned that if the servicer remains ITAR-controlled, that Intelsat's satellites intended for service may be caught in the ITAR designation if Intelsat has to provide data for the servicer to attach or otherwise engage with Intelsat's spacecraft. Intelsat recommends that DDTC respond to this concern with a note or guidance, as it could affect many commercial satellite operators.

#### V. Proposed Paragraph (a)(2) Space Situational Awareness

(2) *Track ground, airborne, missile, or space objects using imaging, infrared, radar, or laser systems;*

Intelsat suggests that space-based tracking for non-military end-use be excluded. Situational awareness can enable satellite operators to both assess their fleet and also provide visible confirmation of in-orbit events that are covered by insurance.

Intelsat proposes the following revision:

(2) *Track ground, airborne, missile, or space objects using imaging, infrared, radar, or laser systems, unless the space objects tracking is for non-military end use;*

#### VI. Proposed Paragraph (a)(10) Exclusion for Communications Links

(10) *Are specially designed to be used in a constellation or formation that when operated together, in essence or effect, form a virtual satellite (e.g., functioning as if one satellite) with the characteristics of other items in paragraph (a);*

Intelsat is concerned that this paragraph could broadly capture constellation or formation used merely to provide communication links between satellites. Satellites that are purposely built for a defined mission do not need to include space to ground communications if inter-satellite communications or relay are employed. Intelsat has a patent application addressing such capabilities today.

Intelsat proposes the following revision:

(10) *Are specially designed to be used in a constellation or formation that when operated together, in essence or effect, form a virtual satellite (e.g., functioning as if one satellite) with the characteristics of other items in paragraph (a), except for constellation or formation used to provide communication links (e.g. relay);*

#### VII. Proposed Paragraph (a)(9) PNT is Too Broad

(a)(9) *Provide Positioning, Navigation, and Timing (PNT);*

Intelsat is concerned that this paragraph is too broad. For example, it could unnecessarily include Federal Aviation Administration (FAA) Wide Area Augmentation System (WAAS) payload used for aeronautical navigation.

Intelsat proposes the following revisions:

(a)(9) *Provide Positioning, Navigation, and Timing (PNT), for military end-use;*

#### VIII. Proposed Paragraph (c)(4) Space Launch Vehicle Unnecessary

(c) *Global Positioning System (GPS) receiving equipment specifically designed, modified, or configured for military use; or GPS receiving equipment with any of the following characteristics:*

... (4) *Designed or modified for use with unmanned air vehicle systems capable of delivering at least a 500 kg "payload" to a "range" of at least 300 km.*

**Note 1 to paragraph (c)(4):** *"Payload" is the total mass that can be carried or delivered by the specified rocket, space launch vehicles, missile, drone, or unmanned aerial vehicle that is not used to maintain flight. "Range" is the maximum distance that the specified aircraft system is capable of traveling in the mode of stable flight as measured by the projection of its trajectory over the surface of the Earth. The maximum capability based on the design characteristics of the system, when fully loaded with fuel or propellant, will be taken into consideration in determining "range." The "range" for aircraft systems will be determined independently of any external factors such as operational restrictions, limitations imposed by telemetry, data links, or other external constraints. For aircraft systems, the "range" will be determined for a one-way distance using the most fuel-efficient flight profile (e.g., cruise speed and altitude), assuming International Civil Aviation Organization (ICAO) standard atmosphere with zero wind.*

Intelsat recommends deleting "space launch vehicles" from Note 1. Launch vehicles for spacecraft will easily exceed the 500kg payload mass and the 300 km altitude. Intelsat also notes that this paragraph mixes aircraft systems and space launch vehicles.

#### IX. Proposed Paragraph (e)(1) Exclusions for controlled Phased Arrays and Beam Forming

(e)(1) *Antennas as follows: (i) having a diameter greater than 25 meters; (ii) are actively scanned; (iii) are adaptive beam forming; or (iv) are for interferometric radar;*

Intelsat recommends that ground-controlled phased arrays and ground-based or pre-configured beam forming antennas be excluded from (e)(1). Current commercial capabilities allow for the reconfiguration of beams via ground control. The beam forming is *already* resident within the satellite or the antenna can be

stimulated to create the needed shape. Thus, this paragraph would capture commercial satellites. Therefore, Intelsat recommends the following revisions:

(e)(1) *Antennas as follows: (i) Having a diameter greater than 25 meters; (ii) Are actively scanned, except for ground controlled phased array; (iii) Are adaptive beam forming, except for ground based or pre-configured beam forming; or (iv) Are for interferometric radar;*

**X. Proposed Paragraph (e)(4) Exclusion of Mechanical Heat Pipes**

(e)(4) *"Space-qualified" mechanical cryocooler, active cold finger, and associated control electronics specially designed therefor,*

Intelsat recommends that DDTC exclude mechanical heat pipes from cryocoolers. Heat-pipes are the primary means commercial satellites today maintain and distribute heat across satellite. These are commercial items and should not be on the USML. Intelsat suggests the following revision:

(e)(4) *"Space-qualified" mechanical cryocooler (excluding mechanical heat-pipes), active cold finger, and associated control electronics specially designed therefor,*

**XI. Proposed Paragraph (e)(5) Express Exclusion of Passive Vibration Suppression**

(e)(5) *"Space-qualified" active vibration suppression, including isolation and dampening, and associated control electronics therefor;*

Intelsat recommends that there be a clear exclusion of passive vibration suppression. Passive suppression is used currently when stable platforms are needed for use with payloads that require persistent coverage (e.g., fixed coverage antennas). Intelsat recommends the following revision:

(e)(5) *"Space-qualified" active (not passive) vibration suppression, including isolation and dampening, and associated control electronics therefor;*

**XII. Proposed Paragraph (e)(10) Exclusion of GPS Correction Capabilities**

(e)(10) *Attitude determination and control systems, and specially designed parts and components therefor, that provide earth location accuracy without using Ground Location Points better than or equal to: (i) 5 meters from low earth orbit (LEO); (ii) 30 meters from medium earth orbit (MEO); (iii) 150 meters from geosynchronous orbit (GEO); or (iv) 225 meters from high earth orbit (HEO)*

Intelsat is concerned that this paragraph would sweep in non-military hosted payloads operational today. This includes the Wide Area Augmentation System (WAAS), which provides GPS correction for the FAA and aircraft that use FAA systems to accuracies *much* better than noted for GEO. Therefore, Intelsat recommends the following revision:

(e)(10) *Attitude determination and control systems, and specially designed parts and components therefor, that provide earth location accuracy, excluding GPS correction capabilities, without using Ground Location Points better than or equal to: (i) 5 meters from low earth orbit (LEO); (ii) 30 meters from medium earth orbit (MEO); (iii) 150 meters from geosynchronous orbit (GEO); or (iv) 225 meters from high earth orbit (HEO)*

**XIII. Proposed Paragraph (e)(15) Clarification that Phase Noise Applies only to Paragraph (a)**

(e)(15) *"Space-qualified" oscillator for radar in paragraph (a) of this category with phase noise less than  $-120 \text{ dBc/Hz} + (20 \log_{10}(\text{RF}))$  (in GHz) measured at  $2 \text{ KHz} * \text{RF}$  (in GHz) from carrier;*

Intelsat notes that phase noise is a standard requirement for any commercial satellite system. The performance referenced by the above paragraph is consistent with Intelsat's operational satellites. This phase noise is needed so as to allow for commercial customers to maximize use of the available spectrum. DDTC should ensure that these characteristics are only controlled as they relate to defense article spacecraft in Cat. XV(a). Intelsat recommends the following revision:

(e)(15) *"Space-qualified" oscillator for radar only in paragraph (a) of this category with phase noise less than  $-120 \text{ dBc/Hz} + (20 \log_{10}(\text{RF}))$  (in GHz) measured at  $2 \text{ KHz} * \text{RF}$  (in GHz) from carrier;*

**XIV. Proposed Paragraph (e)(19) Exclusion of Thermal Blankets**

(e)(19) *Spacecraft re-entry vehicles, and specially designed parts and components therefor, as follows (MT if usable in rockets, SLVs, missiles, drones, or UAVs capable of delivering a "payload" of at least 500 kg to a "range" of at least 300 km):*

- (i) *Heat shields, and components therefore, fabricated of ceramic or ablative materials;*
- (ii) *Heat sinks and components therefore, fabricated of light-weight, high heat capacity materials; or*
- (iii) *Electronic equipment specially designed for spacecraft re-entry vehicles;*

Intelsat is concerned that this paragraph covers too much that is already widely used in commercial industry. For example, with respect to (e)(19)(i), ablative materials are layered components that allow for the distribution and dissipation of heat. Thermal blankets/membranes are a standard within the commercial industry to maintain the thermal operating environment within a satellite. Moreover, (e)(19)(ii) is far too broad and should be deleted. As an example, aluminum fits this definition, which is broadly used throughout a spacecraft for just this purpose.

Intelsat proposes the following:

(e)(19) *Spacecraft re-entry vehicles, and specially designed parts and components therefor, as follows (MT if usable in rockets, SLVs, missiles, drones, or UAVs capable of delivering a "payload" of at least 500 kg to a "range" of at least 300 km):*

(i) *Heat shields, and components therefore, fabricated of ceramic or ablative materials, excluding thermal blankets/ membranes; or*

(ii) ~~*Heat sinks and components therefore, fabricated of light weight, high heat capacity materials; or*~~

~~(iii) *Electronic equipment specially designed for spacecraft re-entry vehicles*~~

#### XV. (x) Clarification for "Interface"

(x) *Commodities, software, and technical data subject to the EAR (see § 120.42 of this subchapter) used in or with defense articles controlled in this category.*

This could broadly catch too many EAR-controlled products, software and technical data. Only when EAR products interface with ITAR products, and the ITAR products are defined should that interface be controlled, not the EAR products themselves. Therefore, Intelsat proposes the following:

(x) *Commodities, software, and technical data subject to the EAR (see § 120.42 of this subchapter) used only when interfaced in or with defense articles controlled in this category.*

#### XVI. Proposed Section 120.9: Definition of Defense Services

Proposed definitions in 120.9(5) and 120.9(6) do not contain 'foreign person'. This appears to be a mistake, as it is contrary to DDTC's own acknowledged definition.<sup>14</sup> Otherwise, the absence of the term implies that defense services would also apply to assistance to *U.S. persons*. It would not be an export control issue to provide assistance to a U.S. person.

Intelsat proposes the following revised language:

(5) *The furnishing of assistance (including training) to a foreign person in the integration of a satellite or spacecraft to a launch vehicle, including both planning and onsite support, regardless of the jurisdiction of, the ownership of, or the origin of the satellite or spacecraft, or whether technical data is used; or*

(6) *The furnishing of assistance (including training) to a foreign person in the launch failure analysis of a satellite, spacecraft, or launch vehicle,*

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<sup>14</sup> See, e.g., DDTC, Proposed Rule on Spacecraft, 78 F.R. 31444, 34447 ("By definition, defense services are only provided by U.S. person to a foreign person.").

regardless of the jurisdiction of, the ownership of, or the origin of the satellite, spacecraft, or launch vehicle, or whether technical data is used.

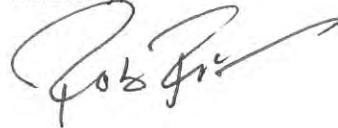
XVII. Clarification on Proposed Definition of "Integration" versus "Installation"

*Note to paragraph (a)(2): "Integration" means the systems engineering design process of uniting two or more items in order to form, coordinate, or blend into a functioning or unified whole, including introduction of software to enable proper operation of the article. This includes determining where to integrate an item (e.g., integration of a civil engine into a destroyer which requires changes or modifications to the destroyer in order for the civil engine to operate properly; not plug and play). "Integration" is distinct from "installation," which means the act of putting something in its place and does not require changes or modifications to the item in which it is being installed (e.g., installing a dashboard radio into a military vehicle where no changes or modifications to the vehicle are required).*

Intelsat requests that DDTC give clarification on whether the definition of "integration" versus "installation" in the Note to paragraph (a)(2) also applies to (a)(5). If so, the paragraph could be moved to the bottom of 120.9(a) and could begin "Note to paragraph (a)(2) and (a)(5)."

Thank you for providing the opportunity to share Intelsat's comments. If you have any questions or need information, please contact the undersigned at 202-944-6901 or via email at [robert.fisher@intelsat.com](mailto:robert.fisher@intelsat.com), or Ruth Bedore, Principal, Licensing and Determinations at 202-944-7629 or via email at [ruth.bedore@intelsat.com](mailto:ruth.bedore@intelsat.com).

Sincerely,



Robert Fisher  
Associate General Counsel

Exhibits

# Exhibit A

UNCLASSIFIED



# Hosted Payload Solutions (HoPS)

## Industry Day

**CHIEF, HOSTED PAYLOAD OFFICE: Lt Col Mark Brykowsytch**  
**PROJECT MANAGER: Capt Eric Rabarijaona**  
**CONTRACTING OFFICER: Mr. Timothy Huling**

# HoPS IDIQ Strategy



- **HoPS Top-Level Strategy**

- Pursue a commercially hosted space capability in order to secure affordable and resilient access to space
- Maximize hosting opportunities to provide choices and competitive pricing
- Leverage robust commercial base and practices

- **Flexibility required to meet diverse mission requirements (mission areas, orbits, purpose)**

- Ability to perform up front systems engineering studies to enhance mission success, minimizing execution/schedule risk
- Centralized contract vehicle ensures HPO applies past lessons learned
- Implement streamlined & reproducible acquisition to secure fleeting opportunities

# HoPS Mission Candidates



Organization	Mission	Orbit/ Configuration	Approximate Launch
NASA	TEMPO	GEO Medium	2018
MC	Experiment	GEO Medium	2017
IS	IR Payload	GEO Medium	2018
SD	Scientific	LEO Modular	TBD
WM	Space Weather	TBD	TBD
MC	Comm	GEO Medium	TBD

UNCLASSIFIED

# HoPS Mission Candidates



**Military-Related Payloads:**  
- MC is MILSATCOM (Military Satellite Communications Systems Directorate).  
- IS Infrared Payload is a mission for the Air Force.  
- SD is the Air Force Space Development and Test Directorate.  
**These would be covered by Proposed Cat. XV(e)(17).**

Organization	Mission	Orbit/ Configuration	Approximate Launch
NASA	TEMPO	GEO Medium	2018
MC	Experiment	GEO Medium	2017
IS	IR Payload	GEO Medium	2018
SD	Scientific	LEO Modular	TBD
WM	Space Weather	TBD	TBD
MC	Comm	GEO Medium	TBD

**Non-Military Payloads:**  
- NASA's TEMPO will measure air pollution.  
- Space Weather is associated with NOAA.  
**These may be covered by Proposed Cat. XV(e)(18).**

# Exhibit B

# Space

## Disruptive Challenges, New Opportunities, and New Strategies

*Ellen Pawlikowski, Lieutenant General, USAF*

*Doug Loverro, DISES, USAF*

*Tom Cristler, Colonel, USAF, Retired*

FEBRUARY 17, 1864 was a cold night just outside Charleston Harbor. The War of the Rebellion had raged for the prior three years as a bitter struggle of will and staying power. Key to that staying power—or more precisely, to breaking it—was the strategic blockade Union forces had imposed on the South, the so-called Anaconda Plan;<sup>1</sup> and no single point in that blockade was more important than Charleston Harbor. As the site of the Civil War's first real battle and the largest port in the South, it bore both symbolic and strategic significance.

On that night, though, a new strategic dynamic was about to unfold. Beneath the dark, frigid waters of the Atlantic, the *H. L. Hunley* steered toward its target, the USS *Housatonic*. RADM John Dahlgren, the US

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Lt Gen Ellen M. Pawlikowski is the Commander, Space and Missile Systems Center, Air Force Space Command, Los Angeles AFB, California. As the Air Force Program Executive Officer for Space, General Pawlikowski manages the research, design, development, acquisition, and sustainment of satellites and their associated command and control systems. She received her bachelor's degree from the New Jersey Institute of Technology and earned a PhD in Chemical Engineering from the University of California at Berkeley. Her career has spanned a wide variety of technical management, leadership, and staff positions, including command at the wing and center levels.

Mr. Douglas L. Loverro, a member of the Defense Intelligence Senior Executive Service, is the Executive Director, Space and Missile Systems Center. He is the senior civilian executive and principal assistant to the commander. His responsibilities include research, design, development, and acquisition of space launch, command and control, and satellite systems. He received his bachelor's degree from the US Air Force Academy, has earned several master's degrees, and was a distinguished graduate from the Industrial College of the Armed Forces. Mr. Loverro served on active duty in the Air Force in a full range of assignments, retiring at the rank of colonel.

Col Thomas Cristler, USAF, retired, is an independent consultant specializing in strategic planning and space and Command & Control/Intelligence, Surveillance & Reconnaissance systems acquisition. He served as deputy director of Air Force Space Acquisition in the Office of the Under Secretary of the Air Force and in numerous Air Force and National Reconnaissance Office program management positions. He holds master's degrees in Astronautical Engineering from the Air Force Institute of Technology and in Strategic Studies from the Air War College.

Navy commander of the South Atlantic Blockading Squadron, had heard of the new Confederate vessel—a submersible that could engage ships while under water—and its two previous failed missions;<sup>2</sup> but this knowledge was not able to save his fleet from loss. As alarms rang out above, and with cannons ill adapted to target the low lying vessel, the *Hunley* rammed its 135-pound torpedo into the hull of the *Housatonic*, and in less than five minutes, the *Housatonic* was lowered to its watery grave (along with its attacker just a few hours later). Submarine warfare had begun, and the Union navy, and every subsequent navy, had to either adapt or sink into insignificance.

A century and a half later, “In the predawn darkness of 11 January 2007,”<sup>3</sup> a similar strategic shift was emerging. Symbolically and strategically, the US position in space had been a source of strength and prowess since the dawn of the space age. The space race of the late 1950s and early ’60s was a formative surrogate for the more expansive superpower contest that raged on for the next three decades. The US “victory” in the race for the moon was a defining moment for our nation and for our adversaries. That symbolic victory underscored the strategic import yet to come.

The technological edge that led to this victory had sharpened over the ensuing 50 years. At the close of the last millennium, the United States enjoyed dominance in space power that, while waning, was still head and shoulders beyond its closest competitors. The US reliance on that dominance had not gone unnoticed. Chinese strategists recognized their ability to counter US military capability lay, in part, in the ability to target space.<sup>4</sup> As in the case of the *Hunley*, the US apparently knew of the upcoming Chinese kinetic antisatellite (ASAT) weapon test and its previous failures.<sup>5</sup> But with measures ill adapted to intervene in such a test, all the US could do was observe and take heed. Space warfare had begun anew, and the space community, along with every space-faring nation, was now on notice that they had either to adapt or plummet into insignificance.

*In times of disruptive change your expected future is no longer valid.  
Leaders need to think and act differently in order to chart a new  
course for the enterprise.*

—Doug Berger, *Innovate*, August 2005

Disruptive change is not a new phenomenon. New technologies, unexpected threats, novel tactics and techniques, and altered approaches

can create changes to the strategic environment in which we operate. Those changes can alter the landscape in ways that, if not addressed, can dramatically upset the existing order. They can render effective strategies impotent, change winners into losers, and turn victory into defeat.

Disruptive change has been a decisive force throughout history. The English longbow rendered knights' armor ineffective in the Battle of Crécy and is considered by many historians as the beginning of the end of classical chivalry.\* Assembly line mass production not only dramatically impacted the speed at which manufactured goods could be assembled, but also reset the productivity curve for each worker, significantly increasing their value and wages and precipitously driving down the cost of manufactured goods†—a major step in the growth of the middle class. Today, digital music and file sharing have upset 50 years of unimpeded growth in the record industry, with many predicting its end is near.<sup>6</sup>

Disruptive change rarely involves a single element, nor does it happen abruptly. It has taken over 30 years for the record industry. The introduction of digital music in 1982,<sup>7</sup> along with high-speed Internet, high-capacity digital storage drives, and a change in public focus from high-quality music to readily available music, have all led to the extended downhill slide that leaves many big music labels grasping for how to cope with the threat.

How will disruptive change impact the direction of US space power, and what strategies will be effective in dealing with it? The answer lies in our understanding of the rise of space power and how that led to the conditions of today. This article examines the forces of disruptive change in addition to the ASAT threat, presents a set of possible responses to the challenges, and investigates whether the responses group into logical categories of actions. It then delves into how those actions might be implemented in future architectural states for space systems and if the conditions of the space market are appropriate for those responses. Finally, it asks how we might change the acquisition of space capabilities to better allow these responses and what that might mean in specific mission areas.<sup>8</sup>

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\*Once mounted, knights became vulnerable to common soldiers firing from a distance; the classic use of armored cavalry and hand-to-hand battle became of lesser significance in the outcome of battles.

†For example, wages in the Ford factory doubled while the cost of an individual automobile fell by almost 30 percent.

## **The Growth of Space Power**

The current generation of US satellite systems emerged in an era far removed from today. From the very beginning of the space age to the last days of the Cold War, most space systems were focused on strategic conflict. They were highly classified, with services and information that had little impact on the tactical landscape. Space warfare was viewed as unlikely—just another element of the strategic *détente* between the Soviet Union and the United States. If a war in space were to occur, it would be as a prelude to a strategic contest between the world's two superpowers.

Depending upon one's view, either the United States or the Soviet Union was the preeminent space power during the early days of the Cold War.<sup>9</sup> But by the late 1970s, the US space industrial base—powered by simultaneous investments of Apollo, ICBMs, and SLBMs—was unmatched, robust, and vibrant, with multiple competitive sources of supply at every level of production. Retired general Tom Moorman said, “The 1960s and early 1970s saw the rapid growth of military space technologies, infrastructure and programs. The breadth of space capabilities developed during this time was indeed quite remarkable and in a word—breathtaking.”<sup>10</sup>

In those days technology was king, and experimentation in the military uses of space was expansive. From manned military programs, such as Dyna-Soar and the Manned Orbiting Laboratory (MOL),<sup>11</sup> to unmanned nuclear detection and warning programs and early space reconnaissance programs, failures preceding success were common, if not expected. And failures could be tolerated, because dependence on specific systems for everyday war-fighting was minimal. In fact, due to their highly classified nature, most of the failures were shielded from the kind of scrutiny that other programs endured.<sup>12</sup>

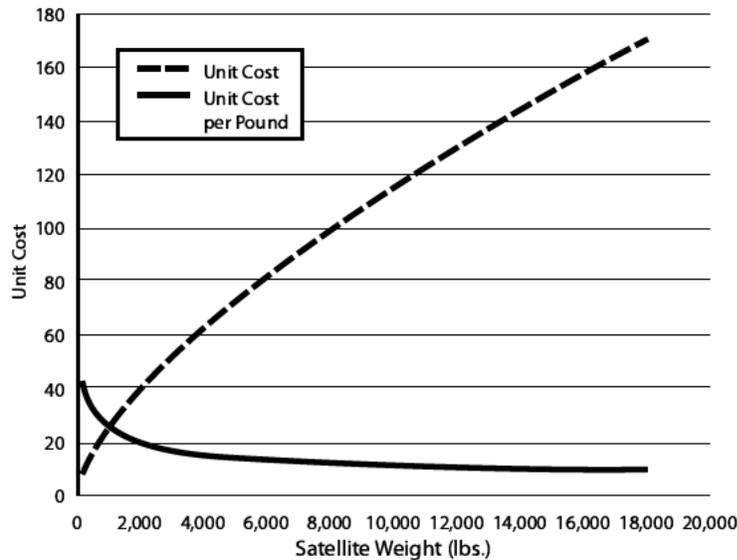
Lastly, the cost of space, while important, was of lesser concern. As part of the superpower contest between the United States and the Soviet Union, most space programs were viewed as vital and nonnegotiable. The price tag for a program was regarded in contrast to its larger strategic purpose rather than as an element of discretionary military spending.

With these conditions as backdrop, the US space program and the systems it developed were aimed at only a few primary ends—pre-conflict intelligence, nuclear attack warning and response,<sup>13</sup> and continuity of nuclear command and control.\* Continuous war-fighting resiliency, short of

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\*It is interesting to note that the GPS system was justified for part of its development, not on the basis of its impact to tactical maneuver warfare, but on the role it played in nuclear attack assessment.

nuclear survivability,<sup>14</sup> was sacrificed for technical capability. There was no “live-fire survivability testing” or requirement that accompanied similar war-fighting systems. Additionally, space was viewed as an extension of strategic détente; the same kind of deterrence that prevented nuclear war was relied upon to protect satellite systems.



**Figure 1. Satellite cost versus weight** (Graph generated through the unmanned space cost model, or USCOM.)

These forces had a direct impact on the way space systems were designed. An unchanging dynamic of space systems is that their utility on a per-pound basis tends to increase as their weight increases, with a simultaneous decrease in cost per pound (see fig.1). Similarly, the cost of launch was significant, but once a launch vehicle was determined, it made economic sense to maximize the system weight within the launch vehicle constraints.

In traditional war-fighting systems, the concentration of so much capability onto a single platform might not make military sense; but the lack of a direct threat to the system reduced the consequences of that decision. Plus, given the short lives of space systems (most at that time were planned to last 3–5 years), production runs were relatively large and replacement satellites could be called up in comparatively short time frames.

As the space enterprise matured, this approach continued. The evolution of the defense meteorological satellite program (DMSP) is instructive. The

original (Block 1) satellite launched in the early 1960s weighed about 175 lbs. By the late 1990s, the Block 5 satellites had swelled to over 2,500 lbs. Had it been completed, the replacement national polar orbiting environmental satellite system (NPOESS) would have weighed in at over 5,000 lbs. Even though the cost-per-pound of such a satellite would be about one-third of the initial smaller design, the total cost would have increased by a factor of 10.

### **Space Begins to Blossom**

As the Cold War began to thaw, space was poised for change. Space capabilities during that era had been primarily focused on supporting strategic warning, intelligence, and continuity of operations in the event of nuclear war. In contrast, its role in non-nuclear force enhancement was modest at best.<sup>15</sup> Yet today, US space dominance has become a crucial element of how the United States fights wars. Our use of space capabilities has transformed over the past two decades.

The First Gulf War was labeled by then–Air Force chief of staff Gen Merrill McPeak as “the first space war.”<sup>16</sup> Indeed, the impact of space power on the conduct of Desert Shield/Desert Storm was substantial;<sup>17</sup> substantial enough for both space advocates and non-advocates to take notice. However, the true war-fighting impact was arguable. Precision bombing was still dependent upon laser or electronic designation\* rather than GPS guidance;<sup>18</sup> imagery products, too large for broadcast through existing satellite communication (SATCOM) networks, were delivered to theater by air transport; and while DSP-detected scud launches were useful for warning troops and civilians, the information was neither timely nor accurate enough to allow “scud hunters” to find their targets.<sup>19</sup> Space power was still in its infancy.

These facts were not lost on senior DoD and Air Force leadership. Their sentiment was best expressed by the commander of Desert Storm allied air forces and future commander of US Space Command, Gen Chuck Horner: “What we have to do is change our [space] emphasis from strategic war to theater war. We have to get over the Cold War and make sure

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\*For example, in the 1991 Gulf War, 92 percent of the bombs were unguided and 8 percent were laser guided. By contrast, nearly 60 percent of the bombs dropped on Afghanistan in 2001 and 2002 were either laser or GPS guided.

that we're equipping and training and organizing to fight the kind of war that's probably going to be thrust upon us."<sup>20</sup> And from his perch at US Space Command, he had the wherewithal to make it happen. Over the next 10 years, the integration of space and theater tactical forces expanded beyond expectations. While these capabilities exercised their adolescence in Kosovo, they reached true adulthood in Operations Enduring Freedom and Iraqi Freedom.

Today, the direct combat support role of space is inarguable.<sup>21</sup> Without exaggeration, the combat effects we have come to expect from our smaller, more mobile force structure would not be possible without space capabilities.<sup>22</sup> The impact of GPS alone has fundamentally shifted the way US forces locate and destroy targets, plan operations, control both material and war-fighting assets, synchronize effects, and guide both troops and remotely piloted aircraft (RPA) home. Beyond GPS, the impact of SATCOM (RPA control, direct broadcast of real-time imagery), space imagery (target location and identification), space weather (route and operations planning), and overhead persistent infrared reconnaissance (missile warning, missile defense, and battlespace awareness) have had wide-ranging impact on every element of war.

### **Compounding Changes—Disruptive Forces**

As stated by then–Deputy Secretary of Defense Bill Lynn, “In less than a generation, space has fundamentally and irrevocably changed. . . . Without [space capabilities], many of our most important military advantages evaporate.”<sup>23</sup> In Clausewitzian terms, space has become a US center of gravity,<sup>24</sup> a fact as apparent to our adversaries as to our own defense establishment. Thus, borrowing from their own military philosophy, “What is of supreme importance is to attack the enemy’s strategy,”<sup>25</sup> Chinese planners set out upon an ambitious effort to hold US space systems at risk; an effort that culminated with the events of January 2007 described in the prologue above.

China is not the only nation capable of threatening US space capabilities. The technological capability to jam satellites is fairly simple and can be easily assembled by either individuals or nations for a fairly modest investment. Multiple reports of both state and nonstate groups jamming satellites have been seen over the last decade. GPS jammers are well known and offered openly for sale on the Internet. Satellite transit times are available from several websites and can be downloaded onto smart phones.<sup>26</sup> While none

of these threats rise to the level of an in-space ASAT test, they demonstrate how technologies once reserved for only advanced space-faring nations are now the purview of smaller states and individuals alike. The days of space chivalry are clearly numbered.

These fundamental changes—the growth of space as a tactically vital resource and the demonstration by adversaries of their intent to make space a target in both a nuclear and conventional contest—are two of the critical disruptive forces sweeping over US space strategy today. However, there are others.

Space technological strength is no longer a monopoly for American industry; multiple nations now boast a fully developed space industrial base, from satellite technologies to launch. By 2011, over 50 countries had at least one satellite in orbit;<sup>27</sup> they, and multiple consortia, vie for orbit positions and expansion of capabilities and can buy those capabilities from an increasing number of companies that provide space technology to the world.

The expansion of space industrial capability beyond the shores of the United States or Russia coincided with the “peace dividend” in the early 1990s; both led to a rapid consolidation of industry within the United States. The robust industrial base of the ICBM and Apollo eras that had empowered growth and competition in the space industry during the Cold War was disappearing. US suppliers, especially those in the second and third tiers, came at risk due to inconsistent acquisition and production rates, long development cycles, consolidation of suppliers under first-tier prime contractors, and a more competitive foreign market.<sup>28</sup>

At the same time industrial competitiveness waned, costs began to grow, and delivery times began to stretch. Since the mid-1990s, we have seen some of the longest delivery times for major space systems since the beginning of the space age.<sup>29</sup> The causes are multifaceted—higher spacecraft complexity, fewer sources of space-qualified parts, increased software complexity—and it is the continuation of a trend that started a decade before.

Higher costs were already leading to fewer satellites being ordered, each one built with greater and greater capability. As older satellites began to die, cautions were raised by many, including STRATCOM commander Gen Kevin Chilton, about the fragility of satellite constellations and “gap management.”<sup>30</sup> Launch costs had also been rising for well over a decade, and the flexibility of the launch base had decreased. Driven by the critical role

satellites had come to play in both nuclear and routine defense activities and the increased investment of dollars and schedule that those satellites represented, launch was becoming a “fail-safe” activity. The space business had come a long way from the days of Corona, where the first 13 missions ended in failure, to the present. Figure 2 provides a broad picture of how some of these forces were leading to change in the space establishment.

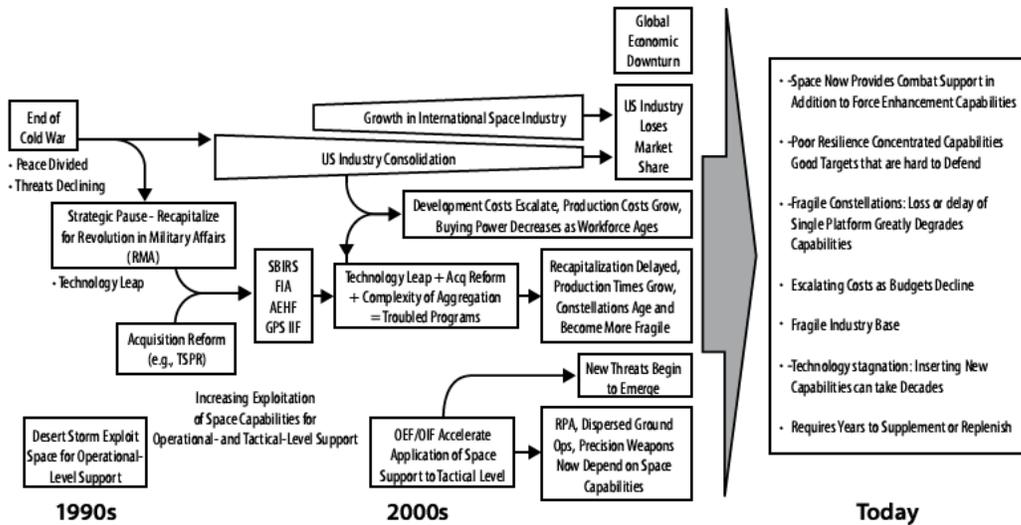


Figure 2. Evolution of today's challenges

These forces tended to build upon one another. Shrinking constellations, rising launch costs, increasing satellite costs, greater reliance, and longer build cycles have all led to the phrase, “The vicious circle of space acquisition.” While there are several illustrations of this cycle, the one developed by Maj Gen Tom Taverney provides perhaps the most comprehensive view (fig. 3).

The cycle drove multiple undesirable outcomes. One of the worst was the impact on technology risk. As constellations become more fragile, and satellite costs increase and schedules are extended, the risk of inserting new technologies into a space-system build increases. As a result, spacecraft planned for construction in the next decade are still using computer processing technology from the late 1990s when they were designed. For example, some billion-dollar satellites launching in 2020 will have missed over 24 years of capability increases driven by Moore’s law, or roughly 16 cycles of processing power increases.\* Another by-product of this cycle is an increase in ordering period

\*Moore’s law states that the processing power of semiconductors doubles about every 18 months. By missing 16 cycles, the processing speeds of our future spacecraft could be more than 50,000 times less capable than they could be if technology risk did not inhibit its adoption.

between satellites. As it does, obsolescence creeps in, factories become less efficient, and any industrial learning to be garnered is lost. The result, of course, is that costs climb and the cycle spins off into a parallel spiral.

### The Vicious Circle of Space Acquisition

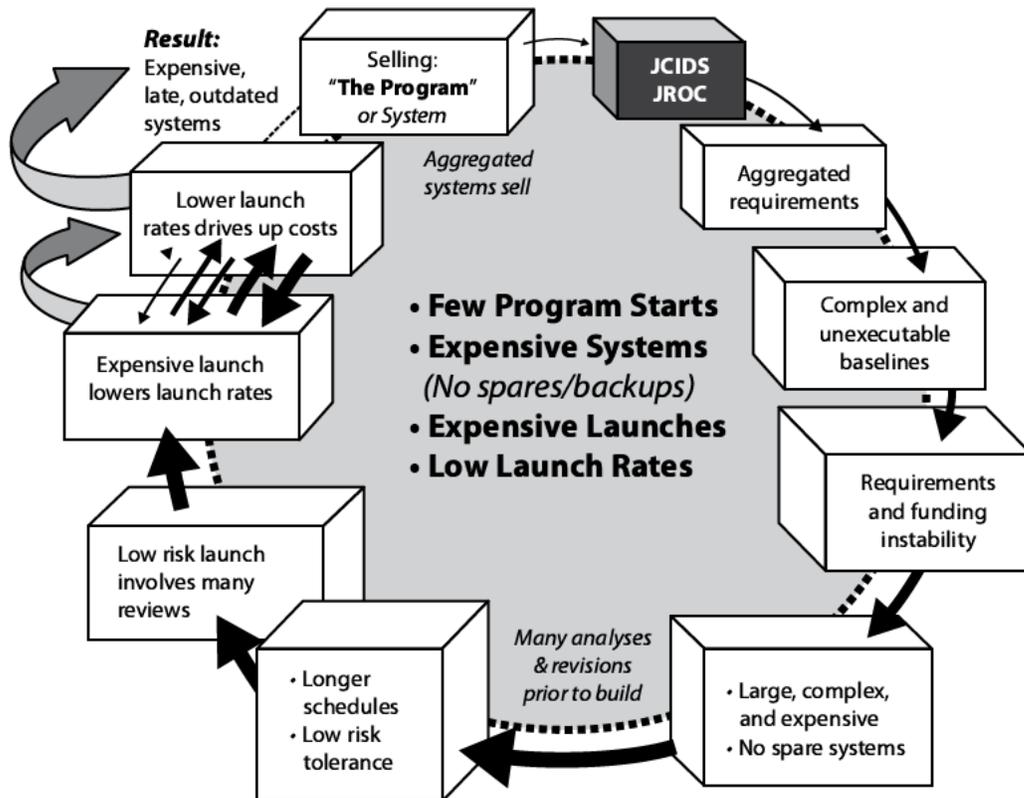


Figure 3. Space system acquisition “vicious circle” (Maj Gen Thomas Taverney, “Resilient, Disaggregated, and Mixed Constellations,” Space Review, 29 August 2011.)

### The Final Straw

The forces discussed in the preceding section represent significant changes in the industrial-dependency-threat equation under which space systems developed. The uses, importance, industrial base, cost dynamics, complexity, and competitiveness of space have all fundamentally changed from where we began; but the trajectory of system architectures did not change with them—rather, they continued on their original path. This disparity might be practical if money was no object, but unfortunately it is.

The days of unhindered spending for space superiority and technical advancement are over. At the annual Acquisition Symposium at the Naval Postgraduate School in 2009, Secretary Gates said:

Given America's difficult economic circumstances and perilous fiscal condition, military spending on things large and small can and should expect closer, harsher scrutiny. . . . The gusher has been turned off, and will stay off for a good period of time. . . . The Defense Department must take a hard look at every aspect of how it is organized, staffed, and operated—indeed, every aspect of how it does business.

The combination of all these forces represents disruptive change in the way we approach space systems. As with the music industry discussed earlier, the changes have occurred over decades. Some, such as the Chinese ASAT attack, were acute; others, such as changes in the industrial base, evolved slowly. But the sum total is disruption of the forces that led to the path we have taken. Like the music industry, we ignore these changes and continue on that path at our own peril. A more prudent approach would be to examine the elements of these changes and try to understand if a better path exists.

## **Formulating Responses**

Recognizing disruptive change is difficult enough—determining how to deal with it is even harder. The first step is to try to understand more clearly how the various forces combined with other elements of the system to create the challenges faced. We examined several elements including the impact of acquisition policy and reform, technology readiness, the rise of a commercial satellite market, and the competition for engineering talent. We found the most important elements were not the conditions surrounding what we build, but rather the architectures we choose to build. In figure 4 we trace the impact of building aggregated, highly integrated, long-lived satellites. The impact of that choice contributes directly to many of the challenges we discussed above. Dealing then with those challenges will require we deal with this underlying architectural issue.

Adapting to disruptive changes through an architectural response is not unique to the space industry. In the prologue, we discussed the first submarine attack during the Civil War. As noted there, Admiral Dahlgren was aware of the possibility of attack by this new submersible. In his orders to the fleet a month before, he noted:

I observe the ironclads are not anchored so as to be entirely clear of each other's fire if opened suddenly in the dark. This must be corrected . . . It is also advisable not to anchor in the deepest part of the channel, for by not leaving much space between the bottom of the vessel and the bottom of the channel it will be impossible for the diving torpedo to operate except on the sides, and there will be less difficulty in raising a vessel if sunk.

Order of Rear-Admiral Dahlgren, U.S. Navy, commanding South Atlantic Blockading Squadron, FLAG-STEAMER PHILADELPHIA, Off Morris Island, South Carolina, January 7, 1864.

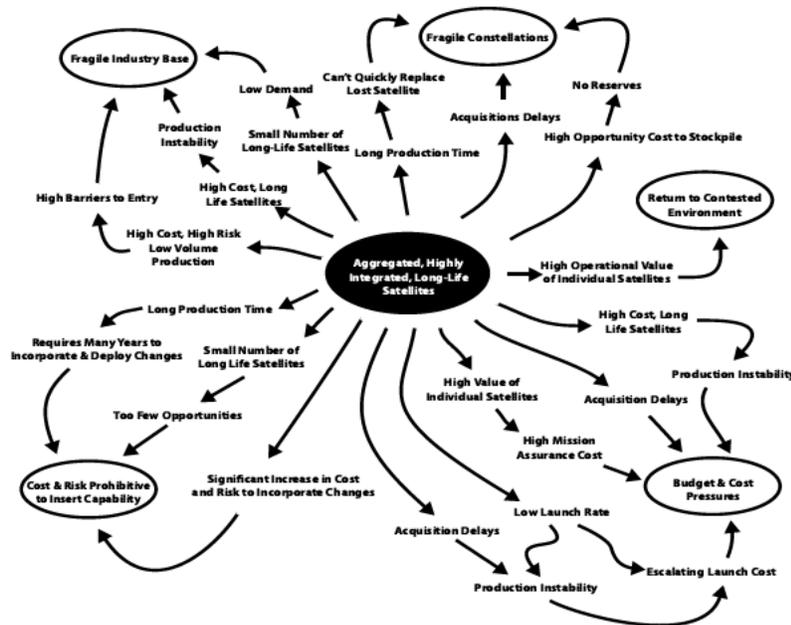


Figure 4. Effect of aggregated, highly integrated, long-life satellites

Both these tactics involved deployment or architectural responses to the new weapon he anticipated within the limits of what he could do with the equipment he had. Of course in the century following the attack, the navies of the world adapted many more responses to this submarine threat (and to an air threat still to come) by creating naval battle groups consisting of disaggregated capabilities as opposed to the unitary battleship architecture which previously had been the rule.

A similar architectural response is demonstrated by the successful music companies of the current decade. Those successful companies (Apple, Amazon, et al.) changed the architecture of the music (and book)

distribution business in response to the digital challenge brought about by the CD, Internet, and storage discussed earlier. Interestingly, this shift was not just a change in the architecture of how music was delivered but also what was delivered. The record industry had abandoned the “single” decades earlier in favor of an integrated album. By delivering songs for 99 cents each, Apple changed both how music was delivered and what was delivered. These architectural responses serve as a guide for how we might address the disruptive challenges we find ourselves facing today.

## **Understanding the Details**

The preceding discussion is a simplification of both the historical examples as well as the current challenges in space power. In fact, we did a detailed analysis of a variety of areas to understand the root causes of these challenges to determine what responses would be most successful in addressing them.<sup>31</sup> Using an eight-step approach, we decomposed each of the challenges into its driving causes and then looked across all challenges to identify the causes with the greatest effects.

The primary causes found to be propelling all the challenges are shown in table 1. When combined with the lessons we derived from the architectural response to the historical challenges, they provided us with guideposts to judge the adequacy of our responses.

**Table 1. Primary causes of disruptive challenges**



Next, using the same eight-step process, we analyzed potential responses to each of the challenges. We decomposed all the challenges through a series of fishbone charts and examined potential responses to each. We were especially interested in determining if there were common solutions that simultaneously addressed multiple challenges. For example, when we examined the challenge of fragile constellations, we found several possible solutions including investing in protection, buying more and smaller

satellites, storing spare satellites in orbit, and reducing satellite complexity. Similarly, we examined the hesitancy to adopt new technologies due to the impact on the cost and schedule of a system. Possible responses here included taking more risk, buying more and smaller satellites, investing a greater share of resources in technology maturation, and changing US export controls. In both cases, we noted one common response: buying more and smaller satellites. We did this same exercise for each of the challenges enumerated in the discussions above and collected all the common potential responses, as shown in table 2.

**Table 2. Common Responses to Challenges**

Challenges	Common Responses
<ul style="list-style-type: none"> <li>• Fragile constellations</li> <li>• Lack of resilience</li> <li>• Technology stagnation</li> <li>• Fragile industrial base</li> <li>• Inability to quickly supplement or replenish</li> <li>• Rising, uncontrollable cost</li> </ul>	<ul style="list-style-type: none"> <li>• More, smaller, less-complex satellites</li> <li>• Mixed constellations</li> <li>• Increase constellation size</li> <li>• Distribute capability</li> <li>• Encourage low-cost medium launch</li> <li>• Change export controls</li> </ul>

Finally we examined whether the common responses were able to deal with the fundamental causes enumerated in table 1. It was clear that by using more, smaller, and less-complex satellites, we directly addressed the issue of aggregation. Disaggregation lowered the cost of individual vehicles and the operational impact of losing a vehicle. This approach allows more tailored mission assurance and smaller launch vehicles, which reduces the cost of launch. Encouraging the development of low-cost, medium-launch vehicles can lower associated costs even further. By reducing the operational impact of losing an individual vehicle, increasing constellation size, and distributing capability, we also change the effect of an attack and make it harder for an adversary to attain his intended results. Thus, distributing capabilities becomes a foundation for changing the conditions for deterrence. Using smaller satellites, coupled with increased constellation size, requires a more continuous production rate. A production line enables lower-cost options for on-orbit sparing, ground reserves for reconstitution, and a responsive capability if a surge is needed. Finally, smaller,

more distributed capability leads to a more open ground architecture, which is now required to integrate the contributions of these individual and potentially mixed families of capabilities.

While it is clear in theory the responses discussed above could address the challenges that have grown into the space enterprise, it is less than clear if they can be executed in practice. The responses will surely lead to increased resilience and help unwind the vicious circle discussed earlier. And it is clear these responses are *capable* of controlling cost escalation of individual satellites and launches; however, we need to establish disaggregation and production modes which are also affordable at the architectural level. Disaggregated architectures certainly provide greater resilience, more opportunity for technology integration, an enhanced industrial base with more-frequent production buys, and the means for a quick response to changes in the strategic dynamic. But are they more affordable? To understand this question, we looked at the conditions existing in the commercial space market.

## **Commercial Space Market**

The maturity of technology and markets outside of DoD acquisition has changed substantially since the current generation of systems was developed. Historically, the national security segment dominated the global market. In terms of number of vehicles launched, the commercial and military markets reached rough parity around 2000. In 2010, the commercial market launched 50 percent more than the military segment, with growth projected to double the military market by the middle of this decade.<sup>32</sup> This growth and maturity have created new realities in the marketplace that provide significant new opportunities for the DoD.

First, the commercial satellite bus market is the most competitive segment of the space enterprise. This competition has driven companies to find efficiencies in parts and processes to minimize costs and time to market. The result has been to maximize the use of common bus components and modular structures, providing a core capability that enables them to configure, rather than redesign, a satellite to meet its specific mission requirements. This approach minimizes the amount of redesign required for different missions, reducing cost and production time. The result has been a consistent ability to produce satellites in 24 to 36 months, and at much lower price points than the DoD has been able to realize.<sup>33</sup> If our

architectures can be adjusted to take advantage of this highly competitive market, we have the potential to gain substantial savings.

Second, many of the commercial and international satellites being launched today have sufficient margins to allow for a secondary, or “hosted,” payload. With the large number of vehicles going to orbits compatible with DoD missions, hosted payloads provide an opportunity to deploy capabilities at a fraction of the cost of our current systems. There are limitations we must be aware of in using this approach, such as restrictions on the ability to reposition the asset in response to contingencies. But given the global nature of our space missions, hosted payloads could provide a base level of coverage with DoD-owned satellites providing the flexible response needed.

The third opportunity in this commercial environment is the emergence of new entrants, such as SpaceX and Orbital Systems, to the medium-launch market. Both have contracts for 10–12 launches to supply the International Space Station. SpaceX is also under contract with a variety of commercial satellite vendors to support their payloads.<sup>34</sup> This volume is sufficient to establish the reliability and price point these vendors will require to offer medium-launch services and reintroduce competition into this segment of the launch market. While the jury is still out on these specific carriers, the handwriting on the wall is clear—the launch market is going to be more, not less, competitive in the years to come.

If we are to take advantage of these opportunities, the technology enablers must be in place to package our space systems to use commercial buses, hosted payloads, and smaller launch vehicles. With the exception of nuclear hardening, those enablers are already in place today. We demonstrated these enablers recently with the hosting of a wide-field-of-view (WFOV) infrared sensor package aboard a commercial communications satellite launched by SES Americom. The so-called commercially hosted infrared payload (CHIRP) was launched from an international launch base late last year and is now undergoing checkout on orbit.

The CHIRP demonstration showed that standard commercial bus specifications were sufficient to support the power, pointing, and stability necessary for overhead persistent infrared (OPIR) mission area sensors. We likewise have demonstrated off-the-shelf commercial bus capabilities can meet the core requirements needed to support DoD missions and

payloads in the communications mission area. The wideband global SATCOM system (WGS) was developed based on commercial capabilities and is produced on a commercial production line at Boeing. Power, pointing, and stability requirements are met using commercial components.<sup>35</sup>

It is interesting to note that the WGS was originally the wideband *gap-filler* system. It was intended as a placeholder until a more ambitious (advanced wideband) satellite could be developed; later advanced wideband was supplanted by the drive toward an even more ambitious system, the transformation satellite system (TSAT). Both these programs would have represented one more run around the vicious circle with costs constraining us to a four-ball constellation. By staying with the less-complex, more easily produced WGS system, the DoD has been able to save substantial cost, and the size of the WGS constellation has grown from the originally envisioned four satellites to an inventory of 10. Given this experience, it is clear we have the ability to use a commercial bus at a lower cost to significantly reduce the time to produce and deploy capabilities for the war fighter, and to provide those capabilities in a more resilient mode than we have done historically.

The technology to package militarily useful capabilities small enough to be hosted, or to make use of smaller launch vehicles, was demonstrated by CHIRP. Similar small sensors from other vendors have been through ground testing. In the communications mission area, robust commercial encryption standards and components are being leveraged to define releasable, protected communications waveforms, payloads, and terminals that are smaller and less complex than our current systems. Commercial capabilities for unprotected wideband communications supporting RPAs and AISR are already in use and can be packaged as either a hosted payload or on a dedicated platform. These technologies enable options for both hosted payloads and smaller, less-complex satellites. In turn, the smaller satellites enable expanded use of medium-launch vehicles.

Taken together, these opportunities indicate there are approaches available to implement the common responses of smaller, less-complex satellites and distributed capabilities. This opportunity encourages the lower-cost medium-launch market and allows disaggregation of mission capabilities, which supports mixed constellations of small distributed capabilities complemented by the more robust, nuclear-hardened systems.

The successes of the commercial space marketplace suggest these responses can serve to reduce overall system cost.

## **Changing How We Buy—A Payload-Based Approach**

To take advantage of opportunities and effectively and efficiently implement a distributed architectural strategy, some of our acquisition strategies will have to change. Our historic approach to designing and procuring satellites has been to optimize performance from the top down, which almost invariably results in a highly customized bus for each mission, requiring uniquely designed and manufactured components. This approach served us well when the space industry was still in the early stages of discovering what is possible for the war fighter from space. Now the industry and market have matured from building almost exclusively unique and cutting-edge technology systems to a more flexible model of commoditized capabilities and economies of scale; a payload-based approach allows us to follow them.

Continuing our top-down performance optimization approach, which drives unique requirements for things like the satellite bus, will prevent the DoD from taking advantage of the most competitive part of the space industry. It also hamstring our ability to take advantage of hosted payload opportunities. Today's "top-down" payloads require unique support from the bus; using them as a hosted payload would require support to be added to the commercial bus, or re-engineered in the payload itself. At best, this requirement just adds cost. In most cases it prevents using the payload as a hosted capability at all because the changes in the technical baseline and schedule are unacceptable to the host, even if we are willing to pay the additional cost.

For this new strategy, we need to consider a focus shift of DoD space system development efforts more toward mission payloads. If we design a payload to provide the capability needed by the war fighter and be supported by a commercial bus, the ability to leverage both the commercial bus market and hosted payload opportunities opens up. By acquiring the mission payloads as the core element of a mission-area architecture, we can create a product with the inherent capability to fly on either a dedicated bus or as a hosted payload with minimal or no changes to the production baseline. This shift in focus would allow us to compete for procurement

of a block of buses to support the next several payloads coming off the production line, mirroring current commercial practices.

Hosting payloads need no longer be a “one off” exercise requiring heroic efforts to win approval, modify products, and meet commercial timelines. It becomes an inherent part of our strategy to deploy capabilities on orbit. We can rapidly adjust to take advantage of the host opportunity by matching the timing of a payload coming off the production line to the host schedule. Overall, the time to produce and deploy a new payload can fall from the standard 7–8 years toward the commercial standard of 2–3 years. This change in time line alone will drive a significant reduction in cost.

A second aspect to consider is the amount of capability we choose to package into a single payload. While physics and technology will determine the smallest viable increment, shifting the procurement toward a greater number of smaller payloads creates additional opportunities. If there are a sufficient number of common payloads in the architecture, we can establish production lines to realize the benefits of a learning curve, reducing unit costs and risk and allowing more tailoring for the mission assurance process. This greater number of payloads also creates regular, planned technology/capability insertion points, reducing the time to deploy enhanced capabilities.

A risk to consider is whether or not we will have to compromise mission performance if we use this new strategy. Based on the technological opportunities discussed above, the risk is low for most of the DoD space-mission capabilities.\* Nuclear-hardened capabilities, such as strategic missile warning and nuclear command and control, are the primary areas where we will need to proceed cautiously. These complex, nuclear-hardened systems can especially benefit from disaggregation of unrelated capabilities, such as battlespace awareness and tactical-protected MILSATCOM. Disaggregation will allow us to realize more affordable and resilient capabilities for the theater war fighter while at the same time allowing smaller, nuclear-hardened cores to be retained.

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\*This is not necessarily the case for intelligence community space missions. The peculiar demands of intelligence are less amenable to the disaggregated, smaller approach that appears to bear benefit for the national defense side of space. This article is not intended to discuss those issues.

Finally, when we combine a payload-focused acquisition strategy with the distributed architecture strategy we can see a path to unwinding the vicious circle facing today's space acquisitions. Such an approach:

- reduces complexity, allowing for more predictable and executable program baselines;
- stabilizes requirements by providing a predictable process for capability insertion;
- reduces operational and economic consequences of losing a vehicle, allowing for a more tailored and less-costly risk management, vice risk avoidance, mission assurance approach;
- establishes a consistent replenishment cycle, stabilizing satellite and launch vehicle production lines and creating the opportunity for affordable on-orbit and ground spares;
- creates more numerous launch and deployment (hosting) opportunities, reducing the cost of getting to space; and
- complicates any adversary's calculus of its surety of ability to deny the advantages of space for an extended period of conflict.

It is interesting to note at least one satellite system has followed this architectural and procurement approach from its beginning. GPS is a distributed, disaggregated assemblage of individual payloads, none of which can do its job individually. But taken together, they form a robust, affordable, and resilient architecture, which has an established production line with routine insertions of new technology.<sup>36</sup> The GPS III system has also adopted a payload approach, as indicated above, that uses a nearly off-the-shelf commercial bus paired to a purpose-built navigation payload.<sup>37</sup>

### **Transition—Taking the Next Steps**

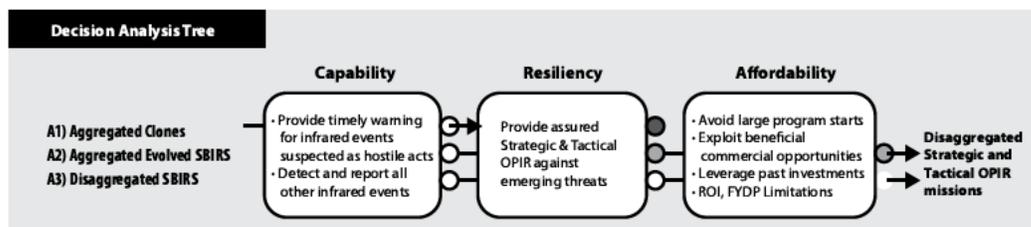
These new strategies cannot be implemented instantaneously, nor do they need to be. Our current space systems, highly capable and the most technologically sophisticated in the world, are serving us well. However, we must begin to move in a new direction if we are to address the disruptive changes discussed above. To begin this shift we need to choose to go against the status quo and undertake the following:

- Define alternative architectures to provide passive resilience and enable protection in depth. Allow mixed architectures that leverage government, commercial, and international opportunities.
- Demonstrate a path through early prototyping and on-orbit demonstration.
- Begin the shift to smaller, distributed, diverse constellations.
- Curtail current productions once a new capability is demonstrated and secure.

This plan establishes a path to enable migration to a mixed architecture over the next 10–15 years. We have taken the first steps along this new path. We have examined the options and opportunities for increasing resilience and affordability in several of our mission-area architectures using the tenets established above. The most mature evaluations are in the OPIR and MILSATCOM mission areas.

## OPIR

Figure 5 shows some of the future architectural options considered for the OPIR mission area and the assessment of how well those architectural options would meet our goals of delivering the required war-fighting capability while increasing the resiliency and affordability of the capability. The criterion used to assess the architectural option against those goals is shown in each respective box. The assessment concluded all the options could meet the capability requirements, but continuing with the status quo architecture (aggregated clones) or evolving the current platform could not meet the resilience or affordability criteria. Therefore, a disaggregated approach to the OPIR mission area splitting strategic and tactical missions into separate payloads which can be flown on a variety of platforms, such as the legacy platform (but now dedicated to strategic warning), a dedicated, small, commercial bus, or a commercial, international, or other US government host is required.<sup>38</sup>



**Figure 5. OPIR architecture decision analysis tree**

Development of a low-cost WFOV staring-sensor payload for tactical missions offers opportunities for significantly lower cost and risk as well as increasing overall resilience by proliferating capabilities across multiple platforms.<sup>39</sup> Strategic warning remains healthy and is less costly due to a smaller strategic-warning payload and significantly reduced complexity and weight.<sup>40</sup> This approach also enables incremental deployment of tactical capabilities to augment current capabilities and gain operational confidence in how to best employ the capability. By conducting an operational demonstration of this capability based on leveraging the technology and experience gained through the CHIRP experiment, we will have the information needed to understand the costs and risks associated with a mixed architecture before needing to make a disaggregation decision on the next production increment of the SBIRS program (vehicles 7 and 8).

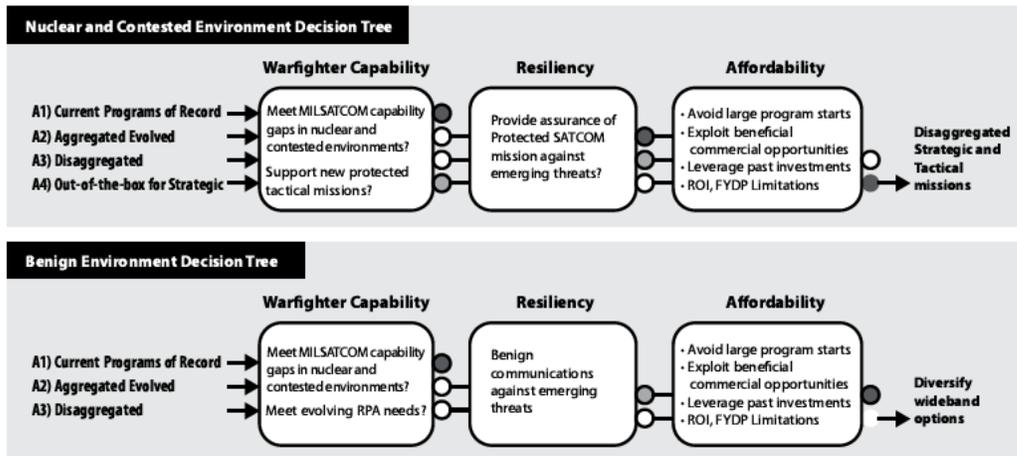
## **MILSATCOM**

Figure 6 shows the future architectural options considered for the MILSATCOM mission area for both the contested/nuclear and benign operational environments. In the case of protected MILSATCOM, there is currently a significant shortfall in capability. The current protected communication capability must grow by a factor of 10 or more to support the full tactical protected requirement. Also, due to the high-grade cryptography employed, the current capability cannot be used to support lower-echelon units or RPAs where there is a likelihood of equipment capture and exploitation. As with OPIR, we assessed how well the alternative architectural options would meet our goals of delivering the required war-fighting capability while increasing the resiliency and affordability of the capability.

The assessment concluded the status quo would not be capable of meeting the required future capability. Evolving the current capability could meet the future capability requirement but with only a limited increase in resiliency and at very high cost. Disaggregating strategic and tactical protected communications enables smaller, lighter, less-expensive payloads for both services. This disaggregation creates the option for a simpler tactical protected capability using releasable cryptography supporting lower-echelon units, RPAs, and allies; it can be provided with much lower cost and risk. It also enables incrementally deploying the tactical protected capability more frequently and in smaller increments, decreasing the impact of delays or unexpected loss of a satellite, and offering a wider variety of deployment

options such as hosting the tactical protected payloads or packaging them on a small commercial bus and more responsive, lower-cost launch vehicle.

Capabilities for the benign communications environment were also assessed. As in the contested environment, there is a growing shortfall in basic capacity and in the specialized support needed for long track airborne ISR platforms. Current programs were not sized to address this requirement, so some modification is necessary. Today's capabilities are largely based on commercial capabilities, the primary difference being the use of communication frequencies reserved for the military; however, they are still concentrated in a small number of platforms. In this area we have already achieved some level of distributed capability between dedicated wideband MILSATCOM platforms and widespread use of leased commercial SATCOM services. To provide the needed capabilities and increase resilience with an affordable solution, we concluded diversifying the wideband SATCOM capability is the best approach. We should continue investments to reduce the cost of our military wideband backbone, augment that capability with hosted payloads and international partnerships, and pursue innovative business strategies with commercial providers, which will enable wider and more-flexible access to commercial SATCOM capabilities.



**Figure 6. MILSATCOM alternative architectures decision analysis tree**

## Conclusions

Having looked at the disruptive changes and challenges facing the United States today in space, we formulated responses to those changes, explored the new opportunities enabling implementation of those responses, and developed a new strategy to allow the DoD to mitigate the challenges (see table 3). From this study we conclude the best means available to affordably provide resilient space capabilities the war fighter can depend upon and adapt as mission needs evolve is to use a distributed architecture strategy coupled with a payload-focused acquisition strategy that will:

- focus government development on mission payloads designed to be supported by commercial bus capabilities,
- create stable payload production rates,
- leverage the highly competitive commercial satellite bus market, and
- leverage hosted payloads on commercial, international, and allied platforms.

**Table 3. Resolution to Challenges**

Challenges	New Strategy
<ul style="list-style-type: none"><li>• Poor Resilience—concentrated capabilities are good targets that are hard to defend</li></ul>	<ul style="list-style-type: none"><li>• Distributed architecture disperses capability across multiple hosts and smaller platforms, complicating adversary targeting and making it harder to sustain effects</li></ul>
<ul style="list-style-type: none"><li>• Fragile Constellations—loss or delay of single platform greatly degrades capabilities</li></ul>	<ul style="list-style-type: none"><li>• Distributed architecture is less dependent on individual platforms; more frequent deployment of smaller increments of capability reduces impacts of delay</li></ul>
<ul style="list-style-type: none"><li>• Escalating costs as budgets decline</li></ul>	<ul style="list-style-type: none"><li>• Costs controlled or reduced through reduced complexity, leveraging highly competitive commercial bus market and hosted payloads, stable production, and more frequent launch to drive down costs through learning curve and other efficiencies</li></ul>
<ul style="list-style-type: none"><li>• Fragile industry base</li></ul>	<ul style="list-style-type: none"><li>• Stabilize lower-tier suppliers through stable production and launch; focuses development resources on maintaining intellectual capital needed for unique military capabilities</li></ul>

Challenges	New Strategy
<ul style="list-style-type: none"> <li>• Technology Stagnation—inserting new capabilities can take decades</li> </ul>	<ul style="list-style-type: none"> <li>• Consistent and frequent technology insertion opportunities due to lower procurement risk; mirror commercial time to market of three years or less</li> </ul>
<ul style="list-style-type: none"> <li>• Requires years to supplement or replenish</li> </ul>	<ul style="list-style-type: none"> <li>• Affordably establish on-orbit reserves through smaller, less-complex satellites and hosted payloads; also enables affordable ground reserves and ability to surge production through a stable production line. More frequent launch and expanded number of launch providers enhances the capability to surge launch if needed</li> </ul>

This approach greatly enhances the resiliency of our space capabilities. By increasing the number of platforms and dispersing our capabilities, we reduce the impact on the war fighter if a satellite is lost to mishap or hostile action. By reducing the cost of each platform, we can affordably create on-orbit reserves for rapid recovery and ground reserves for timely reconstitution. We also have determined this strategy will enhance the affordability of our space capabilities. The distributed architecture strategy looks at the entire architecture cost to determine the best trade between capabilities on individual satellites and overall architecture cost. The cost of higher quantities are offset by savings from hosting, continuous production lines, commercial bus procurements, smaller and less-complex satellites, more-frequent and lower-cost launch, and a more tailored approach to mission assurance. To achieve this goal, it is essential we implement the architectural, business, and budgeting practices to enable the DoD to create sufficient volume so we can access and realize the economies of scale we are seeing in other segments of the space marketplace.

We should also note the new strategy can form the basis of a different framework for deterrence. By using greater numbers of smaller platforms, orbital diversity, rapid recovery, reconstitution options, and international partnering, we increase the complexity of a potential adversary's attack calculus. Such a strategy imposes higher force-structure requirements, more-complex targeting and demanding situational awareness, greater risk of collateral damage, difficulty in sustaining desired effects, and the risk of entangling other parties in the conflict.

With these elements we will have taken the first substantive steps to addressing the disruptive changes that could otherwise lead to a diminution of the critical advantages space forces confer on our war-fighting capabili-

ties today. The early airpower strategist Giulio Douhet said, “Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.”<sup>41</sup> The US Navy enjoyed victory in naval conflict by recognizing submarine warfare had created a disruptive change in the character of war. Major record labels, failing to recognize the disruptive influence of file sharing and digital media and adapt their systems before those changes occurred, began a long, slow decline in stature while digital-ready adversaries such as Apple and Amazon were poised to take their place.

A system’s evolutionary path stays relevant only if the environment that spawned it remains static; but disruptive forces require those paths to be reevaluated. The disruptive forces that drive the need for change to our space architectural strategy are already evident. The means are available, and we have defined a way to adopt them. Space is too important to the national security of our nation for us not to adapt until after change is upon us. **SSQ**

#### Notes

1. Bern Anderson, *By Sea and By River: The Naval History of the Civil War* (1962; reprint, New York: Da Capo Press, 1989), 34.
2. *Official Records of the Union and Confederate Navies in the War of the Rebellion*, series 1, vol. 15 (Washington: Government Printing Office, 1921), 226–27.
3. Ashley Tellis, “China’s Military Space Strategy,” *Survival* 49, no. 3 (September 2007): 41.
4. *Ibid.*, 45.
5. “Space to Manoeuvre—Satellite Attack Upsets US Space Supremacy,” *Jane’s Intelligence Review*, 7 February 2007.
6. Scott Karp, “Music Recording Industry Will Be First Traditional Media Industry to Be Utterly Destroyed by Digital Technology,” *Publishing 2.0*, 28 December 2007.
7. “And 25 Years Ago Philips Introduced the CD,” *GeekZone*, 1 November 2008.
8. The work reported here is an outgrowth of a think-tank study commissioned in 2010. Contributors to that study include retired general officers Lt Gen Mike Hamel, Maj Gen Tom Taverney, Maj Gen Ken Israel, Brig Gen Jim Armor, Brig Gen Tip Osterthaler, and Brig Gen Len Kwiatkowski; then—Brig Gens Jay Santee and John Hyten, then—RADM Liz Young, Dr. Pete Rustan, Gil Klinger, Joe Rouge, CEO of Orbital Space Systems Dave Thompson, President of Microcosm Dr. Jim Wertz, and author Doug Loverro. Also, a great debt is owed to Tom Cristler and Toni Arnold who led most of the analysis and did all of the writing for the white paper.
9. See Alexei Arbatov, “Russian Perspectives on Spacepower,” in *Toward a Theory of Spacepower* (Washington: NDU press, 2007), chap. 23. As stated there, “In 1957, the Union of Soviet Socialist Republics (USSR) was the first nation in the history of the world to put a satellite in space, and in 1961 it followed with the first manned space flight. During the Cold War, Soviet space power was second to none—in some respects behind and in others ahead of that of the United States.”

10. Gen Thomas S. Moorman Jr. (ret.), speech at American Institute of Aeronautics and Astronomy (AIAA) Space 2007 Conference and Exposition, 21 September 2007, Long Beach, CA.
11. Curtis Peebles, *High Frontier: The United States Air Force and the Military Space Program* (Washington: Air Force History and Museums Program, 1997), 15–26.
12. *Ibid.*, 13.
13. Dana J. Johnson et al., *Space: Emerging Options for National Power* (Santa Monica, CA: RAND, 1998), 38.
14. In the strange calculus of space technology, designing a satellite to survive a non-direct nuclear attack was more straightforward than designing a system that could hold up against nonnuclear mechanisms, since many aspects of a nuclear attack were already accounted for by designing the satellite for extended stay in its natural radiation environment. For example, under natural background radiation conditions in LEO, peak flux for electrons with energy greater than 1 MeV ranges from  $10^4$  for the outer radiation belt to  $10^6$  for the inner. Enhanced solar flux is said to have resulted in  $>1$  MeV electron flux to reach  $10^8$  particles/sq cm sec. Coincidentally, this is the same magnitude computed by the model due to a high-altitude nuclear explosion one day after the burst over Korea. Source: Defense Threat Reduction Agency, *High Altitude Nuclear Detonations against Low Earth Orbit Satellites ("HALEOS")*, DTRA Advanced Systems and Concepts Office, April 2001, 12.
15. *Space-force enhancement* is defined as “force-multiplying capabilities delivered from space systems to improve the effectiveness of military forces as well as support other intelligence, civil, and commercial users.” JP 1-02, *DoD Dictionary of Military and Associated Terms*, 8 November 2010 (as amended through 15 October 2011), 312, <http://www.dtic.mil>.
16. Craig Covault, “Desert Storm Reinforces Military Space Directions,” *Aviation Week and Space Technology*, 8 April 1991, 42.
17. Steven J. Bruger, *Not Ready for the “First Space War” What About the Second?* Naval War College student papers, 17 May 1993.
18. *Ensuring America’s Space Security*, Report of the Federation of American Scientists Panel on Weapons in Space, September 2004, 12.
19. *Gulf War Air Power Survey*, Vol. 2, pt. 1 (Washington: GPO, 1993), 189.
20. Bruger, *Not Ready for the “First Space War,”* 21.
21. *Combat support* is defined as “operational assistance provided to combat elements.” JP 1-02, 60.
22. Gen William Shelton, “The Foundational Role Space and Cyber Play in our Nation’s Defense,” Global Warfare Symposium, 17 November 2011, Los Angeles, CA, 8–9.
23. William J. Lynn, “A Military Strategy for the New Space Environment,” *Washington Quarterly* 34, no. 3 (Summer 2011): 8.
24. The concept of a military “center of gravity” was first proposed by Carl von Clausewitz in *On War*. It is defined in JP 1-02 as, “the source of power that provides moral or physical strength, freedom of action, or will to act.”
25. Sun Tzu, *The Art of War*, trans. by Samuel Griffith (London: Oxford University Press, 1971), 77.
26. “Satellite transit” describes the passage of a satellite, normally in low-Earth orbit, overhead. Knowledge of transit times allows individuals to hide their activities from unwanted surveillance.
27. Mike Orcutt, “Space Over Time,” *Technology Review*, 23 July 2011.
28. *National Security Space Strategy: Unclassified Summary* (Washington: DoD, January 2011), 3.

29. For example, both the space-based infrared satellite and the GPS IIF satellite took over 14 years from contract award to delivery. Other systems (NPOESS, JWST, AEHF) saw similar delays or were even cancelled.
30. Gen Kevin Chilton, "Commander's Perspective," speech to the 2009 Strategic Space Symposium, 3 November 2009.
31. Douglas Loverro, "Reinventing Space 2011: The Changing Dynamics of Space Power," May 2011, presentation at the Reinventing Space conference, May 2011, Los Angeles, CA, 23.
32. "Toc-satellites-to-be-built-launched-by-2019.29," *Euroconsult*, <http://www.euroconsult-ec.com>.
33. Futron Corporation, *Satellite Manufacturing: Production Cycles and Time to Market*, May 2004, 2, [http://www.futron.com/upload/wysiwyg/Resources/Whitepapers/Satellite\\_Manufacturing\\_Production\\_Cycles\\_0504.pdf](http://www.futron.com/upload/wysiwyg/Resources/Whitepapers/Satellite_Manufacturing_Production_Cycles_0504.pdf).
34. SpaceX has a launch manifest of over 40 launches, including the station resupply and the Iridium constellation, plus multiple other customers. Orbital Space Systems is still in the process of securing its own launch market.
35. The WGS satellite is based on the Boeing 702HP bus. See [http://www.boeing.com/defense-space/space/bss/factsheets/702/wgs/wgs\\_factsheet.html](http://www.boeing.com/defense-space/space/bss/factsheets/702/wgs/wgs_factsheet.html)). This is a common platform configured to support multiple commercial communications satellites including PanAmSat, INMARSAT-5, MEXSAT and others. See <http://www.boeing.com/defense-space/space/bss/factsheets/702/702fleet.html>.
36. GPS modernization was made possible because we found ourselves in the late 1990s with a robust on-orbit constellation and a large number of spare satellites on the ground. We were able to spiral in new technology with the IIR-M satellites (M-code and a second civil signal), provide more in GPS IIF (aviation signal, L5), plus the change to flexible power for both systems. GPS III is being laid out in a similar fashion with routine insertion of technology into an ongoing production line and each satellite simple and inexpensive enough that the risk of insertion remains low.
37. The Lockheed A2100 bus is the basis for the GPS III system, but with hardening appropriate for the medium earth orbit (MEO) in which it flies.
38. Lt Gen Ellen Pawlikowski, "AF Space Portfolio Future Architectures," briefing to secretary of the Air Force, 24 October 2011.
39. John "Pete" Peterson and Jim Bui, "Overhead Persistent Infra-Red (OPIR) Architecture Study," DoD Executive Agent for Space, 17 June 2011.
40. "Space Modernization Initiative Alternatives Analysis," SMC/IS, 1 November 2011. The analysis used the current CAPE ICE SBIRS GEO 3/4 cost estimate as the basis for disaggregation with the following assumptions: (a) costs up to launch, no launch costs considered; (b) GEO 3 NRE and GEO 4 production article; (c) future costs indexed to inflation; and (d) for a disaggregated GEO, assume single scanner sensor and no staring sensor. Based on these assumptions, initial cost estimates show a 20-percent savings for a single scanner satellite needed to support strategic warning mission.
41. Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (1942; reprint, Washington: Office of the Air Force History, 1983).

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July 8, 2013

U.S. Department of State  
Ms. Candace M.J. Goforth,  
Director, Office of Defense Trade Controls Policy,  
(202) 663-2792  
[DDTCResponseTeam@state.gov](mailto:DDTCResponseTeam@state.gov).  
ATTN: Regulatory Change, USML Category XV and Defense Services

Dear M. Goforth,

As an American citizen, aerospace engineer who has 1<sup>st</sup> hand experience in aerospace systems and the International Traffic in Arms Regulations (ITAR), and father, I support the ongoing US State, Commerce, and Defense Departments' effort to secure fair trade in this troubled international economy. I am concerned.

I recognize that current US efforts to implement the National Export Strategy, maintain Classified and Sensitive Material Definitions, and to amend the ITAR to revise Category XV (Spacecraft Systems and Related Articles) of the U.S. Munitions List (USML). This last effort is what I will specifically address here.

Engineers invest themselves in solving problems through the mastery of technological challenges. Aerospace solutions are among the most difficult and due to the velocities and mediums involved, often are the most hazardous. A significant US investment exists in the fielding of end items on the USML and up 'til now, controlled by ITAR.

There is a reason that it has taken mankind 200,000 years to be able to explore space. Although there are efforts to make access to space affordable, we are not there yet. Since it remains unaffordable, it is important to understand why space components and their integration are non-trivial. I recommend that we have failed in our pursuits to assure that the civilian use of space does not impact our superior military capabilities. Current amendments to ITAR do not protect military capabilities.

Arguably, the release of this list of specific capabilities to be protected by export control has already irreversibly compromised National Security. We urge you to reconsider the current proposed ITAR revisions because the security enjoyed by the US is not sustainable if we "give" these technologies to foreign entities that will use them to master space and essentially displace the US as the most influential power on earth.

By publishing the list, we have already done too much. People may take for granted the global positioning system and believe that it can be duplicated and improved upon. There is a reason that this program is fielded by the USAF. It is NOT a trivial capability and other nations are discovering this. Did you hear about the foreign launch catastrophe last week? As far as warfighting is concerned, the nation that controls access to space controls the high ground and current plans recommend sharing this high ground. There is no good faith reason for US taxpayers to support this pursuit.

We, US engineers, enjoy the opportunities afforded to us by our form of government and processes for assuring National Security. Please do not dismantle the superiority in US space capabilities that we enjoy by making them available to other nations. If they wish to contract us to design, develop, and operate space capabilities while supporting our continued mastery of space, then by all means further enhance and enable this trade. Giving space superiority to foreign entities economically hurts the US, enables foreign access and control of space, and therefore negatively impacts US National Security. In order to move forward, a determination must be made that the removal of such satellites and items from the USML is in the national security interests of the United States. I do not believe that such a determination is possible.

I look forward to working together with you to reverse the negative impact already caused by the release of the list of “protected” space export items. I also wish to work with you in further securing the vibrant economic and industrial command that space exploitation affords all Americans.

Best and sincerest regards,

/s

Roger Oliva  
[Roger\\_Oliva@hotmail.com](mailto:Roger_Oliva@hotmail.com)

# CLEVELAND-MARSHALL COLLEGE OF LAW

## OFFICE OF THE DEAN

July 8, 2013

### Re: ITAR Amendment – USML Category XV and Defense Services

Dear Directorate of Defense Trade Controls:

I am writing to voice my enthusiastic support for the amendment of Category XV of the International Traffic in Arms Regulations proposed in the May 24, 2013 Notice of Proposed Rulemaking and to offer some comments for your consideration. By way of introduction, I am a law professor and Associate Dean at Cleveland State University's Cleveland-Marshall College of Law where I teach Space Law. I am also a member of the FAA's Commercial Space Transportation Advisory Committee (COMSTAC), a member (and former Assistant Secretary) of the International Institute of Space Law, and serve *of counsel* to the Law Offices of Jon P. Yormick Co., LPA.

Although I applaud the proposed amendments in general, I ask that the following comments be considered before the final regulations are issued. My comments are underpinned by the idea that space technology should only be included on the USML if the technology meets clearly identifiable parameters that have military significance. It is my opinion that the proposed language in paragraphs (a)(4), (a)(11), and (e)(19) will likely capture items that have no military significance and will therefore unnecessarily hamper the competitiveness of our domestic space industry. More detailed comments on each of these paragraphs follow:

(1) Para. (a)(4): Space-based Servicing. This paragraph includes spacecraft that “[p]rovide space-based logistics, assembly or servicing of any spacecraft (e.g., refueling).” Private companies are currently exploring the feasibility of on-orbit servicing, assembly and refueling of commercial satellites and other private space vessels. If the proposed amendments are enacted, we would face the ironic situation that commercial satellites would no longer be subject to the ITAR, but the vehicles providing on-orbit servicing of the satellites would be subject to the ITAR. I therefore propose that this paragraph be deleted. Alternatively, the paragraph could be revised to include only spacecraft that are specially designed for the on-orbit servicing and assembly of those spacecraft controlled by the ITAR. This could be achieved by revising the language of this paragraph to read thus: “are specially designed to provide space-based logistics, assembly or servicing (e.g., refueling) of any of the items in paragraph (a).”

# CLEVELAND-MARSHALL COLLEGE OF LAW

## OFFICE OF THE DEAN

(2) Para. (a)(11): Manned Spacecraft. This paragraph includes spacecraft that “[a]re man-rated sub-orbital, orbital, lunar, interplanetary or habitat.” I recommend that this paragraph be deleted. The mere fact that a spacecraft is manned does not give the vehicle military value. Manned spaceflight has historically been carried out by civilian space agencies rather than the military. Moreover, human spaceflight services that will soon be provided by private companies, SpaceX and Virgin Galactic, will be designed and offered for the use of NASA and private passengers (as opposed to the military). This nascent industry should be freed from burdensome regulation to the extent possible. If a given spacecraft meets the parameters described elsewhere in the new Category XV, controlling the spacecraft under the ITAR is appropriate. But if these parameters are not met, then the mere fact that the spacecraft is manned should not subject the spacecraft to the ITAR.

(3) Para. (e)(19): Spacecraft Re-entry Vehicles. I recommend that the language of this paragraph be clarified so it does not capture commercial re-entry vehicles that have insignificant military value. As written, it appears that even re-entry vehicles with little or no military value (such as Virgin Galactic’s spaceplane that re-enters the atmosphere after suborbital flight) fall within the scope of this paragraph. Moreover, subjecting all “electronic equipment specially designed for spacecraft re-entry” would appear to capture electronic systems in any re-entry vehicle regardless of the military value of the vehicle. I recommend that this paragraph be revised to apply only to those re-entry vehicles utilizing technology that has significant military value (such as heat shields suitable for long-range missiles).

Thank you for considering these comments. If I can be of any assistance as you move forward with this process, please feel free to contact me at [mark.sundahl@law.csuohio.edu](mailto:mark.sundahl@law.csuohio.edu) or by phone at 216.687.2300.

Sincerely yours,



Mark J. Sundahl, J.D., Ph.D.

July 8, 2013

United States Department of State  
Directorate of Defense Controls  
2401 E. Street, NW  
Washington, D.C. 20037

Subject: ITAR Amendment—USML Category XV and Defense Services (RIN 1400-AD33)

Dear Sir/Madame:

We are pleased to respond on behalf of the Council on Governmental Relations (COGR) and the Association of American Universities (AAU) to the May 24, 2013 Federal Register Notice (78 FR 31444) on proposed revisions to the International Traffic in Arms Regulations (ITAR) relating to U.S. Munitions List Category XV and Defense Services (RIN 1400-AD33). COGR is an association of 189 U.S. research universities and their affiliated academic medical centers and research institutes that concerns itself with the impact of federal regulations, policies, and practices on the performance of research and other sponsored activities conducted at its member institutions. AAU is an association of 60 U.S. and two Canadian preeminent research universities organized to develop and implement effective national and institutional policies supporting research and scholarship, graduate and undergraduate education, and public service in research universities. Our comments on the proposed rule are directed entirely to the revised definition of “Defense Services” (ITAR 120.9). We have provided comments separately to the Department of Commerce’s Bureau of Industry and Security (BIS) with regard to the proposed transfer of spacecraft systems and related items from the USML to the Commerce Control List (RIN 0694-AF87).

Our associations provided comments on the Department of State’s Directorate of Defense Trade Control’s (State/DDTC) revision of the defense services definition that was previously proposed in April of 2011 (RIN 1400—AC80; 76 FR 20590). In those comments, COGR and AAU expressed support for the removal of the use of public domain information from the definition of defense services. The change currently proposed in ITAR 120.9(a)(1) is substantively identical to the change that was previously proposed and we again express our strong support for this change. As we noted previously, it will allow U.S. university researchers to collaborate with foreign national students, colleagues, or sponsors on projects related to defense articles so long as they are relying on published information or information developed through fundamental research, without the need for Technology Control Plans (TCPs) or authorization from State/DDTC. The change will reduce the costs and burdens associated with administering a TCP and obtaining authorization for both the university community and the government, and positively impact the scope and volume of research activities at our institutions without any negative impacts on U.S. national security. We also believe it is consistent with the objectives of the President’s Export Control Reform Initiative. We appreciate State/DDTC’s clarification in the proposed rule that differentiates training in tactical employment of defense articles from training in basic operation, which is not included in

defense services (120.9(a)(3)). The additional clarifications in the proposed 120.9(b) also are helpful. In our previous comments we highlighted the need for such clarifications, which should lead to a clearer understanding of the scope of defense services.

However, after reviewing the Federal Register Notice and conferring with our respective memberships, we have several substantive concerns about the proposed changes to the definition of defense services. First, in the current rule State/DDTC is proposing to include in the defense services definition the furnishing of assistance to a foreign person in the United States or abroad in the integration of any item subject to the ITAR or the Export Administration Regulations into an end item or component controlled as a defense article (120.9(a)(2)). As with the previous proposal, the definition does not exclude use of public domain information in providing such assistance. As previously expressed, we have concerns about the inclusion of this provision. In the proposed rule State/DDTC asserts the belief that the service of integration cannot be effected only with public domain information. No basis for this belief is cited, other than State/DDTC's view that it necessarily involves the use of technical data. In our view, the response from State/DDTC does not adequately address the concern. While we agree that integration generally may involve the transfer of technical data or other proprietary information, there is nothing unique about furnishing this kind of assistance that necessarily precludes the use of only public domain information. (For example, an engineering professor could apply only know-how gained from fundamental research to assist in the integration of radar technology into a military vessel's anti-missile system).

The proposed rule also includes in the definition of defense services the furnishing of assistance including training in the integration of a satellite or spacecraft to a launch vehicle or in launch failure analysis regardless of whether technical data is used (120.9(a) (5) and (6)). No exclusion for use of public domain information is provided for these services as well, nor is any explanation provided. This leads to inconsistencies in the ITAR provisions. It is incongruous that furnishing assistance to a foreign person in the design, development, engineering, manufacture, production, assembly, testing, intermediate- or depot-level maintenance, modification, demilitarization, destruction or processing of a defense article using only public domain information is not a defense service under the proposed redefinition, while assisting a foreign person in integrating components into that article or furnishing assistance with regard to satellites or spacecraft is considered a defense service. It is not clear why use of public domain information for certain types of services or activities related to defense articles should lead to greater concerns than for others.

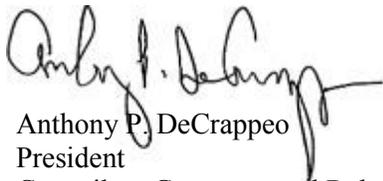
Second, the proposed definition of "integration" is quite broad in scope and a cause for concern for our respective memberships. Apparently, even minor changes or modifications to a defense article (anything other than "plug and play") would constitute integration for purposes of defense services. Coupled with the lack of a public domain exemption, this expansive definition is likely to perpetuate unnecessary burdens for our institutions that are engaged in experimental activities involving software development or systems engineering for defense articles, with little or no benefit. Scientists at our institutions often develop and test new hardware and software which are integrated to validate the experimental designs, or fabricate items for experimental purposes. These research activities typically are fundamental in nature, but under the proposed redefinition would appear to require defense services licenses. We believe there should be a carve-out in the definition for "integration" activities performed in the conduct of fundamental research.

We also note that a helpful provision in the definition previously proposed that would have excluded providing assistance in medical, logistical, or other administrative support activities to a foreign person is missing in the most recent proposed definition. As pointed out in our previous comments, this would have authorized medical faculty and students at our institutions to collaborate with allied militaries and physicians to address battlefield treatment processes and procedures without the need for a defense services authorization. We hope this provision was eliminated since State/DDTC does not view such collaboration as a defense service, and urge State/DDTC to confirm this in its response to the public comments.

Finally, the federal register notice states that revisions in the ITAR definitions of technical data and public domain information will be forthcoming. These definitions are critical for the university community. We trust that State/DDTC will seek the widest possible consultation and outreach with our community and other research institutions before making substantive changes to these definitions. Moreover, we hope that State/DDTC will provide ample opportunity for review and comment on any changes, and look forward to a continued dialogue with State/DDTC about these issues.

We appreciate the opportunity to comment on the proposed rule.

Sincerely,



Anthony P. DeCrappeo  
President  
Council on Governmental Relations



Hunter R. Rawlings III  
President  
Association of American Universities



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## DRAFT HPA Comments

### Paragraph (e)(18) - Hosted Payloads

(e)(18) - *Department of Defense-funded secondary or hosted payload, and specially designed parts and components therefor;*

The Hosted Payload Alliance recommends (e)(18) be deleted for the following reasons: (1) as written, the language would frustrate the interests and objectives of the Department of Defense and other U.S. Government agencies who plan to use hosted payloads as a business model; (2) the language would capture DoD funding for purely dual use technologies that DoD would like to implement on hosted payloads; and (3) payloads that have military functions and purposes would likely be captured by other provisions in Category XV, rendering (e)(18) unnecessary.

First, subjecting DoD-funded payloads that do not otherwise have a military function to ITAR control would frustrate the objectives of DoD and harm other U.S. Government agencies planning to use DoD funding mechanisms for non-military hosted payloads. Hosted payloads are a critical part of DoD's business plan.<sup>1</sup> Lieutenant General Ellen Pawlikowski, who commands the Air Force's Space and Missile Systems Center, has stated that "hosted payloads provide an opportunity to deploy capabilities at a fraction of the cost of [DoD's] current systems."<sup>2</sup> One of the key elements to implement this plan includes a contracting vehicle called the Hosted Payload Solutions Indefinite Delivery Indefinite Quantity (IDIQ). This contracting vehicle is a DoD mechanism (awarded and managed by the Air Force)<sup>3</sup> that other government agencies will be able to use<sup>4</sup> to obtain services from commercial satellite providers. For example,<sup>5</sup> one of the first Hosted Payload Solutions mission candidates is NASA's TEMPO mission.<sup>5</sup> TEMPO will measure atmospheric pollution in North America and create a dataset to provide understanding and improve prediction of air quality and measure effects of greenhouse gases.<sup>6</sup> Similarly, NOAA is considering using DoD-funded payloads for weather monitoring.<sup>7</sup> Both of these missions would be areas where NOAA and NASA would potentially want to coordinate with other international organizations interested in climate change. If DoD-funding alone would require such payloads to be treated as ITAR, the export control restrictions would

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<sup>1</sup> See generally HoPS Industry Day Presentation (Feb 19, 2013).

<sup>2</sup> See Lt. Gen. Ellen Pawlikowski, et al., *Space: Disruptive Challenges, New Opportunities, and New Strategies*, Strategic Studies Quarterly, Spring 2012, p 42.

<sup>3</sup> See Air Force Space and Missile Systems Center, Hosted Payload Solutions (HoPS) Performance Work Statement, at 1 (Sept. 17, 2012), <https://www.fbo.gov/utills/view?id=ffa3e08707febbdf3e8f287972af26f4>.

<sup>4</sup> See GAO Rep. 2013 Annual Report: Actions Needed to Reduce Fragmentation, Overlap, and Duplication and Achieve Other Financial Benefits: (Apr. 9, 2013) <http://www.gao.gov/assets/660/653631.tx>

<sup>5</sup> See excerpt from DoD Presentation dated Feb. 15, 2013, **Exhibit A**.

<sup>6</sup> See NASA, NASA Science Missions: TEMPO, at <http://science1.nasa.gov/missions/tempo/>; NASA has expressed excitement at "using commercially available space on geostationary communication satellites to engage in cutting edge science." NASA Press Release, "New Space Sensor as a Hosted Payload to Track Air Pollution Across North America, Nov. 8, 2012, [http://www.nasa.gov/home/hqnews/2012/nov/HQ\\_12-390\\_TEMPO\\_Instrument.html](http://www.nasa.gov/home/hqnews/2012/nov/HQ_12-390_TEMPO_Instrument.html).

unnecessarily increase the cost and complexity with those procurements and hamper international cooperation without any national security benefits contrary to the objectives of export control reform advocated by DoD in the 1248 report.<sup>8</sup>

Second, making DoD funding the only criteria for ITAR control would also sweep many dual use technologies requested and funded by DoD under ITAR control. For example, DoD has indicated it is interested in a steerable beam option to allow it to track certain activities by adjusting the area covered by the beam in real time.<sup>9</sup> This “steering” of a beam is also desired by commercial customers such as airlines who may want to track their fleet crossing similar but not identical paths simultaneously. This steering technology is useful for cruise ships and naval vessels as well as commercial airlines and military aircraft. Similarly, the DoD may be interested in funding enhancements to the Ku-band transponder which may benefit military unmanned aerial vehicles and also benefit greater broadband use services available on commercial airlines. In light of the interrelated nature of military communications and commercial communications, it is particularly important that the ITAR controls for hosted payloads be specific to the military technologies that DoD intends to protect. Subjecting dual use technology enhancements to ITAR-control solely due to DoD funding imposes licensing costs and delays that would impede the capability of U.S. industry to competitively serve DoD’s interests without a corresponding benefit to national security.

Third, (e)(18) is unnecessary because other clauses in Category XV *would be* sufficient to control critical technologies funded by DoD. Per (e)(17), DoD-funded payloads that perform *any of the* listed functions in paragraph (a) would still be ITAR-controlled. For example, other HoPS mission candidates such as infrared payloads such as those used on CHIRP for missile warning detection,<sup>10</sup> would clearly be covered by missile tracking under (e)(17) and (a)(2). Alternatively, to the extent DDTC and DoD intend to include a ‘catchall’ for future technologies potentially not contemplated by (a), DDTC has potentially less overly broad options than “DoD-funding” to achieve that objective. For example, (a) could include a catch all for experimental technologies developed by DoD for a potential military end use as opposed to scientific experimental technologies.

The changes requested above should permit DoD to ensure national security without negatively impacting its own procurement objectives and commercial benefits it seeks to gain through partnerships on hosted payloads from companies such as those represented by the Hosted Payload Alliance.

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<sup>7</sup> See 1248 Report , pages 1 – 4.; see also Pawlikowski, page 39 (Gen. Pawlikowski stated that “export controls limiting competition and partnerships” have been a “[p]rimary cause of disruptive challenges” to U.S. Space Power); see also Gen. Kevin P. Chilton, *Military Space Borne Capabilities*, 2009 Strategic Space Symposium – Commander’s Perspective, (Nov. 3, 2009) (cautioning regarding “gaps” in fragile satellite constellations as old satellites began to die and launches – ever increasing in cost – were less and less available).

<sup>8</sup> [SMC, “Notional GEO Sample Mission Requirements Document, 8 March 2013, p. 3. The draft concept proposing a “1-meter diameter steerable X-Band antenna” was proposed as a possible scenario for the Hosted Payload Solutions (HoPS) Indefinite Delivery Indefinite Quantity (IDIQ) request for proposal.]



Gerald Musarra  
Vice President  
Government & Regulatory Affairs

July 8, 2013

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

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

**Re: ITAR Amendment – USML Category XV and Defense Services (RIN 1400-AD33)**

Lockheed Martin Corporation (Lockheed Martin) is pleased to submit comments on the proposed rule issued by the U.S. Department of State and published in the Federal Register on Friday, May 24, 2013 (78 Fed Reg. 101.)

The proposed rule seeks to amend the International Traffic in Arms Regulations (ITAR) to revise Category XV (Spacecraft Systems and Related Articles) of the U.S. Munitions List (USML). In addition, it proposes a revised definition of “defense service,” specifically including the furnishing of assistance for certain spacecraft related services. This proposed rule is being published in conjunction with a proposed rule from the Department of Commerce, Bureau of Industry and Security, that describes how articles the President determines no longer warrant control on the USML Category XV would be controlled on the Commerce Control List (CCL) (RIN 0694-AF87).

**I. GENERAL COMMENTS: GLOBAL COMMERCIAL SATELLITE INDUSTRY OPPORTUNITIES**

Lockheed Martin commends the U.S. Government’s continued commitment to implementing comprehensive export control reform. The ongoing effort to restructure the export control technology control lists by moving less-sensitive items from the USML to the CCL is the first step toward reforms that improve U.S. national security and economic competitiveness abroad. The proposed changes to Category XV are a particularly important part of this positive effort. When finalized, the proposed rules will implement the provisions of the 2013 National Defense Authorization Act, signed into law on January 2, 2013, which authorizes the President to remove certain satellites and related items from the USML, returning control of these commercial items to the U.S. Department of Commerce.

The changes to controls on satellites and related items outlined in the proposed rule closely resemble the recommendations contained in the Department of State and Department of Defense April 18, 2012 *Report to Congress: Section 1248 of the National Defense Authorization Act for Fiscal Year 2010 (Public Law 111 - 84)*. We concur with the U.S. Government’s rationale for implementing these changes as set forth in the conclusions of that report:

[M]aintaining non-critical satellites and related components on the USML and monitoring low-risk launch activities provide limited national security benefits. Moreover, this practice places the U.S. space industrial base at a distinct competitive disadvantage when bidding against companies from other advanced satellite-exporting countries that have less stringent export control policies and practices. Transferring select items from the USML to the CCL would allow for controls consistent with other technologies and would help enhance the competitiveness of the U.S. space industrial base, while continuing to protect U.S. national security needs.

Lockheed Martin designs, develops, tests, manufactures and operates a full spectrum of advanced-technology space systems for national security, civil and commercial customers. Export sales are more important than ever to the success of U.S. commercial satellite manufacturers and to the overall health of the U.S. space industrial base, which provides thousands of high-quality jobs in research and development, engineering, and manufacturing throughout the United States. Improvements that streamline export controls on commercial satellites and related programs help to make companies like Lockheed Martin – and the thousands of suppliers and component manufacturers we work with to build our systems – more competitive in the international marketplace. In particular, implementation of the proposed rules will help to address the misperception that U.S. export controls pose an insurmountable barrier to commercial and scientific space cooperation with U.S. companies.

It is important to note that the transfer of licensing jurisdiction of the space-related items to the CCL does not constitute a decontrol of sensitive technologies. Rather, the reforms outlined in this proposed rule, and other rules restructuring the USML and CCL, ensure that certain items and capabilities are appropriately controlled as commercial items. Regardless of whether a space-related export is a defense article or commercial item, Lockheed Martin remains deeply committed to working with the U.S. Government to prevent the unauthorized release of sensitive capabilities and technologies.

In addition, we note that the positive effect of transferring licensing jurisdiction is not limited to facilitating traditional exports. That is, controlling commercial technologies on the CCL reduces regulatory and procedural burdens on appropriate foreign party participation in U.S. civil and commercial space programs inside the United States, including many U.S. Government space programs Lockheed Martin supports. By minimizing the regulatory compliance burden, the proposed State and Commerce Department rules will help to reduce costs, improve efficiencies, and facilitate greater space cooperation with our allies and partners.

Taken together, Lockheed Martin believes that the new law and proposed regulations will help to strengthen the U.S. satellite industry, restore U.S. competitiveness abroad, and create new jobs here in the United States – while continuing to protect vital U.S. national security interests. We appreciate the collaborative efforts of the U.S. Government and U.S. Congress in this area, and we look forward to continuing to work toward expanding the international market share of the U.S. commercial space industry in accordance with established U.S. national security, economic, and foreign policies.

## II. SPECIFIC RECOMMENDED CHANGES TO THE PROPOSED RULES

As a general matter, if implemented in their current form, the draft regulations would have positive benefits for the U.S. commercial space industry. However, there are several provisions of the proposed rules that would benefit from further clarification and/or revision. Where possible, the following comments provide recommendations for changes to the language of the proposed rule in order to increase its effectiveness and clarity.

### A. Space-Based Logistics (XV(a)(4))

The designation of spacecraft systems performing such tasks as re-fueling or servicing any spacecraft as defense articles is inconsistent with the U.S. Government policy noted in §120.3 of the ITAR and the intent of the proposed rules. Specifically, the emerging space logistics industry is poised to service a great number of commercial, non-ITAR controlled spacecraft; space-based logistics technology is not specially designed to service military spacecraft. Control of these systems as defense articles (and, by extension, control of its operation data as technical data, and control of tactical employment assistance as a defense service) will certainly hamper its marketability and inadvertently benefit foreign competition in this field.

Control under Department of Commerce jurisdiction (*i.e.*, Export Control Classification Number (ECCN) 9A515) would ensure that only end-users who are duly authorized (*e.g.*, by license or license exception) would receive items requiring a license. Such end-users could be evaluated on a case-by-case basis (or as a class, where an exception is available) to limit the possibility of unauthorized use.

*Recommendation:* Delete proposed paragraph (a)(4) concerning “space-based logistics. . .” from USML and identify appropriate parameters for control on the CCL under ECCN 9A515.

### B. Remote Sensing Capabilities and Characteristics (XV(a)(7)(i) & (ii); XV(a)(8))

The transfer of jurisdiction of certain remote sensing technologies to the Department of Commerce is a welcomed reform. The commercial remote sensing sector remains an exciting – and growing – international opportunity for Lockheed Martin and the U.S. commercial space industry. In order for U.S. companies to be competitive, it is important that U.S. export controls reflect global market realities.

In consideration of control parameters for technologies that warrant continued control on the USML, we recommend that the U.S. Government consider the current availability of foreign commercial satellite technologies. Current international commercial remote sensing capability continues to expand and improve. U.S. satellite and component manufacturers should compete on a level-playing field – particularly, in regard to recommended controls on aperture sizes in XV(a)(7)(i). Permitting a broader scope of remote sensing technologies to be controlled on the CCL – including larger aperture size, which we anticipate will increase by 0.1 meters every three years on the global commercial market – is not the equivalent of decontrolling the export of these

technologies. The transfer of jurisdiction will not eliminate the numerous technology release checks and balances, including government-to-government satellite cooperation agreements that govern use by specific end-users, which enable the U.S. Government to ensure these capabilities are exported in accordance with U.S. national security and foreign policy.

However, it is imperative that U.S. export controls provide the necessary protections on the sensitive systems engineering and integration know-how associated with remote sensing satellites – regardless of aperture size or other limitations on integrated spacecraft parts and components. The export of a U.S. commercial turn-key remote sensing satellite poses less risk of diversion or material contribution to military applications than the export of the expertise that provides the means to improve system functionality and capability. Because the controls on technical data and defense services in the proposed rule (paragraph (f)) are linked to the defense articles enumerated in paragraphs (a)-(e), we recommend that the U.S. Government develop more comprehensive criteria for determining how to control this critical systems engineering and integration know-how for remote sensing satellites.

In addition, the proposed control parameters in paragraph (a)(7) may inadvertently capture interplanetary and scientific satellites. For example, paragraph (a)(7)(ii) appears to capture all interplanetary probes with surface viewing optics and remote sensing satellites, without distinction between commercial, civil and meteorological. These controls will likely also capture non-earth observing astronomy/solar satellites/systems. We request that the Department of State reconsider whether the continued control of these scientific spacecraft as munitions items is in keeping with the intent of the proposed controls and the conclusions of the 2012 “1248 Report.”

*Recommendation:* For paragraph (a)(7)(i), we recommend changing “0.35 meters” to “1.1 meters,” in keeping with global availability/trends. We also recommend adding a new paragraph to (a)(7) or elsewhere in the proposed rule that provides criteria for remote sensing technology and systems engineering for satellites with military or security intelligence, surveillance, or reconnaissance information-gathering capabilities that should remain on the USML, regardless of aperture size or other limitations on integrated parts and components. For (a)(7) and (a)(8), we recommend adding a note to clarify that the intent is not to capture non-earth observing scientific spacecraft.

### **C. Constellation Satellites (XV(a)(10))**

A constellation performs functions using multiple satellites that an individual satellite of that constellation could not perform independently. While satellite constellations may have a mean, median, or mode characteristic, the individual satellites have properties (e.g., aperture size) which do not change according to their place in a constellation. Effective export controls must therefore address the specific function for which the constellation is specially designed.

This appears to be the intent of the current language in the proposed paragraph (a)(10): “Are specially-designed to be used in constellation or formation that when operated together, in essence or effect, form a virtual satellite (e.g., functioning as if one satellite) with the characteristics of other items in paragraph (a).” However, controlling “characteristics” identified in paragraph (a) does not address constellation functionality. “Characteristics” appears to be

applicable only to paragraphs (a)(5), (6),(7), (8), (11), and (12), while function is the foundation of the controls in paragraphs (a)(1)-(4). For example, it is unclear if a constellation with similar functional capabilities to an individual satellite controlled by (a)(7)(i) would be controlled on the USML. This should be clarified in the final rule.

*Recommendation:* Modify paragraph (a)(10) to control both the functions and characteristics of other items in paragraph (a).

**D. Manned-Space/Interplanetary (XV(a)(11))**

The proposed controls on “man-rated” spacecraft are overbroad and undefined. “Manned or unmanned space vehicles” are already included in the scope of XV(a); the additional controls on man-rated spacecraft in (a)(11) are redundant, unless there are additional end uses that are not identified elsewhere in paragraph (a) that warrant control on the USML. In its current form, the proposed rule would stifle U.S. companies’ ability to compete in future commercial manned-space enterprises. In addition, the current text may control exports intended for the International Space Station, which are not currently subject to the ITAR.

Furthermore, “man-rated” is an undefined term that lacks clarity. It is unclear whether one, or all, of the features required to support life or make a system “man-rated” (*e.g.*, pressurization, power, temperature control, oxygen, food/water, hygiene systems, other?) would make a space habitat, for example, ITAR-controlled. It is also unclear why being “man-rated” would make a spacecraft or habitat ITAR-controlled when a commercial aircraft, having similar “man-rated” features, is not captured on the USML absent some military application.

We recommend that the final rule identify specific systems of military concern (*e.g.*, re-entry systems, heat shields) related to manned-space capabilities that may be considered more sensitive. The systems identified in XV (*see* paragraph (e)(19)) may already be sufficient to address these concerns.

As noted in Section I of these comments, overly broad controls on man-rated systems will not only have a chilling effect on U.S. exports, but may also hinder international cooperation on U.S. programs by making access to manned-space programs more cumbersome than national security interests require.

*Recommendation:* Delete paragraph (a)(11) “Are man-rated sub-orbital, orbital, lunar, interplanetary or habitat; or” for the reasons noted above.

**E. Spacecraft Parts, Components, Accesories, Attachments, Equipment, or Systems: Hosted and Secondary Payloads (XV(e)(17) & (18))**

As mentioned in Section C of these comments, the proposed controls on secondary or hosted payloads, and specifically designed parts and components therefor (paragraph (e)(17)) would benefit from a clarifying note or additional language. At issue is the proposed control on payloads that perform the “functions described in paragraph (a).” As written, this could be interpreted to control only hosted payloads with a functionality identified in paragraph (a)

regardless of its characteristics and capabilities (e.g., all remote sensing hosting payloads regardless of capability.)

*Recommendation:* Add the following: “**Note 1 to paragraph (e)(17):** Hosted payloads for commercial communications, remote sensing, scientific, and/or meteorological applications that do not have the performance characteristics identified in paragraph (a) are subject to the EAR.” (See also recommendations provided in section II.B of this memo regarding proposed controls outline in paragraphs (a)(7) and a(8).)

In addition, the proposed controls on secondary and hosted payloads do not address how the licensing jurisdiction of a commercial satellite would be affected by the integration of a USML hosted payload. The Department of State should consider exempting commercial satellites that include a USML hosted payload from being subject to the existing “see through” rule and/or include a “de minimis” approach for satellites with hosted payloads when the end user is the U.S. Government.

*Recommendation:* Add a second note to paragraph (e)(17) to clarify that satellites subject to the EAR, which incorporate a secondary payload subject to control in (e)(17), are not subject to the USML when the end user is the U.S. Government.

XV(e)(18) controls on “Department of Defense-funded” secondary or hosted payload (and specially designed parts and components therefor) is ambiguous and redundant to other controls included in Category XV. Controlling a payload or part/component with capabilities not described in the category based on the source of its funding is inconsistent with the explicit intent of the proposed rule and the general requirements of §120.3 of the ITAR.

Militarily significant payload characteristics of concern are already identified in Category XV, including (e)(17), which addresses hosted and secondary payloads. If the Department of State is concerned about controlling payloads that are not identified in this category, but remain militarily significant, the current proposed controls on “classified” items in (e)(20) should be sufficient to ensure that sensitive payloads remain subject to the ITAR.

*Recommendation:* Delete (e)(18) in its entirety for the reasons stated above.

## **F. Definitions**

### **1. “Defense Service” (§120.9)**

The proposed revision of the definition of “defense service” is a positive development. The proposed clarifications make clear that public domain data and basic operation training is not considered within the new definition. The distinction between “installation” and “integration” services outlined in the note to paragraph (a)(2) is a useful clarification, in particular, as are the modifications contained in §120.9(b)(1)-(5). There are, however, additional clarifications to the definition that would benefit U.S. exporters as well as ensure the U.S. Government is appropriately controlling the provision of defense services to foreign parties, including:

- Public Domain and Assistance/Training (§120.9(a)(1)): Various types of data not controlled by the ITAR as technical data, but which are not in the public domain, are likely to be disclosed to a foreign person during training. For example, an exporter must furnish financial, schedule, and availability information about a defense article, which is not in the public domain, to a foreign person during the course of training. In effect, such an exchange is no more sensitive than providing public domain data related to the design, development, engineering, etc., of the defense article. Accordingly, this non-public information should not be considered differently than public domain data for purposes of ITAR control. Similarly, a military vehicle may be tested using a proprietary “check engine” function software, which would not necessarily be in the public domain. This proprietary software could even be a common commercial product used for testing. To control the assistance in testing the vehicle because the software is not in the public domain would seem to be beyond the intent of this definition.

*Recommendation:* Change “using other than public domain information (*see* §120.11 of this subchapter)” to “using technical data (*see* §120.10 of this subchapter)”. This recommendation is consistent with the Department’s confirmation that “a defense service involves technical data” (*see* “Comments on the Use of Public Domain Information in a Defense Service,” Paragraph 1, Public Notice 8329) and serves to protect U.S. national security interests while not unnecessarily broadening the scope of the definition of what constitutes a defense service.

- Public Domain and Protective Services (§120.9(b)(4)): Similar to the scenarios applicable to §120.9(a)(1) described above, various types of data not controlled by the ITAR as technical data, but not in the public domain, may be disclosed to a foreign person in the course of law enforcement, security, or protective services (e.g., financial, schedule, availability information, and/or proprietary software or training packages.) This data has no relation to a defense article or military operations.

*Recommendation:* Change “using only public domain information” to “using information that is not controlled by the ITAR.” This recommendation is consistent with the Department’s confirmation that “a defense service involves technical data” (*see* “Comments on the Use of Public Domain Information in a Defense Service,” Paragraph 1, Public Notice 8329).

- “Mere Employment” (§120.9(b)(2)): “Mere employment” of a natural U.S. person by a foreign person is not defined. There is nothing inherent in employment by a foreign person, as a general matter, that would be controlled by the ITAR. Clarification is therefore unnecessary and may complicate the definition of “defense service.”

*Recommendation:* Delete §120.9(b)(2): “Mere employment of a natural U.S. person by a foreign person”.

- Human Space Flight (§120.9(b)): In addition to the examples provided in §120.9(b) of activities that do not constitute a defense service, the Department of State should consider

adding explicit clarification that supporting human space flight should not be considered a “defense service.”

*Recommendation:* Add a new category to §120.9(b): “Delivering a human via a launch vehicle and a spacecraft to Earth orbit, between Earth orbiting locations or beyond when the end-use is scientific or tourism and when data transfer is limited to basic operations of the launch vehicle and spacecraft, crew nominal and emergency ingress and egress operations, basic spacecraft return and recovery operations, detailed crew life support systems training, crew safety and crew flight suit operations.”

## 2. Specially Designed

The proposed Department of State rule uses both “specifically designed” and “specially designed.” “Specially designed” is used in multiple paragraphs (e.g., XV(a)(1), (a)(10), (b), (d)(7), (e)(7), (e)(9), (e)(10), (e)(17), (e)(18), (e)(19), and Note 1 to Paragraph (e)); “Specifically designed” appears only twice (Paragraphs (c)(3) and Note 2 to (c)(4)). “Specifically designed” is not defined in either the ITAR or Export Administration Regulations, and its continued use will result in inconsistent interpretations. Conversely, “specially designed” is a defined term, per new ITAR 120.3(c)(2) language, which addresses the intent behind the design and manufacture of articles. Lockheed Martin cannot identify any reason to continue to use the term “specifically designed” in the proposed rule.

*Recommendation:* The proposed rule should use “specially designed” in lieu of “specifically designed” where it appears in the proposed rule. This suggested replacement text would add consistency and clarity to the language within Category XV as a whole.

## G. Entry Into Force

Lockheed Martin is eager to have changes to U.S. export controls on commercial satellites and related items enter into force as quickly as possible. We appreciate requests for the U.S. Government to shorten the transition period for Category XV controls, which is expected to be an additional six months after the publication of the final rules. We should ensure that the proposed export controls provide the necessary relief and flexibility that enables the U.S. commercial space industry to compete and win in the global market place, while still appropriately protecting sensitive technologies that provide the U.S. warfighter with a military advantage. A shorter transition time may help accomplish this goal, but it is important that the new licensing requirements and procedures are implemented in such a way that U.S. exporters and the licensing agencies alike are able to implement and comply with them effectively.

*Recommendation:* Prior to publication in final form, we recommend that the Departments of State and Commerce reassess the need for a six-month transition period for the EIF of the final changes to Category XV, taking into account how the transition for other categories of control is proceeding and the potential effect on U.S. licensing agencies to implement the new procedures sooner than planned.

### III. CONCLUSION

Thank you for the opportunity to provide comments on the proposed rules. Lockheed Martin remains a strong supporter of comprehensive and balanced export control reform, and we look forward to continuing to work with the Department of State, and other U.S. agencies, to expand and improve the U.S. commercial space industry in accordance with our U.S. economic, national security, and foreign policies.

Sincerely,

A handwritten signature in cursive script, reading "Gerald Musarra", followed by a horizontal line extending to the right.

Gerald Musarra  
Vice President  
Government and Regulatory Affairs



July 08, 2013

Ms. Sara Heidema  
Acting Director, Office of Defense Trade Controls Policy  
Directorate of Defense Trade Controls  
Bureau of Political Military Affairs  
PM/DDTC, SA-1, 12<sup>th</sup> Floor  
U.S. Department of State  
Washington, DC 20522-0112

**Subject: ITAR Amendment – USML Category XV and Defense Services**

**Re: Federal Register/Vol.78, No. 101/31444//Friday, May 24, 2013**

Dear Ms. Heidema:

The Boeing Company (“Boeing”) welcomes the opportunity to comment on the Proposed Rule published on May 24, 2013 to amend Parts 120, 121 and 124 of the International Traffic in Arms Regulations (“ITAR”).

We want to reiterate our support of your reform initiative efforts and our commitment to continue to work with the Directorate of Defense Trade Controls (“DDTC”) as you bring reform to fruition. Boeing looks forward not only to streamlined and harmonized regulations, but also to the one-agency, one control list system laid out by the Administration in April of 2010.

Generally, the revised definition of “defense services” represents an improvement over the current definition. What constitutes a defense service is more precisely defined, and examples describing activities which *do not* constitute a defense service are helpful to resolve aspects of the definition that have been of longstanding concern to industry. Nonetheless, we would like to recommend some additional refinements to the draft definition.

The revisions to Category XV are generally well thought out and supportive of maintaining a robust U.S. industrial base while at the same time protect unique U.S. technologies critical to national security. The significant level of transfers to the jurisdiction of the Department of Commerce should lead to a more level playing field for U.S. suppliers of commercial satellite and other spacecraft parts and components and, in time, for the entire U.S. space industry. With that said, we also have concerns and recommendations in this area, since a number of the technical parameters would negatively impact our commercial systems, as some



capabilities are listed that are commonly and widely used on commercial communication satellites.

Following are our comments on the language amended by the Proposed Rule:

#### **Part 120.9: Definition of “Defense Service”**

- Paragraph (a)(1) - It is difficult to assess this paragraph under the current definitions of “public domain” and “technical data.” In the Supplementary Information section addressing industry comments received on the first proposed rule (76 Fed. Reg. 20590, April 13, 2011) regarding references to proprietary information subject to the Export Administration Regulations (“EAR”) within the definition of “defense service,” the Department did not specifically address those questions, but instead advised that new definitions of “public domain” and “technical data” were forthcoming.

In anticipation of the publication of revised definitions of these terms, and the inclusion of language related to proprietary information, Boeing respectfully requests that the Department exclude from the definition of “defense service” assistance provided in areas such as financing, business arrangements and contracting activities related to a defense article. Inclusion of these types of activities would result in transaction-related elements of a defense sale being captured, a result more appropriate in the face of a full-fledged U.S. economic embargo of a country.

- Paragraph (a)(2) - We appreciate the inclusion of a definition of the term “integration” as a Note, adding clarity to subparagraph (2). However, we recommend further clarification regarding the potential ramifications of designating an end item subject to the EAR which is integrated into an end item or component subject to the United States Munitions List (“USML”) as a USML item. Specifically, we request clarification as to whether the defense article designation would remain for purposes of related follow-on activities. For example, if the integrated EAR commodity had to be tested, not with respect to any aspects of its integration into the ITAR-controlled end-item but only with regard to its own functioning capability as an integrated item, exporters would need to know whether or not the resulting testing data would become subject to the ITAR simply by association.
- Paragraph(a)(3) - While we appreciate the effort to qualify references to the “employment” of a defense article by adding the term “tactical” and excluding “basic operation,” we believe that a definition of “tactical employment” would be more helpful, since activities controlled under this paragraph would normally occur in direct interaction with the foreign customer. This could result in slight variations that could mean the difference between ITAR and EAR controls.



Without access to the revised definition of “public domain” at this time, we are not able to assess whether or not this paragraph would impact exclusions currently in place for fundamental research at accredited universities. We look forward to the opportunity to review and comment on the new definitions.

- Paragraph (a)(4) - In combination with paragraph (b(5), the revised language in this paragraph regarding the conduct of combat operations for a foreign person provides more clarity with respect to its scope.
- Paragraphs (a)(5) and (a)(6) - These paragraphs add what we believe is an unnecessary level of program-related specificity to a general definition. For that reason we recommend that they be removed from the definition and instead be included in the control paragraphs of the relevant categories. In other words, controls on space launch activities are too specific for a general definition of “defense service.”
- Paragraph (a)(6) - We recommend that the term “launch failure analysis” be qualified to clarify that activities confined only to the satellite (and with no reference to the launch vehicle) that are not deemed related to the launch vehicle failure be excluded from the definition of “defense service.” The term “launch failure” should relate to the launch vehicle, not the satellite payload. Damage to a satellite payload, or an unsuccessful satellite deployment as a result of a non-nominal launch, should also not be included in the definition of “launch failure.”
- Paragraph (b) - We recommend that DDTC post separate guidance on its website to provide additional examples of scenarios in which a defense service would not be present. Assistance is normally provided by engineers in direct interactions with the foreign customer and it may be difficult for them to determine whether a defense service is or is not being provided, particularly as they become familiar with the new controls.
- Paragraph (b)(2) - The reference to a “natural person” for purposes of the employment of such person by a foreign person is unclear. If the intent is simply to narrow the definition currently in Part 120.15 which refers to categories of “persons” other than individuals, that clarification should be provided to avoid the perception that the reference is to a different category of individuals. If the intent is to cover a different category of individuals, clarification would also be necessary.

#### **Part 124.1: References to the Licensing of Defense Services**

- Paragraph (a) - Guidance with respect to what types or scope of services that would normally be allowed for export under a license granted pursuant to Part 125 would be helpful. Such guidance would make it easier for exporters to determine in what



circumstances it would be appropriate to submit a written request for the provision of such services. Unnecessary delays would be avoided, particularly if the request were to ultimately be denied.

Additionally, the inclusion of a deadline for a response from the Department to a written request would allow for adequate planning.

### **Part 121.1: United States Munitions List Category XV – Spacecraft Systems and Related Articles**

- Language Related to “Specially Designed” - The terms “specially designed”, “specifically designed”, “modified or configured”, “specifically designed or modified” are all used in various control paragraphs. Unfortunately, there is insufficient consistency between these interrelated terms of art. This will likely lead to confusion and misinterpretation of the control parameters. We recommend that only the term “specially designed” be used to maintain consistency with the rest of the USML and Commerce Control List (“CCL”) rewrites. Doing so would be consonant with the stated goal of the reform effort to harmonize regimes to the extent possible.
- Paragraph (a)(3) - Signal measurement and signal intelligence capabilities are requested by commercial customers to help satellite operators determine who may be interfering with their satellite broadcast signal. This capability allows for interference mitigation, since commercial satellites are constantly subject to signal interference and the operator needs to know how to prevent it. The technology is not unique to military satellites.

We recommend this paragraph be modified to move signal measurement and signature intelligence capabilities to EAR controls under the new proposed ECCN 9D515, and under a new subsection specifically capturing this type of technology “specially designed” for commercial satellites.

- Paragraph (a)(9) - To some degree, all satellites provide self-positioning, navigation and timing. Therefore, in the interest of clarity, we recommend that language be included to provide a necessary level of differentiation. We propose the following :

*This provision does not control satellites or spacecraft that provide only a differential correction broadcast for the purposes of positioning, navigation, or timing; a beacon (e.g., for satellite tracking or uplink power control); on board positioning, navigation and timing.*



- Paragraph (a)(11) - The Boeing Crew Transportation 100 (“CST-100”) vehicle is designed and developed exclusively for commercial space activities but is captured under this paragraph because: (1) it is an orbital vehicle; and (2) it is man-rated. What makes this spacecraft so unique, however, is that it will afford safe, reliable commercial transportation involving commercial passengers (non-astronauts) from the Earth’s surface to orbiting space complexes in Low Earth Orbit (“LEO”), including the International Space Station (“ISS”) and the Bigelow Space Complex.

When operating as described above, the CST will be strictly a commercial transport, the only difference being that it will be piloted by an astronaut. While the pilot will have access to controlled technology—and we understand that such technology will remain under the ITAR, DDTC has already determined by Commodity Jurisdiction (DDTC Case CJ 320-13 of June 14, 2013)) that passenger training on the travel experience will be subject to the EAR and not listed on the CCL.

Because the CST-100 was designed and developed for commercial space activities, Boeing recommends that this and any other similar spacecraft that may be developed in the future be subject to the export control jurisdiction of the EAR.

- Paragraph (a)(12) - We recommend that the text of this paragraph include a carve-out for classified telemetry, tracking, and command (“TT&C”) encryption capability approved for release by the National Security Agency (“NSA”). The U.S. Defense Department (“DOD”) procures a significant amount of communications capacity aboard commercial communications satellites (“comsats”). It is normally a DOD requirement that such satellites possess secure TT&C communications capability. The designation of this classified software as ITAR-controlled on an otherwise EAR-controlled comsat could serve as a deterrent to the incorporation of this capability by satellite manufacturers. This, in turn, would decrease the worldwide availability of commercial on-orbit communications capability for DOD.
- Paragraph (c) - GPS receiving equipment could be better placed in USML Category XI. While the satellite broadcasts the signals, the receivers are on different platforms, *e.g.*, airplanes.
- Paragraph (c)(2) - The language in this paragraph is too broad and could, therefore, inadvertently capture capabilities being considered for commercial use. For example, application of GPS technology is common to many commercial products, except for GEO satellites, and is not militarily significant or specially designed for military use. Therefore, GPS technology should not be controlled as it would be of benefit to a GEO synchronous orbiting satellite for determining spacecraft position.



We recommend that a Note be added to this paragraph to exclude standard GPS receivers (and their supporting algorithms) integrated into spacecraft designed to operate in geosynchronous orbit (“GEO”). Alternately, DDTC could create an exemption from the ITAR’s so-called see-through rule for GEO spacecraft with integrated GPS receivers.

- Paragraph (c)(3) - Future applications of commercial aircraft GPS receiving equipment may rely on null steering antennae to help eliminate noise interference from other applications working close to the GPS transmission band. Another reason to apply a null steering antenna to a civil GPS receiver is to ensure signal reception in the case of intentional criminal activity directed against a commercial aircraft positioning system. Therefore, Boeing recommends that such items be controlled under the EAR. Boeing would be pleased to discuss this topic in more detail directly with your office.
- Paragraph (e)(1)(i) - We recommend language to read, “having a diameter greater than 35 meters” to allow enough room for commercial market requirements. Currently, a customer has requested a proposal for an antenna diameter of 32 meters.
- Paragraph (e)(1)(ii) - Active arrays technology is common textbook technology and can be used in commercial communication systems. Commercial satellites currently in orbit have that capability. We therefore recommend that active array technology be controlled by the EAR, rather than the ITAR.
- Paragraph (e)(1)(iii) - The language in this paragraph could be interpreted to capture all adaptive beam forming (ground and/or space based). Adaptive beam forming is a widely known technology, hardly implemented in space but widely implemented in earth applications, such as the “Ground Based Beam Forming” developed by VIASAT (USA), which has an ECCN 5A002 determination provided by the manufacturer. We recommend deletion of this subparagraph in order to exclude adaptive beam forming from ITAR controls, or clarification that the capability is captured only if space-based.
- Paragraph (e)(6) - It is not clear whether the items following, “...multi aperture assemblies;...” are defining what these assemblies are and what is intended to be controlled within the reference, or whether they are separate, individually controlled items. If the intent of this subparagraph is to control individual items such as an Inertial Reference Unit (IRU), then such units that are currently widely used on all commercial satellites would be inadvertently captured. Given the broad range of Inertial Reference Unit (IRU) capabilities, we recommend specifying the range of capabilities to be controlled under this paragraph.
- Paragraph (e)(13) - No distinction is made regarding the technical characteristics of control moment gyroscope capabilities. Therefore, this paragraph would capture



“miniature” gyroscopes on the USML which we do not believe was the intent of this provision in the Proposed Rule. We recommend adding parameters to specify size, characteristics and capabilities of the control moment gyroscopes to be captured under this paragraph, or including the “specially designed” qualifier to avoid inadvertent capture of commercial technologies.

- Paragraph (e)(17) -The jurisdiction of hosted payloads should not change the jurisdiction of a commercial satellite subject to the EAR even if a particular hosted payload were to perform functions covered under paragraph (a). We recommend that the “see-through” rule not be applied in such circumstances. We propose that the following clarification be included in this paragraph:

*If an EAR-controlled commercial communications satellite contains an ITAR-controlled hosted payload, only the payload and the integration activity related to that payload will be considered ITAR-controlled.*

More broadly, Boeing seeks clarification under these rules regarding jurisdictional and licensing treatment in circumstances in which ITAR components or subsystems are incorporated into EAR-controlled satellites. For example:

- During the satellite manufacturing process, a space-tracking system controlled by paragraph (a)(2) is incorporated into an otherwise EAR-controlled satellite. Is the entire satellite now to be considered ITAR-controlled for export? Going forward after incorporation, is all system-level ground test data used during the manufacturing process now considered ITAR-controlled, or only test data that directly involves the subsystem?
- Once this satellite is on-orbit, would telemetry data such as power data or data-handling that supports the ITAR component or subsystem be considered ITAR or EAR controlled?

Boeing recommends that the ITAR “see through” rule not apply in such circumstances.

- Paragraph (e)(18) – While funding as a reason for control of secondary or hosted payloads, and specially designed parts and components, could be interpreted to mean that the Department of Defense has funded research and development of such items, it could also be interpreted to mean that the Department has simply paid for their transport to space. We make this point because it is not uncommon for foreign governments to fund payloads for transport via a U.S. satellite. We recommend that DDTC clarify the scope of the term “funded” within this context to avoid potential confusion.



- Note 2 to Paragraph (e) - We are uncertain about the intent of Note 2 to this paragraph, specifically Note (1) within Note 2, since it is not in harmony with what we understand to be the historical intent of the term “space-qualified.” If the intent of Note 2 is to confirm that all articles are accepted for space use, then the term “space-qualified” seems inappropriately applied. As you know, in the space community, the term “space-qualified” is a type-based verification as opposed to a unit-based verification, *i.e.*, the flight hardware would not be tested to verify its qualification status. Rather, a unit acceptance test would be performed to show that an article of the design and configuration as an article that underwent qualification testing is acceptable for deployment in space. Clarification of this Note would be appreciated.
- Paragraph (f) – We believe the inclusion of 9C515 and the exclusion of 9E515 may be an error, since the Commerce Department Proposed Rule does not identify a new ECCN 9C515 but does create a new ECCN 5E515 (which controls technology).

In closing, we want to thank you for the opportunity to provide comments and reiterate our commitment to continue to participate in and contribute to the reform effort. Please do not hesitate to contact me if you have any questions or if we can be of any assistance. I can be reached at (314) 232-9527 or at [gregory.j.sloan@boeing.com](mailto:gregory.j.sloan@boeing.com).

Sincerely,

A handwritten signature in black ink, appearing to read 'G. Sloan', with a long horizontal line extending to the right.

Gregory J. Sloan  
Director, Global Trade Controls - Boeing Defense, Space & Security



July 8, 2013

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: Office of Defense Trade Controls Policy

RE: Notice of Proposed Rulemaking, Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Services”

The Aerospace Industries Association (AIA) and our member companies appreciate the opportunity to comment on the Departments of State’s proposed amendments to the International Traffic in Arms Regulations (ITAR). Revising both Category XV (Spacecraft Systems and Related Equipment) of the U.S. Munitions List (USML) and the definition of “Defense Services” will create increased clarity and will result in a more predictable, efficient, and transparent export control system.

AIA and our member companies thank the Administration for their tireless efforts of export control reform. Below please find AIA’s questions, comments, and suggested revisions for both Category XV and “Defense Services.”

### USML Category XV

**XV(a)(2)** “Track ground, airborne, missile, or space objects using imaging, infrared, radar, or laser systems;”

Question – Would this apply to Near Earth Object (NEO = asteroid) tracking from a space platform? Tracking other planets from a space platform?

Recommendation: A clarification to “man-made space objects” would eliminate the concern, or add a rate to the description (e.g.  $>0.6$  rad/sec  $\sim > 3$  degree / sec) relative velocity, using the rate limit in XV(e)(16) only because it was there is in the right range for max NEO velocities of interest)

**XV(a)(4)** “Provide space-based logistics, assembly or servicing of any spacecraft (e.g. refueling);”

Question: Would this apply to spacecraft at Mars? Why “any” spacecraft instead of spacecraft determined to be controlled by the USML? Does it address only “self-assembly” or also robotic (controlled by human command) assembly on orbit?

Comment: Technologies with clear dual-use applications, such as space-based servicing or refueling, should be considered for control on the CCL, with appropriate restrictions.

In concert with this consideration, it should be noted that it is not the U.S. industry’s intention to sell and/or transfer ownership and operation of, or technology for, servicing spacecraft. This new and emerging commercial market’s initial service capabilities will be U.S. industry-controlled client-spacecraft inspection and operational life extension (i.e., attitude control and station-keeping). While U.S. industry will not pass control of our servicing vehicles, there will be real-time sharing of telemetry with the spacecraft client(s) for specific purposes of flight safety and mission-payload operations coordination. Eventually, the U. S. industry’s commercial, international, U.S. Government and U.S. civil spacecraft servicing will be expanded to (but not limited to) spacecraft refueling, repairs and potential salvage. All spacecraft servicing activities, as defined herein, will be under the complete control of U.S. industry service spacecraft operator(s) unless otherwise directed or authorized by the U.S. Government.

The major U.S. and international customers for this new and emerging market are largely commercial communications spacecraft fleet operators such as Intelsat, SES, Eutelsat, AsiaSat, ABS, DirecTV, Sirius/XM and DISH. The spacecraft fleets of these operators are largely comprised of spacecraft built by Lockheed Martin, Boeing, Space Systems Loral, Thales-Alenia and EADS-Astrium. Of the approximately 380 operating satellites in GEO, approximately 260 are commercial communications satellites. All of these spacecraft, as well as those of the U.S. Government, represent currently developing and potential clients in this significant new and emerging market.

Recommendation: This section requires further clarification. AIA suggests this section should read: “Provide space-based logistics, assembly or servicing of ~~any~~ spacecraft *controlled on the USML* (e.g. refueling).”

**XV(a)(7)** Have any of the following electro-optical remote sensing capabilities or characteristics:

(i) Electro-optical visible and near infrared (VNIR) (i.e., 400nm to 1,000nm) or infrared (i.e., greater than 1,000nm to 30,000nm) with less than 40 spectral bands having an aperture greater than 0.35 meters;

Comment: Today’s U.S. commercial electro-optical systems are operating with 1.1 meter aperture systems and have been since 2009. A 0.70 meter threshold is relevant to current market conditions as numerous foreign competitors have provided or have been contracted to provide 0.70 meter-class systems for foreign customers as shown in the table below.

Figure 2. Open Source International EO Satellite Systems with Aperture 0.65m or Greater				
Country	System	Aperture (m)	Launch	Optics Company/Organization
India	CartoSat-2A	0.70	2007	Indian Space Research Org. (ISRO)
India	CartoSat-2B	0.70	2010	Indian Space Research Org. (ISRO)
France	Pleiades-1A	0.65	2011	Thales Alenia Space
France	Pleiades-1B	0.65	2012	Thales Alenia Space
Korea	Kompsat-3	0.72	2012	Thales Alenia Space
Israel	Ofeq 10	0.70	2013	Elbit Systems Electro-Optic (Elop)
Turkey	Gokturk-1	0.65*	2013	Thales Alenia Space
*Estimate based on reporting that Gokturk-1 imager similar to Pleiades				
Japan	ASNARO-1	0.70	2013	NEC Corporation
Japan	ASNARO-2	0.70	2014	NEC Corporation
Italy	OPTSAT 3000	0.70	2015	Elbit Systems Electro-Optic (Elop)

Additionally, over the next decade, commercially available aperture sizes offered by our foreign competitors will continue to grow. Should the Administration decide to transfer aperture sizes in excess of .70 meters to the CCL, U.S. companies would experience much longer term relief.

Recommendation: AIA proposes an increase in the aperture threshold for satellites in XV(a)(7)(i) from 0.35 meters to at least 0.70 meters (greater if the U.S. wants to anticipate future foreign competition). This increase will have no negative impact to national security, given the foreign availability of such systems, the commonality of technology between 0.35 and 0.70 meter systems, and the Satellite Cooperation Agreement requirement for certain electro-optical remote sensing systems. This increase will provide a more relevant threshold for U.S. industry given the current international marketplace.

**XV(a)(11)** Are man-rated sub-orbital, orbital, lunar, interplanetary or habitat;

Comment: Using the term “Man-rated” as the sole parameter to control this type of spacecraft is overly broad. The specific aspects of “man-rated” spacecraft that are uniquely military and warrant control under the ITAR should be identified. Subjecting “man-rated” spacecraft to inappropriate export restrictions could result in the same fate as

the U.S. commercial satellite industry which suffered under inappropriately restrictive export controls for over a decade.

Recommendation: Paragraph (a)(11) should be removed in its entirety as it should not be necessary given the reference to “Manned or Unmanned” spacecraft in paragraph XV(a). If language is necessary a possible alternative could be to use the FAA’s licensing structure for commercial space vehicles which could narrow what is a “spacecraft” under the ITAR. If “man-rated” remains in the final rule the term should be defined.

#### **XV(d) Reserved**

Comment: The proposed elimination of XV(d), purports to avoid the capture by the USML of integrated circuits (“ICs”) that inadvertently meet certain technical parameters. As such, it would satisfy the needs of the civilian semiconductor industry and for that reason, we support the proposed USML revisions.

The proposed implementation of revised Category XV(d) is 180 days after the publication of the final rule. While this waiting period is critical for most business to position themselves to comply with the new regulations, the semiconductor industry is poised to immediately comply with revised regulations.

Recommendation: We encourage the Administration to waive the 180-day implementation period for elimination of USML XV(d) and make the effective date of that change coincide with the publication date of the final rule.

**XV(e)(1)** Spacecraft parts, components, accessories, attachments, equipment, or systems, as follows:

- (1) Antennas as follows:
  - (i) Having a diameter greater than 25 meters;

Comment: We suggest a technical edit to paragraph (e)(1)(i) to improve clarity about the precise technical parameter to which the proposed 25 meter threshold applies. Large space-based antenna reflectors are typically elliptical, not circular. Thus, they have two diameters to which this specification could apply – the diameter along the major axis and the diameter along the minor axis. The specification in the Proposed Rule implies that if *either* the major and minor axes of an antenna is greater than 25 meters in diameter, the antenna is subject to the ITAR. However, when deployed for use, large antenna reflectors are tilted along their minor axes such that the apparent diameters of the major and minor axes are the same. Because antennas of this type are tilted to reduce the effective diameter of their major axes, the technical parameter that controls their performance is the size of the antenna’s minor diameter. Hence, the phrase “apparent circular aperture” more precisely captures the parameter of technical concern than the term “diameter.”

Recommendation: We recommend this section to read: “Having an apparent circular aperture-diameter greater than 35 meters.” A threshold of 35 meters allows for growth and flexibility as commercially available technology advances.

**XV(e)(2)** Space-qualified optics (i.e., lens or mirror), including optical coating, having active properties (e.g., adaptive or deformable), or having a largest lateral dimension greater than 0.35 meters;

Recommendation: The phrase “of the clear aperture” should be inserted to read as “... or having a largest lateral dimension *of clear aperture* greater...” Additionally, pursuant to the recommendation in (a)(7), the aperture size should be increased to at least .70 meters. Typically optics utilized in a given system will be manufactured to a larger dimension than the useful clear aperture and should be controlled by the latter, not by the actual size of the optic. Without this addition, the threshold for USML control is inconsistent with the stated system aperture requirement of (a)(7)(i) i.e. a 0.35 meter aperture payload would be controlled as 9A515, but the primary mirror of the system would be subject to XV(e)(2) because the optic will be manufactured at least fractions of an inch larger than the 0.35 meter clear aperture.

Also, quotation marks around the term “space-qualified” should be inserted for consistency with other paragraphs, as “space-qualified” is a defined term in Note 2 to paragraph (e).

**XV(e)(3)** “Space-qualified focal plane arrays (FPA) having a peak response in the wavelength range exceeding 900 nm and readout integrated circuit (ROIC) specially designed therefore;”

Comment: Clarification of paragraph (e)(3) is needed as it is unclear from the language if focal plane arrays having a peak response in the wavelength range exceeding 900nm that do not utilize readout integrated circuits are intended to be retained on the USML or controlled elsewhere.

It should be noted that foreign suppliers are readily available for FPAs with peak response out to ~2500 nm with ROICs “specially designed” for space flight. The generic “space-qualified” language is not relevant. Focal plane arrays with a wavelength range of <2500 nm are not unique to the U.S.

The Export Control Reform efforts are rightly focused on national security concerns. However, subjecting focal plane arrays with the above capabilities to USML control will not provide a national security benefit and will result in U.S. companies continuing to be disadvantaged in the international market.

Multiple foreign vendors have developed focal plane array capability in the 1 – 5 micron (1000 – 5000 nm) spectral range. The key capability that resides in the U.S. is the large format (> 2048 x 2048 pixels) devices with high frame rates and high sensitivity. The below table lists a number of vendors outside the U.S. who produce 1 – 5 micron FPAs along with the maximum array size they list on their websites.

Vendor, Country	Website	Largest IR focal plane array ( $\lambda_c \geq 5\mu\text{m}$ )
Sofradir, France	<a href="http://www.sofradir.com">www.sofradir.com</a>	2048 x 1024, "Jupiter MW"
AIM, Germany	<a href="http://www.aim-ir.com">www.aim-ir.com</a>	640 x 512 MW, 1024 x 256 SW
Semiconductor Devices, Israel	<a href="http://www.scd.co.il">www.scd.co.il</a>	1920 x 1536 pixels, "Blackbird", MW

As foreign vendors are clearly competing in this market space and have been for many years (particularly Sofradir who competed to supply the JWST FPAs in the early 1990's) it is unclear why U.S. firms cannot compete on an equal footing in the wider market.

Recommendation: If the Department of State determines FPA with the above capabilities warrant USML control, restrictions should be placed either on radiation hardness limits (designed for >100 kRad (Si) operation) or another limit, other than wavelength range.

Additionally, a reference to paragraph (a) of this category should be included. This suggestion is due to concerns regarding the implementation of DDTC's previously proposed §126.19 "Policy on the export and re-export of defense articles incorporated into commodities 'subject to the EAR.'<sup>1</sup>" Some instruments excluded from ITAR control under paragraph (a)(7) utilize key components controlled by paragraphs (e)(3) and (e)(4) respectively. These components individually make up substantially more than 1% of the end item value, a requirement of §126.19(a)(4), which would result in these instruments remaining subject to ITAR control.

An alternative to the suggestion to include a reference to "paragraph (a) of this category," would be to increase the de minimus content percentage as proposed in §126.19(a)(4) from 1% to 10% for each individual component.

**XV(e)(4)** "Space-qualified" mechanical cryocooler, active cold finger, and associated control electronics specially designed therefor;

Comment: The Export Control Reform efforts are rightly focused on national security concerns. However, "Space-qualified" mechanical cryocoolers are currently commercially available from suppliers in the United Kingdom, France, Japan, China, Germany and Russia. The control of "Space-qualified" mechanical cryocoolers on the USML has little, if any, national security benefit and will impact the competitiveness of U.S. industry in non-military applications because of the availability of "Space-qualified" mechanical cryocoolers from many other sources internationally.

Recommendation: We recommend this section to read: "Space-qualified" mechanical cryocooler, active cold finger, and associated control electronics "specially designed" for use in military applications but not when used for scientific and meteorological payload or instrument applications therefor;

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<sup>1</sup> This proposed addition of §126.19 was published in the Federal Register on Tuesday, March 15, 2011, yet no final rule has been implemented.

**XV(e)(5)** “Space-qualified” active vibration suppression, including active isolation and active dampening, and associated control electronics therefor;

Recommendation: The addition of “active” should be included (as shown above) as a qualifying description given that isolation and dampening can both be done through passive means that are not intended for control in this paragraph.

**XV(e)(6)** Optical bench assemblies for items in paragraph(a) of this category and the multi aperture assemblies; fast steering mirrors (*i.e.*, greater than 300 rad/sec<sup>2</sup> acceleration), pushbroom assemblies, flexure mounts, beam splitters, mirror folds, focus or channeling mechanisms, alignment mechanisms, inertial reference unit (IRU), black body cavities, baffles and covers, and control electronics specially designed therefor;

Question: If a sensor that has a Ground Sample Distance (GSD) greater than the limit in XV(a)(7)(iv) which required a blackbody source (e.g. CERES instrument) is the blackbody cavity ITAR controlled? Even if it could use the EXACT SAME blackbody cavity for something that had a smaller GSD that would be an ITAR controlled sensor? Is the intent of the paragraph to control all subsystems for elements that are controlled under XV(a) regardless whether or not the specific element is uniquely required for such a system? If it’s only for those subsystems specifically built to go into the ITAR-controlled sensor, that is acceptable but confusion results when the SAME subsystem has multiple applications. If the first use is in an ITAR-controlled application, is that subsystem then ALWAYS ITAR controlled? Even if the use would be in a system that is below the XV(a) thresholds (or even for a ground system application, e.g. test facility)?

Comment: It is unclear if the intent of this section is to capture telescopes, specific bench assemblies within a telescope, or some combination of both. It is also unclear if the items listed after “optical bench assemblies” are intended to be an inclusive list of items within an “optical bench assembly” or if each item is separate and distinct in the list.

Recommendation: The terms “optical bench assemblies” and “multi-aperture assemblies” should be defined or clarified with a note in the paragraph as the terms are used in the commercial industry to refer to many different things.

The phrase “*for items in paragraph (a) of this category*” should be moved to the end of the paragraph to alleviate confusion about individual items listed after the phrase in the current wording. Additionally, “Flexure mounts” or “covers” should not be considered critical national security technologies warranting ITAR-control. Flexure mounts are a commonly used optical mount utilized in both space and ground telescopes and does not seem to warrant control under the ITAR regardless of end application. Additionally “Fast steering mirrors,” “beam splitters,” and “mirror folds” are optical components subject to paragraph (e)(2) depending on their properties and lateral dimensions. The current phrasing creates the potential for conflicting controls between the paragraphs. The word “assemblies” should be added in reference to fast steering mirrors to exclude the optic yet maintain control of the active assembly that controls the optic under paragraph (e)(6).

(e)(6) revised should read as: *Optical bench assemblies, for items in paragraph(a) of this category and the multi-aperture assemblies, fast steering mirrors assemblies (i.e., greater than 300 rad/sec<sup>2</sup> acceleration), pushbroom assemblies, flexure mounts, beam splitters, mirror folds, focus or channeling mechanisms, alignment mechanisms, inertial reference unit (IRU), black body cavities, baffles and covers, for items in paragraph (a) of this category and control electronics specially designed therefor;*

**XV(e)(7):** Non-communications space-qualified directed energy (e.g., lasers or RF) systems and specially designed for a spacecraft in paragraph (a) of this category;

Comment: It is unclear whether this paragraph is intended to include space-qualified laser radar or Light Detection and Ranging (LIDAR), which is currently excluded from USML Category XV under paragraph (e)(9).

**XV(e) Note 2 to paragraph (e):** For the purposes of this paragraph, an article is “space-qualified” if it is designed, manufactured, or qualified through successful testing, for operation at altitudes greater than 100 km above the surface of the Earth...

Comment: Note 2 to paragraph (e) seems to say that an article is NOT considered “space-qualified” until it is individually tested, unless that item is designed and manufactured for operation at altitudes greater than 100 km above the surface of the Earth. Industry supports this clarification.

**XV(e)(14):** “Space-qualified” monolithic microwave integrated circuits (MMIC) that combine transmit and receive (T/R) functions on a single die as follows: (i) Having a power amplifier with maximum saturated peak output power (in watts),  $P_{sat}$ , greater than 200 divided by the maximum operating frequency (in GHz) squared [ $P_{sat} > 200 \text{ W} \cdot \text{GHz}^2 / f_{\text{GHz}}^2$ ]; or (ii) Having a common path (e.g., phase shifter-digital attenuator) circuit with greater than 3 bits phase shifting at operating frequencies 10 GHz or below, or greater than 4 bits phase shifting at operating frequencies above 10 GHz;

Question - What if the MMIC has been designed for the above function but is not “Space Qualified”. Someone could then “upscreen” it after the fact. So it is sold to someone under the EAR ECCN and then is upscreened to “Space Qualified” it should now become ITAR CAT XV. How do you enforce that if the upscreen is in a foreign country?

Comment: A MMIC is not designed as “Space Qualified.” Steps are taken in the manufacturing process that would “qualify” a MMIC for use in space. A MMIC designed for Space/Satellite applications can be fabricated without these steps and is therefor not “Space Qualified.” A MMIC such as this can be “upscreened” to “Space Qualified” after the fact.

**XV(e)(18):** Department of Defense-funded secondary or hosted payload, and specially designed parts and components therefor;

Comment: The source of funding for a specific payload or satellite should not be a factor in determining the jurisdictional control of an item, as it is contrary to the publicized intent of the Export Control Reform initiative as a whole. Paragraph (e)(17) appropriately controls hosted and secondary payloads that perform functions of paragraph (a) of this category. Should the U.S. DOD ever provide even partial funding to a foreign hosted payload program it would, according to (e)(18), alter the export classification of an otherwise 9A515-controlled U.S. payload. This would result in a company having one payload subject to both export controls regulations simultaneously.

Recommendation: Paragraph (e)(18) should be deleted in its entirety.

## **“Defense Services” Definition**

In order to offer thorough and substantive comments, an updated definition of “public domain” is necessary. Below please find our initial comments on the revised “defense services” definition.

### **§ 120.9(a)(1) & §120.9(b)(1):**

Comment: § 120.9(a)(1) & §120.9(b)(1) both include the statement “(see §120.38 of this subchapter).” However, §120.38 was published as a final rule on the same day that comments for the proposed “Defense Services” definition are due. Additional time is needed to thoroughly review how §120.38 will affect the proposed “Defense Services” definition.

As proposed, the definition would include the circumstances in which assistance is provided using proprietary, but not ITAR-controlled data. Allowing for the possibility that a defense service could be provided without the provision of ITAR-controlled technical data will be difficult to administer and may cause confusion in industry.

Additionally, ‘testing’ is included in the Defense Service definition of 120.9(a). Testing was excluded as a defense service in the 2011 FRN definition of O level maintenance.

Recommendation: AIA suggests ‘testing’ be removed from 120.9(a). The definition for 120.9(a)(1) should be revised as follows:

(1) The furnishing of assistance (including training) using ~~other than public domain information (see §120.11 of this subchapter)~~ technical data (see §120.10 of this subchapter) to a foreign person (see §120.16 of this subchapter), whether in the United States or abroad, in the-design, development, engineering, manufacture, production, assembly, ~~testing~~, intermediate- or depot-level maintenance (see §120.38 of this-subchapter), modification, demilitarization, destruction, or processing of defense articles (see §120.6 of this subchapter);

**§120.9(a)(2):**

Comment: First, for consistency we recommend harmonizing the wording between paragraphs (a)(1) and (a)(2) to utilize the conjunction “in,” which results in the following change to paragraph (a)(2):

The furnishing of assistance to a foreign person, whether in the United States or abroad ~~for~~ **in** the integration of any item controlled on the U.S. Munitions List ...

Regarding §120.9 Defense Service, (a)(2), industry believes this does not include normal engineering support for Field Programmable Gate Arrays (FPGAs). Further, the final rule should clarify that providing basic information necessary for installation of a defense article is excluded from the definition of defense service.

Additionally, there appears to be some contradictory guidance between the Transition Rule and the proposed Defense Services definition. For example, a company exports its “600 series” commodity under license exception STA. In order to integrate the “600 series” item into a defense article for a foreign customer, the company needs a TAA. However, the transition guidance published as part of the Final Rule RIN1400-AD37 states that any agreement submitted solely for items moving to the CCL will be Returned Without Action (RWA) with instruction to contact the Department of Commerce. It is unclear how companies are expected to obtain a TAA to integrate a “600 series” item into a foreign defense article if the TAA will be RWA?

Recommendation: The transition guidance should be revised to allow for the above type of activity or this type of activity should be stricken from the definition of defense service.

Comment: While the Export Control Reform efforts certainly will provide many benefits, the number of licenses and agreements will remain at the status quo for this type of foreign sales activity. The estimated benefits described in the Paperwork Reduction section of the proposed rule may be overly optimistic. Companies will still be required to obtain TAAs so the burden of hours should not be substantially less. Furthermore, those companies would not be relieved from the requirement to maintain a registration with the State Department.

**Note to Paragraph (a)(2):**

Comment: The “Defense Services” language as currently proposed offers a clear understanding of the difference between “installation” and “integration.” However, with regard to *installation*, the proposed rule leaves open the possibility for confusion or misinterpretation. For example, a company buys an Italian made storage cabinet (clearly EAR99) for installation into a stateroom on a military ship (clearly a defense article). During the installation, the Italians have to adjust the size of one of the cabinets and bring out a saw and cut it by 2 inches. In the strictest interpretations, the above represents a change or modification of an item subject to the EAR for installation into a defense article.

Recommendation: The Administration should revise the definition of *installation* to allow for moderate changes or modifications to adjust for fit only (no function or form changes) or the language 'does not require changes or modifications to the item' could be removed to address industry's concern.

**§120.9(a)(5)-(6):**

Comment: As currently written, these paragraphs could be misinterpreted to indicate such activity involving solely U.S. persons located in the U.S. would require authorization as a defense service.

Recommendation: These paragraphs should be modified to eliminate potential misinterpretation or should be removed from the definition of "Defense Services" and added to the control paragraphs of the relevant categories.

**§120.9(b)(2):**

Comment: AIA members welcome the clarification that "mere" employment of a natural U.S. person by a foreign person does not constitute a defense service. However, this is an area that warrants further clarification both in the circumstances in which a natural U.S. person is employed by a foreign defense company without any other U.S. involvement and when the U.S. person may be employed by a foreign affiliate of a U.S. company that is already obtaining authorizations from DDTC regarding a particular program, including the case when the U.S. person is employed by the foreign affiliate but not involved in the particular DDTC authorized program. In addition, the circumstance in which a person with dual nationality (U.S. and other) and may not have ever acquired any technical know-how in the United States also requires clarification. Further to the circumstances mentioned above, it would be helpful if DDTC could provide a few representative examples of when "mere" employment of natural U.S. persons by a foreign person does not constitute a defense service.

**§ 120.9(b)(3):**

Comment: Under the Federal Register Notice (FRN) for Defense Services it says "*One commenting party recommended that the definition of defense service address instances where USML articles are incorporated or installed into a CCL item, similar to how ITAR 120.9(b)(3) addresses CCL items integrated or installed into USML items. This circumstance will be addressed in a separate rule.*" Further on in the FRN the proposed ITAR 120.9(b)(3) states the following is not a defense service: "*Servicing of an item subject to the EAR that has been integrated or installed into a defense article;*"

Regarding the above comment on whether the proposed definition of defense services addresses instances where USML articles are incorporated or installed into a CCL item, it is unclear if it is referring to the scenario where the servicing involves only the EAR item and not the defense articles that have been incorporated or installed. If so, this scenario should be addressed for clarity purposes especially if the EAR item is the basis for the servicing and not the defense articles that happen to be installed or incorporated but will not be serviced at all. This would seem reasonable and aligned with the currently proposed exclusion of "Servicing of an item subject to the EAR that has been integrated

or installed into a defense article." Along these lines, perhaps the proposed ITAR 120.9(b)(3) exclusion could be modified along these lines: Servicing of an item subject to the EAR that has been integrated or installed into a defense article, or servicing of an item subject to the EAR that has defense articles integrated or installed whereby no servicing will be provided to the defense articles. In both cases, defense articles are present but will not be serviced.

As indicated in the FRN, it appears this will be addressed in a separate rule, but given the currently proposed definition of 'defense service' does not address this in 120.9(a) nor is it excluded in 120.9(b), it seems there will remain uncertainty until the separate rule is issued. On this note, it would be good to have an indication on whether the separate rule is intended to be issued by BIS/Commerce and/or DDTC/State.

**§ 120.9(b)(5):**

Comment: This section currently reads: "Services performed, to include direct combat operations, as a member of the regular military forces of a foreign nation by a U.S. person who has been drafted into such forces." In the April 13<sup>th</sup>, 2011 version of section (b)(5) it read: "Providing assistance (including training) in medical, **logistical** (other than maintenance), or other administrative support services to or for a foreign person." AIA member companies were hopeful "logistical assistance" would be exempt for a defense service. Under current (b)(5) this does not appear to be the case.

Recommendation: "logistical assistance" should be exempted under the definition of "defense service."

Thank you for the opportunity to comment on proposed Category XV and the revised "defense services" definition. Please know that you have a willing and committed partner at AIA going forward.

Best regards,



Remy Nathan  
Vice President, International Affairs  
Aerospace Industries Association



**DRS Technologies, Inc.**  
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2345 Crystal City Drive, 10<sup>th</sup> Floor  
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July 8, 2013

Ms. Sarah Heidema  
PM/DDTC, SA-1, Room 1200  
Directorate of Defense Trade Controls  
Bureau of Political Military Affairs  
U.S. Department of State  
Washington, DC 20522-0112

**Subject: Response to the Proposed Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service” - 78 FR 31444, RIN 1400-AC80 and RIN 1400-AD33**

Dear Ms. Heidema,

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

Overall, this latest version of the proposed rule for defining a defense service remains a positive step in the export reform effort that will help to eliminate the current requirement for authorization to conduct activities that were never intended to be regulated. However, there remain concerns that certain phrases and words used will needlessly limit the effectiveness of the changes and continue to unnecessarily regulate activities that should not be regulated. Our specific comments and suggestions to address these shortcomings are as follows:

1. §120.9(a)(1) states that the performance of a defense service must involve “using other than public domain data....” As we previously commented, defining a defense service by the inclusion or non-inclusion of public domain data is confusing and will be very problematic. There are many types of data that are not public domain for a variety of reasons such as data controlled by the EAR, or other federal statute, and data not in the public domain for company proprietary or contractual reasons, that should not result in an activity meeting the definition of a defense service. By defining a defense service as one using other than public domain data, questions such as the ITAR regulating services using non-technical, but non-public domain data surface as do services using data regulated by the EAR. 22 CFR §120-130 regulates defense articles and defense services, accordingly, the standard by which data subject to this jurisdiction is measured must be §120.10, Technical Data. We again strongly urge that this sentence be changed to read “using technical data as defined in §120.10....” If the concern is that such a

service could be performed using EAR-regulated technical data, the definition should at a minimum be revised to reflect that and to clearly state it does not include information that is not considered public domain for reasons other than export control.

2. §120.9(a)(2), states that providing assistance for “integration” of a defense article is a defense service. Note to paragraph (a)(2) further expounds on Integration, differentiating it from Installation. Our concerns with the note remain differentiating between installation and integration. The note implies that if something does not meet the simple definition of installation in the last sentence, it is integration. The simple definition of installation given is too narrow. The example it cites is a dashboard radio installed into a military vehicle where no changes or modifications to the vehicle are required, is installation. As cited, simply drilling a hole in the dashboard for the radio antenna cable to pass through would be considered integration as you have “modified” the vehicle. To be considered integration, the modifications should be something beyond simple form or fit. Function modifications associated with the interface between the two articles must be required to consider it integration. This approach conforms with the integration example cited in the same note, integrating a civil engine into a destroyer. The function interface between the two articles requires modification for the engine to successfully operate. We strongly recommend the department consider revising the note associated with the section to reflect the above.

We applaud the export reform initiatives and are optimistic about the changes being undertaken regarding the U.S. export control system. The end goal is to enable the U.S. government to focus more attention on articles critical to national security and allow the U.S. defense industrial base to remain healthy and viable in its continued efforts to develop leading edge systems for our war fighters. The proposed amendments to the ITAR are positive steps. We believe with changes to address the above comments, this proposed rule will help to effectively support both government and industry while enhancing national security.

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

Sincerely,



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

**Before the  
U.S. DEPARTMENT OF STATE  
DIRECTORATE OF DEFENSE TRADE CONTROLS**

In the matter of:	)	
	)	
Amendment to the International Traffic	)	Public Notice: 8329
in Arms Regulations: Revision of U.S.	)	RINs 1400–AC80 and 1400–AD33
Munitions List Category XV and	)	
Definition of “Defense Service”	)	
	)	

**COMMENTS OF ECHOSTAR SATELLITE SERVICES L.L.C.  
AND HUGHES NETWORK SYSTEMS, LLC**

EchoStar Satellite Services L.L.C. (“ESS”) and Hughes Network Systems, LLC (“Hughes”) (“collectively “EchoStar”)<sup>1</sup> hereby provide comments on proposed changes to the International Traffic in Arms Regulations (“ITAR”) in the above-referenced rulemaking proceeding. EchoStar is interested in this proceeding because ESS operates and/or manages a fleet of 22 owned and leased in-orbit satellites and leases capacity on a full-time and occasional-use basis to direct-to-home satellite televisions providers, U.S. government service providers, state agencies, Internet service providers, broadcast news organizations, programmers and private enterprise customers. ESS also provides value added services such as telemetry, tracking and control services to third parties. Hughes is a global provider of broadband satellite technologies and services for home and office, delivering innovative network technologies, managed services, and solutions for enterprises and governments. The Hughes segment uses its two owned satellites, SPACEWAY 3, which has a commandable payload, and EchoStar XVII, and additional satellite capacity acquired from multiple third-party providers to provide satellite broadband Internet

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<sup>1</sup> ESS and Hughes are indirect, wholly-owned subsidiaries of EchoStar Corporation.

access to the North American consumer market and broadband network services and systems to the domestic and international enterprise markets.

EchoStar generally agrees with and supports the overall export control reform initiative and the proposals of the Department of State's Directorate of Defense Trade Controls ("DDTC") set forth in the above-referenced notice. In particular, EchoStar supports the proposal of DDTC to transfer control of the export of commercial communications satellites from the ITAR to the Export Administration Regulations ("EAR") and to revise the definition of "defense services" under the ITAR. The proposed changes will enhance U.S. national security, by allowing DDTC to focus its resources on controlling the export of those items and services that (i) contain or involve technologies unique to the United States, (ii) are critical to U.S. national security, or (iii) involve destinations, end uses, and end users of greater national security concern than NATO allies and other multi-lateral regime partners.

We also appreciate this opportunity to provide comments regarding the proposed rules. After review of the proposed rules and the revised definition of "defense services," in particular, EchoStar believes that the export licensing process would be further improved, if DDTC would clarify the Note to proposed Section 120.9(a)(2) and identify in proposed Section 120.9(b) additional examples of activities that do not constitute "defense services," as explained below. We believe that these clarifications and additional examples would decrease the number of applications for export licenses and technical assistance agreements ("TAA").

Proposed Section 120.9(a)(2) includes within the definition of “defense service” the “furnishing of assistance to a foreign person . . . for the integration of any item controlled on the U.S. Munitions List (USML) or items subject to the EAR into an end item or component that is controlled as a defense article on the USML, regardless of the origin.” The note to proposed Section 120.9(a)(2) then defines “integration” and distinguishes it from “installation.” EchoStar proposes that a necessary criterion of “integration” should be that such activities, at a minimum, must include engineering development or modification of the defense article into which the EAR item is being integrated. EchoStar also recommends DDTC clarify that certain activities do not constitute “integration” for purposes of Section 120.9(a)(2), as follows:

- Configuring existing features of an EAR-controlled item whether for installation into a defense article or after such item has been installed or connected to a defense article – should not be deemed to be “integration.” For example, configuring or setting up existing operational parameters of EAR-controlled communications equipment after it has been installed to optimize performance in a specific operational environment should not be considered a “defense service.”
- Connecting EAR-controlled equipment via an Ethernet cable or other type of standard connector to a defense article should not be deemed to be “integration.” For example, connecting EAR-controlled equipment to a military encryption unit via Ethernet or similar cable should not be considered a “defense service,” particularly when the communications equipment is a “plug and play” device that could be connected to any device with an Ethernet port, irrespective of whether the item was a “defense article.”

Section 120.9(b) also lists certain activities that do *not* constitute a “defense service.” EchoStar recommends that DDTC expand this list to include the following activities, provided that in each case no technical data is transferred to a foreign person and no modification to EAR-controlled hardware or software is made:

- Assistance provided to a foreign person with configuring existing features of EAR-controlled hardware or software before or after installation or integration of such EAR-controlled items into a defense article to enable or optimize performance of such EAR-controlled hardware or software items within the operating environment.
- Assistance provided to a foreign person with testing of EAR-controlled hardware or software that has been installed into a defense article in order to fine tune the performance of such items or ensure that such items operate in accordance with customer requirements, provided such testing relates to or utilizes only existing features of EAR-controlled hardware or software.
- Assistance provided to a foreign person with respect to developing and defining operational requirements, specifications, and test plans for EAR-controlled hardware or software before or after installation or integration of such EAR-controlled items into a defense article, provided such activities relate to or utilize only existing features of the EAR-controlled hardware and software.
- Assistance provided to a foreign person with respect to configuration, changes to or modifications of initial configuration, performance issues, troubleshooting and identification and repair of hardware and software faults for EAR-controlled items that have installed in a defense article. Such assistance should fall within the activity described as not being a

defense service in proposed Section 120.9(b)(3) (“[s]ervicing of an item subject to the EAR . . . that has been integrated or installed into a defense article”).

Based on the foregoing, we respectfully request that DDTC adopt the recommendations set forth in these comments.

Respectfully submitted,

By: Sean P. Fleming  
Sean P. Fleming  
Senior Counsel, International and Trade Compliance

Paul Lauper Ellison  
Senior Trade Compliance Counsel

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Date: July 8, 2013

**From:** Lemon, jim H UTCHQ [<mailto:JIM.LEMON@UTC.COM>]  
**Sent:** Monday, July 08, 2013 7:06 PM  
**To:** DDTC Response Team  
**Subject:** ITAR Amendment -- USML Category XV and Defense Services.

United Technologies Corporation (“UTC”) appreciates the opportunity to submit these comments on the U.S. Department of State’s proposed rule to amend the definition of defense services. UTC is a global, diversified corporation based in Harford, Connecticut, supplying a broad range of high technology products and services, including defense services.

Following are our recommended revisions to the proposed rule:

**1. Revise 120.9(a) to read as follows:**

**From:** (a) A defense service means:

**To:** (a) A defense service means provision of the services included in (1) through (6) below by a U.S. person to a foreign person.

**Rationale:** The stated intent is that defense services are only provided by a U.S. person to a foreign person, yet this is only implied in the ITAR. This should be clearly stated, so as to align with the intent, and the language in 124.1(a) that requires only U.S. persons to obtain State Department approval to furnish defense services.

**2. Revise 120.9(b)(2) to read as follows:**

**From:** (b)(2) Mere employment of a natural U.S. person by a foreign person;

**To:** (b)(2) Providing services that are not included in (a)(1) through (a)(6) above, including those provided while working as a natural U.S. person employed by a foreign person.

**Rationale:** To clarify that U.S. natural persons who are employed by foreign persons do not need State Department approval to provide non-defense services to their foreign employer.

Thank you for the opportunity to comment on this proposed rule.

Jim Lemon  
United Technologies Corporation  
202-336-7462



STANFORD UNIVERSITY

ANN M. ARVIN  
VICE PROVOST  
DEAN OF RESEARCH

July 8, 2013

Directorate of Defense Trade Controls  
Office of Defense Trade Controls Policy  
Bureau of Political-Military Affairs  
U.S. Department of State  
2201 C St., NW  
Washington, D.C. 20520

RE: RINs 1400-AC80 and 1400-AD33 (ITAR Amendment – Category XV Spacecraft Systems and Related Articles and “Defense Services”)

Dear Madam or Sir:

Stanford University appreciates the opportunity to comment on the U.S. Department of State Directory of Defense Trade Control’s Proposed Rules (RINs 1400-AC80 and 1400-AD33) regarding the revision of the U.S. Munitions List Category XV and Definition of “Defense Service”.

Stanford by express policy engages only in “fundamental research” as defined by U.S. National Security Decision Directive 189 (NSDD-189 - “National Policy on the Transfer of Scientific, Technical and Engineering Information”) and implemented by regulation through the Export Administration Regulations (EAR - 15 CFR 734.8) and the International Traffic in Arms Regulations (ITAR - 22 CFR 120.11). Stanford is committed to the principle of freedom of access by all interested parties to the underlying data, to the processes and to the final results of research. In keeping with this commitment, Stanford will not accept research agreements that limit the publication of results or that limit the participation of researchers in the intellectually significant portions of a project on the basis of citizenship.

The development of positive lists with objective parameters to describe controlled items is important to the nation’s premier research universities like Stanford. “Bright lines” between items and technologies controlled by the International Traffic in Arms Regulations (ITAR) and the Export Administration Regulations (EAR) will improve Stanford’s ability to comply with them.

Stanford fully supports and appreciates the current effort to move some satellites and spacecraft from the U.S. Munitions List (USML) to the Commerce Control List (CCL). However, we recommend that the Department reconsider the appropriate jurisdiction for some of the articles proposed for retention on the USML. In addition, we are concerned by an apparent inconsistency between parts of the proposed “defense service” rule and NSDD-189, which could negatively impact academic collaborations and scientific inquiry.

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Tel (650) 723-0977 • Fax (650) 725-1653 • [aarvin@stanford.edu](mailto:aarvin@stanford.edu)

Based on a review conducted by Stanford's Director of Export Compliance and Export Control Officer, Steve Eisner, in consultation with faculty in Stanford's Department of Aeronautics and Astronautics, we have the following specific comments:

§ 121.1 Category XV Spacecraft Systems and Related Articles

Stanford University is concerned that, as currently constructed, the Proposed Rule would result in the inclusion of satellites, nanosatellites ("Cubesats") and spacecraft supporting classroom instruction and fundamental research on terrestrial climate, weather, fires and other earth-based natural phenomena, as well as research on planets, exoplanets, and other space objects.

Based upon our review we suggest the following:

- The term "objects" in § 121.1(a)(2) should be defined or clarified as referring to man-made objects. If intended to include naturally-occurring phenomena such as exoplanets or weather systems it would include fundamental research in space science performed by many university research and scientific satellites.
- The term "Track" in § 121.1(a)(2) needs to be more precisely defined. For example, any nadir-facing imaging satellite with sufficient Ground Sample Distance can "image" an object. Does that mean the satellite is "tracking" an "object" if it takes more than one picture that includes the object within a relatively short time period? If what is intended by "tracking" in 121.1(a)(2) is that the software onboard the satellite can discern and relay the object's position and heading, then such a clarification needs to be made.
- § 121.1(e)(1)(ii) specifies antennas that are "actively scanned." However, we believe the intent is to control "actively electronically scanned arrays" and suggest that this clarification be made in the final rule. As written, the paragraph would include antennas that physically rotate, which are used in space and weather research satellites.
- In § 121.1(e)(6), while the optical bench assembly for items in paragraph (a) may require control under the ITAR, we suggest that beam splitters, fold mirrors, and flexure mounts are widely used components without unique US technology and as such would be appropriately controlled under the EAR.
- The term "earth location accuracy" in § 121.1(e)(10) needs to be defined. It is unclear as stated. A number of fundamental research nanosatellites use attitude determination and control systems with onboard GPS receivers or orbit propagators and easily obtain 5 meters from Low Earth Orbit (LEO). Such a low control threshold could stifle university space science research.
- § 121.1(e)(13) appears to capture all "control moment gyroscopes" (CMGs) without qualification for technical performance. A metric should be provided for this control parameter. Many CMGs are used in civil, non-military fundamental science research at U.S. universities.
- § 121.1(e)(18) is a catch-all which fails to take into consideration the purpose or capabilities of DoD-funded secondary or hosted payloads and as such would include payloads specifically

designed and built to perform research funded by DoD components whose mission includes funding fundamental research, e.g. DARPA or the Office of Naval Research (ONR).

- Treating all DoD-funded payloads as defense articles could make it difficult for DoD to contract with nation's leading fundamental research universities, whether or not there are national security considerations. We suggest that classification of research satellites or spacecraft should be based primarily on their performance capabilities, as intended by Export Control Reform.
- Stanford is concerned that the term "spacecraft reentry vehicles" in § 121.1(e)(19) is ambiguous and vague.

### § 120.9 The Definition of "Defense Service"

Stanford University is quite concerned about § 120.9(a)(2) as proposed. The proposed subparagraph specifies that the furnishing of assistance to a foreign person for the "integration" of any item controlled on the USML or items subject to the EAR into an end item or component that is controlled as a defense article on the USML is a defense service, even if only public domain information is used.

The integration paragraph is particularly problematic for fundamental research universities like Stanford since basic research routinely involves experimentation with hardware and software. Early stage research requires scientists and engineers to create, modify, and hence, "integrate" components and parts using only public domain information to validate designs by means of experimentation, and to advance science and technology through the assembly and testing of prototype hardware and software.

Under the proposed "integration" rule, unless some carve out is created for "integration" activities performed in fundamental research using solely public domain information, the *integration* "catch" in § 120.9(a)(2) appears to negate the *public domain information* "release" in § 120.9(a)(1). Outside of "design" activities that do not involve hardware and software, it is difficult to imagine any other activities listed in § 120.9(a)(1) being feasible without requiring "integration". Stanford University disagrees with the Department of State's assertions that "it is seldom the case that a party can aggregate public domain data for the purposes of application to a defense article without using proprietary information or creating a data set that itself is not in the public domain"<sup>1</sup> and "the Department believes that the service of "integration" cannot be effected only with public domain information"<sup>2</sup>. University courses in the design and fabrication of scientific space instruments, including certain Cubesats, rely completely on public domain information for "integration" as defined in this Proposed Rule.

The effect of the proposed "integration" rule would mean that hardware and software resulting from university fundamental research would be considered "developmental" items, and subject to defense services whenever items used in research are "integrated," thus imposing restrictions on fundamental research universities. Under paragraph (a)(1), these activities are excluded from the

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<sup>1</sup> Federal Register, Vol. 78, No. 101, pg. 31445

<sup>2</sup> Federal Register, Vol. 78, No. 101, pg. 31446

definition of defense services, but because of the “integration” restrictions in paragraph (a)(2), these activities cannot possibly be performed without a defense service taking place.

Beyond the apparent conflict with NSDD 189’s policy directive that “the mechanism for control of information generated during federally-funded research in science, technology, and engineering at colleges, universities, and laboratories is classification,” the “integration” rule also appears to negate the exemption from the registration requirements in paragraph § 122.1(b)(4), as persons who “engage in the fabrication of articles for experimental or scientific purpose, including research and development” will in fact be prohibited from involving foreign students and researchers in these experimental or scientific processes without an export license, even when all of the information relied upon is in the public domain. Any person engaging in these activities (beyond “plug and play”) will now be required to register if they choose to involve foreign nationals and will have to prohibit the participation of nationals of countries proscribed in § 126.1 from all “integration” activities in the conduct of fundamental research.

The impacts of the proposed rule on the world’s best foreign students and scholars who come the U.S. to engage in campus-based fundamental research or participate only in the fabrication articles for experimental or scientific purposes are not trivial. As the Association of University Export Control Officers (AUECO) has stated in their comment letter, without correction or clarification, the effect of the proposed integration rule would be to “undermine major pillars of the federal government’s social contract with higher education to not regulate fundamental research”.

#### The Need for Harmonized Definitions

Stanford shares a concern articulated by others within higher education that without final definitions of terms such as public domain/publicly available, fundamental research, and technology/technical data, the nation’s universities cannot adequately and appropriately analyze proposed rules under consideration as part of the export reform initiative (ECR). For example, the Department’s proposed revision of “Defense Services” uses the term “public domain” information, yet the proposed redefinition has yet to be announced under ECR.

Stanford supports an approach that requires the proposed harmonized definitions be released prior to the release of any further proposed revisions and/or final rules to the USML. We would also support an approach that provides the opportunity to comment not only on the proposed definitions once released, but also on previously closed proposed regulatory changes when the proposed definition may impact the interpretation and/or implementation of the rule, whether proposed or final.

Sincerely,



Ann Arvin  
Vice Provost and Dean of Research

July 8, 2013

Office of Defense Trade Controls Policy  
U.S. Department of State  
Washington, DC

**SUBJECT:** ITAR Amendment -USML Category XV and Defense Services

**Re:** RINs 1400-AC80 and 1400-AD33

The Research Compliance Division of Virginia Polytechnic Institute and State University (“Virginia Tech”) has reviewed the subject proposed rule change to the International Traffic in Arms Regulations (ITAR) and in accordance with guidance in RINs 1400-AC80 and 1400-AD33 (ITAR Amendment – Category XV Spacecraft Systems and Related Articles and “Defense Services”), Federal Register Vol. 78 No. 101 (Friday May 24, 2013), provides the following comment and observations. We appreciate the opportunity to respond to this very important proposed rule.

Virginia Tech strongly agrees with the conclusions made in the response letters from the Association of University Export Control Officers (“AUECO”) and the Council on Government Relations (COGR)/American Association of Universities, and encourages the Department of State to consider their recommendations.

In particular, the Virginia Tech appreciates the clarity of § 120.9 Defense service (a)(1), which establishes the ability of accredited institutions of higher learning to design, develop, engineer, manufacture, produce, assemble, etc. defense articles (using public domain information only) without these activities being a defense service. However, Virginia Tech is concerned that the benefit of this provision is diminished by the provision in § 120.9(a)(2) defining “integration” using public domain information as a defense service.

The proposed § 120.9(a)(2) definition, unmodified, may lead to widespread restrictions on fundamental research. For example, paragraph § 120.9 (a)(1) allows a university to design, engineer, and manufacture a prototype “developmental” submersible, unmanned aerial or ground vehicle as fundamental research, if all the information used is in the public domain. However, these activities become controlled if the engineering of the design involves activities beyond “plug and play” of parts and components into the end item, defined as “integration”. (§ 120.9 (a)(2)).

University research is a dynamic and iterative process. The first “proof of concept” version of an item seldom remains unmodified after experimentation and testing. If each step involving modification of a part or component becomes a defense service (falling under the definition of “integration”, then the entire process is likely to have to be treated as controlled, nullifying the “release” in § 120.9(a) (1). Whereas it may be possible to construct a prototype using only “plug

*Invent the Future*

and play” parts and components, it is Virginia Tech’s experience that most often experimentation leading to creation of “proof of concept” devices or prototypes involves modification of parts or components that would be captured as “integration”, a defense service under the proposed rule § 120.9 (a)(2). Having to segregate these activities from the design, engineering, testing, etc. would dramatically reduce the range of fundamental research activities made possible under § 120.9 (a)(1)’s public domain provisions.

Virginia Tech thanks DDTC for its efforts to modify the ITAR and create a positive list. Virginia Tech also appreciates DDTC’s efforts to bring clarity to the definition of “defense service” and hopes it will take into consideration the comments herein, those of the AUECL/COGR/AAU letters, and those of other institutions of higher learning who respond.

Sincerely,

A handwritten signature in blue ink, appearing to read "David Moore", is written over a light blue rectangular background.

David Moore  
Assistant Vice President for Research Compliance

## **Proposed Text Changes to § 121.1, Note 2 to Paragraph (c)(4)**

Jason Kim, DOC/NOAA/Office of Space Commercialization

### Original Text:

Note 2 to paragraph (c)(4): GPS receivers designed or modified for use with military unmanned air vehicle systems with less capability are considered to be specifically designed, modified, or configured for military use and therefore covered under this paragraph (c)(4). Any GPS equipment not meeting this definition is subject to the jurisdiction of the Department of Commerce (DOC). Manufacturers or exporters of equipment under DOC jurisdiction are advised that the U.S. Government does not assure the availability of the GPS P-Code for civil navigation. It is the policy of the Department of Defense (DOD) that GPS receivers using P-Code without clarification as to whether or not those receivers were designed or modified to use Y-Code will be presumed to be Y-Code capable and covered under this paragraph. The DOD policy further requires that a notice be attached to all P-Code receivers presented for export. The notice must state the following: “ADVISORY NOTICE: This receiver uses the GPS P-Code signal, which, by U.S. policy, may be switched off without notice.”

### Suggested Change #1:

**Move all text after the first sentence into a new “Note to paragraph (c)” placed immediately after paragraph (c)(4).**

*Rationale:* While the first sentence applies to paragraph (c)(4), the rest of the note addresses the entirety of paragraph (c). As currently presented, it is unclear what “this definition” in the second sentence refers to. Moving the text as suggested will clarify the reference.

### Suggested Change #2:

**Strike the sentence stating, “Manufacturers or exporters of equipment under DOC jurisdiction are advised that the U.S. Government does not assure the availability of the GPS P-Code for civil navigation.”**

*Rationale:* The sentence is irrelevant to export control and factually incorrect. Starting in 2008, the U.S. Government has issued multiple assurances that DOD will ensure the availability of the GPS P-Code for civil use through 2020. For reference, see <http://www.gps.gov/technical/codeless/>. The 2008 DOD Federal Register notice cited on that page states, “The U.S. Government... commits to maintaining the existing GPS L1 C/A, L1 P(Y), L2C, and L2 P(Y) signal characteristics until December 31, 2020...” Hundreds of thousands of civil GPS receivers currently access P-Code signals in a “codeless” or “semi-codeless” mode that does not decrypt the military navigation message. Discussions are ongoing to consider moving the end date for civil P-Code access even further into the future.

Suggested Change #3:

**Strike the text stating, “The DOD policy further requires that a notice be attached to all P-Code receivers presented for export. The notice must state the following: ‘ADVISORY NOTICE: This receiver uses the GPS P-Code signal, which, by U.S. policy, may be switched off without notice.’ ”**

*Rationale:* The text of the advisory is irrelevant to export control and factually incorrect. As previously stated, current U.S. policy is to maintain civil access to GPS P-Code through 2020. The National Space Policy of 2010 (PPD-4) states, “The United States must maintain its leadership in the service, provision, and use of global navigation satellite systems (GNSS). To this end, the United States shall: **Provide continuous worldwide access**, for peaceful civil uses, to the Global Positioning System (GPS). . . .” The U.S. Space-Based Positioning, Navigation, and Timing Policy of 2004 (NSPD-39) provides further direction to “**provide uninterrupted availability** of positioning, navigation, and timing services” and “remain essential components of internationally accepted positioning, navigation, and timing services”. Warning foreign users that GPS P-Code “may be switched off without notice” contradicts these national policies and undermines the extensive U.S. efforts to build international confidence and trust in GPS as the global standard for satellite navigation. If the advisory notice requirement is retained, the notice should be reworded to state, “This receiver uses the GPS P-Code signal, whose signal characteristics may change after December 31, 2020.” This is more consistent with the wording of the 2008 Federal Register notice. (DOD may keep P-Code on but change its power level, phase relationship, etc.)

NOAA Recommendations For Changes To Public Notice 8329

*Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of ‘Defense Service’*

July 3, 2013

Para	Current	Proposed	Rationale
(b)(2)	[GPS receiving equipment] Designed for producing navigation results above 60,000 feet altitude and at 1000kts velocity or greater	Designed for producing navigation results above 60,000 feet altitude and at 1000kts velocity or greater <b>for space vehicles covered in 121.1 (a)</b>	This criterion needs to be updated to reflect that U.S. and international spacecraft routinely fly with GPS receivers for navigation purposes. A significant number of satellites that would otherwise become under CCL jurisdiction would remain under ITAR solely for this reason
(e)(2)	Space-qualified optics (i.e., lens or mirror), including optical coating, having active properties (e.g., adaptive or deformable), or having a largest lateral dimension greater than 0.35 meters	Space-qualified optics (i.e., lens or mirror), including optical coating, having active properties (e.g., adaptive or deformable), or having a largest lateral dimension greater than <b>0.55</b> meters;	Largest GOES-R Advanced Baseline Imager (ABI) mirror is .55m in diameter. Ensures that the ABI and its technical design and capabilities remain on the CCL. This is important for dialogue with international partners concerning algorithm development.
(e)(3)	‘‘Space-qualified’’ focal plane arrays (FPA) having a peak response in the wavelength range exceeding 900nm and readout integrated circuit (ROIC) specially designed therefor	‘‘Space-qualified’’ focal plane arrays (FPA) having a peak response in the wavelength range exceeding <b>1330nm</b> and readout integrated circuit (ROIC) specially designed therefor	Longest GOES-R ABI wavelength is 1330nm
(e)(4)	‘‘Space-qualified’’ mechanical cryocooler, active cold finger, and associated control electronics specially designed therefor;	‘‘Space-qualified’’ mechanical cryocooler, active cold finger, and associated control electronics specially designed therefor cryocoolers <b>with cooling power greater than 2.4 W for cold head temperatures less than 70K and greater than 5.0W for cold head temperatures greater than 70K;</b>	No threshold established in paragraph; GOES-R ABI power levels used as threshold. JPSS VIIRS (imaging instrument) has a passive cryocooler
(e)(5)	‘‘Space-qualified’’ active vibration suppression, including isolation and dampening, and associated control electronics therefor;	‘‘Space-qualified’’ active vibration suppression, including isolation and dampening, and associated control electronics therefor, <b>for systems which permit spacecraft to achieve accuracies identified in (e) (10).</b>	No threshold established in paragraph; tied threshold to pointing accuracy

(e)(10)	Attitude determination and control systems, and specially designed parts and components therefor, that provide earth location accuracy without using Ground Location Points better than or equal to: (i) 5 meters from low earth orbit (LEO); (ii) 30 meters from medium earth orbit (MEO); (iii) 150 meters from geosynchronous orbit (GEO); or (iv) 225 meters from high earth orbit (HEO)	Attitude determination and control systems, and specially designed parts and components therefor, that provide earth location accuracy without using Ground Location Points better than or equal to: (i) 5 meters from low earth orbit (LEO); (ii) 30 meters from medium earth orbit (MEO); (iii) 150 meters from geosynchronous orbit (GEO); or (iv) 225 meters from high earth orbit (HEO)	Please clarify if these are 1-sigma or 3-sigma thresholds. If they are 1-sigma thresholds, there is no issue with GOES-R. VIIRS (JPSS inager) has a sample interval of 259m at nadir. JPSS Infrared Sounder (CrIS accuracy is 1.5km
(e)(18)	Department of Defense-funded secondary or hosted payload, and specially designed parts and components therefor	Secondary or hosted payload, <b>including those funded by the Department of Defense</b> , and specially designed parts and components therefor, that perform any of the functions described in paragraph (a) of this category	NOAA suggests that DoD-funded secondary or hosted payloads be governed by the same rule as civil or private sector payloads. The rule, as written, limits ride opportunities and places all DoD secondary or hosted payloads under ITAR control for funding rather than technical reasons.

July 8, 2013

Ms. Sarah J. Heidema  
Acting Director  
Office of Defense Trade Controls Policy  
U.S. Department of State  
Washington, DC 20522-0112

ATTN: Regulatory Change, USML Category XV and Defense Services

Dear Ms. Heidema:

This comment is submitted in response to the Department of State's Public Notice 8329, the notice of proposed rulemaking (NPRM) published in the Federal Register on May 24, 2013 (78 FR 31444).

Space Exploration Technologies Corp. (SpaceX) is registered with the Department of State, Directorate of Defense Trade Controls (DDTC), as a domestic manufacturer and operator of launch vehicles, space vehicles and associated equipment, and an exporter of launch services to the worldwide satellite market. SpaceX is based in California, where it designs and manufactures the Falcon family of launch vehicles, as well as the Dragon spacecraft. In 2012, SpaceX became the first private entity in history to launch a capsule to the International Space Station, berth, successfully reenter and return it to Earth. SpaceX currently has contracts to provide over 40 launch services to an array of domestic and foreign customers, both government and commercial, from launch sites in the United States. SpaceX operates a rocket testing and development facility in Texas, as well as launch facilities at Cape Canaveral AFS and Vandenberg AFB.

SpaceX is supportive of the stated objectives underlying the President's Export Control Reform (ECR) effort, and appreciates this opportunity to comment on the Department's proposed revisions to the International Traffic in Arms Regulations (ITAR) related to USML Category XV and the definition of "defense service" under ITAR 120.9. SpaceX respectfully comments as follows:

1. Under the new ITAR 120.9(a), "defense service" encompasses six distinct areas, enumerated as new paragraphs (a)(1) through (a)(6). The concept of "integration" is central to two of these: first, in the new paragraph (a)(2), which addresses the integration of a generic commodity to a USML end-item; and second, in the new paragraph (a)(5), which addresses specifically the integration of a satellite or spacecraft to a launch vehicle. The meaning of "integration" is clarified in a Note to paragraph (a)(2), but there is no similar Note to paragraph (a)(5). The normal rules of construction suggest that the note defining the term "integration" applies only to paragraph (a)(2) and not to paragraph (a)(5), which could lead to unpredictable results. We recommend that the heading to the Note to paragraph (a)(2) be amended to clarify that the definition of "integration" applies to the use of the term in both paragraphs (a)(2) and (a)(5).

2. Regarding the Note to paragraph (a)(2), we are unsure about the application of the term “introduction of software to enable proper operation of the article.” Additional clarity is needed in two respects. First, we are unsure what “introduction” of software means, as it is neither a term of art in common use with industry, nor is it defined in the ITAR. While speculative, it may have a meaning similar to “install.” If so, this contradicts other language in the Note that clarifies that “integration” is distinct from the term “installation;” but we are unclear what other method for “introduction” of software exists other than installation. Second, we believe that the term “software” here may be overbroad as well. SpaceX, for example, in some instances uses “specially designed” software proposed for control under ECCN 9D515, but USML Category XV only controls classified software, not “specially designed” software. In other instances, SpaceX uses open source software, including Linux, that is in the public domain and is EAR99. As proposed, ITAR 120.9(a)(1) and (2) would, for example, properly exclude from the definition of a defense service providing a CD ROM containing 9D515 “specially designed” or EAR99 software to a foreign person. It seems inconsistent with the stated goals of ECR that the Note appears to capture as “integration” “introducing” EAR controlled software by virtue of inserting a CD ROM into a drive and clicking the “install” icon.

We see a clear best solution to address the confusion over “introduction” and “software,” and suggest deletion from the Note of the clause “including introduction of software to enable proper operation of the article.” This is the preferred approach, in that it retains the government’s ability to control sensitive software elsewhere (e.g., proposed USML Category XV(a)(12), and (e)(20); and proposed ECCN 9D515), while maintaining the bright line between EAR and ITAR controls. Using this approach, furnishing of ITAR controlled software would be controlled as a defense service under ITAR 120.9(a)(1) or (2), while the furnishing of non-ITAR software would be controlled under the EAR.

3. SpaceX notes that in the revised definition of “defense service” (the new ITAR 120.9), paragraph (a)(5) contains the phrase “including both planning and onsite support”. SpaceX suggests it would be helpful to provide more clarity regarding what activities qualify as “planning and onsite support” within the meaning of the new ITAR 120.9(a)(5). For example, a cross-reference to the activities described in existing ITAR 124.15(a)(2)(i) and (ii) could be useful in this context.

4. A consistent theme of ECR is to eliminate license requirements to the greatest extent possible, particularly where such a license would be highly unlikely to ever be denied. Accordingly, we suggest the proposed ITAR 120.9(a)(5) be revised to exclude integration of a satellite controlled under ECCN 9A515 where the assistance is provided within the United States, and the satellite will be owned by, or for the use of, the government or a national of a member of NATO, Australia, Japan, or Sweden. The revised paragraph (a)(5) would add at the end, before “; or”:

; except this subparagraph does not apply to the furnishing of assistance (including training) in the integration of a satellite or spacecraft controlled by the EAR, provided the assistance occurs entirely within the United States, and the satellite or spacecraft is owned by, or for the use of, one or more governments or nationals of a member of NATO, Australia, Japan, or Sweden

5. Finally, in connection with the new ITAR 120.9(a)(3), regarding the relationship between defense articles (particularly those identified in the new USML Category XV(a)(11)) and the training of foreign persons, SpaceX supports the proposed distinction between training in “tactical employment,” which is a defense service, and training in “basic operation,” which is not a defense service. SpaceX refers to the public comment submitted by Bigelow Aerospace, Inc. under this NPRM (the “BA Comment”). The Department of State should confirm that for purposes of the new ITAR 120.9(a)(3), the meaning of “basic operation” includes, at a minimum, the “passenger experience” activities referenced in the BA Comment.

SpaceX believes that the changes to the proposed rule suggested above are congruent with the stated objectives of ECR, and appreciates the opportunity to engage with the Department of State in this effort.

Very truly yours,

David J. Den Herder  
Senior Counsel



July 3, 2013

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

Mr. Kerem Bilge  
Acting Director  
Office of Defense Trade Controls Policy  
U.S. Department of State  
2401 E Street, NW  
Washington, DC 20037

**Re: Control of Spacecraft Systems and Related Items The President Determines No Longer Warrant Control Under the United States Munitions List (USML) (*Federal Register* Notice of May 24, 2013; RIN 0694-AF87) and Revision of U.S. Munitions List Category XV and Definition of Defense Services (*Federal Register* Notice of May 24, 2013; RIN 1400-AD33)**

Dear Mr. Mooney and Mr. Bilge:

ITI is pleased to provide comments related to the above-referenced Notices of Proposed Rulemaking (NPRMs). ITI represents the leading providers of information technology products and services. ITI's member companies are global innovation leaders spanning the information and communications technology (ICT) industry: infrastructure, computer hardware, software, IT services, consumer electronics, e-commerce, and Internet services.

Our comments focus on proposed regulatory modifications within the NPRMs that deal with the export control treatment of radiation hardened integrated circuits (ICs). Consistent with comments from the Semiconductor Industry Association (SIA), ITI strongly supports proposed changes that replace USML Category XV(d) with ECCN 9A515.d and, in doing so, provide a realistic distinction between commercial ICs and specialized devices intended for space. We also robustly support SIA's recommendation for a waiver of the 180-transition rule for these specific changes, since they should not affect existing industry products in the transition from Cat XV(d) to 9A515.d.

Thank you for the opportunity to provide comments on this important topic. We believe these proposed regulatory changes should more effectively delineate the scope of control for radiation hardened ICs of interest, while protecting national security.

Sincerely,

A handwritten signature in black ink, appearing to read "John F. Neuffer", with a long horizontal line extending to the right.

John F. Neuffer  
Senior Vice President for Global Policy



July 8, 2013

Office of Defense Trade Controls Policy  
U.S. Department of State

RE: RINs 1400-AC80 and 1400-AD33 (ITAR Amendment – Category XV Spacecraft Systems and Related Articles and “Defense Services”)

To Whom It May Concern,

I am writing on behalf of the Association of University Export Control Officers (AUECO), a group of 28 senior export practitioners with experience at accredited institutions of higher learning in the United States (U.S.). AUECO members monitor proposed changes in laws and regulations affecting academic activities and advocate for policies and procedures that advance effective university compliance with applicable U.S. export controls and trade sanction regulations.

AUECO is specifically interested in contributing to the export reform effort in order to ensure that the resulting regulations do not have an adverse impact on academic pursuits. As a result, AUECO is providing the following comments in response to the U.S. Department of State’s (Department) request for public comments on its proposed revision of U.S. Munitions List (USML) Category XV Spacecraft Systems and Related Articles and the definition of “Defense Services”.

The development of positive lists with objective parameters to describe controlled items is important for the export community. “Bright lines” between items and technologies controlled by the International Traffic in Arms Regulations (ITAR) and by the Export Administration Regulations (EAR) will improve our ability to comply with the regulations. AUECO fully supports and appreciates the current effort to move some satellites and spacecraft from the U.S. Munitions List (USML) to the Commerce Control List (CCL); however, we recommend that the Department reconsider the appropriate jurisdiction for some of the articles proposed for retention on the USML. In addition, we are concerned by an apparent inconsistency between parts of the proposed “defense service” definition and National Security Decision Directive 189 (NSDD189) *National Policy on the Transfer of Scientific, Technical and Engineering Information*, or applicable exemptions already present in the regulations, which could negatively impact academic collaborations and scientific inquiry.

§ 121.1 Category XV Spacecraft Systems and Related Articles

AUECO appreciates the considerable effort DDTC has undertaken to more specifically describe the articles controlled under USML Category XV. However, as currently constructed the proposed rule would result in the inclusion of satellites and spacecraft supporting fundamental research on

terrestrial climate, weather, fires and other earth-based natural phenomena, as well as research on planets, exoplanets, and other space objects.

We understand that constructing a positive list is challenging, and appreciate the opportunity to provide comments. Based upon our review we suggest that the following satellites, spacecraft and components do not contain technologies unique to the United States, are not critical to national security, and are more appropriately controlled by the EAR.

- “Objects” in § 121.1(a)(2) should be defined or clarified as referring to man-made objects. If intended to include naturally-occurring phenomena such as exoplanets or weather systems it would include many research and scientific satellites.
- As written, § 121.1(a)(9) would seem to include most if not all satellites and spacecraft that use Positioning, Navigation, and Timing (PNT). We recommend that either a clearer description or specific criteria such as precision (such as those in § 121.1(e)(10)) be provided to identify the Positioning, Navigation, and Timing functions that are critical to the national security and require ITAR control.
- § 121.1(e)(1)(ii) specifies antennas that are “actively scanned.” However, we believe the intent is to control “actively electronically scanned arrays” and suggest that this clarification be made in the final rule. As written, the paragraph would include antennas that physically rotate, which are used in space and weather research satellites.
- In § 121.1(e)(6), while the optical bench assembly for items in paragraph (a) may require control under the ITAR, we suggest that beam splitters, fold mirrors, and flexure mounts are widely used components without unique U.S. technology and as such would be appropriately controlled under the EAR.
- § 121.1(e)(18) is a catch-all which fails to take into consideration the purpose or capabilities of DoD-funded secondary or hosted payloads and as such would include payloads specifically designed and built to perform research funded by DoD components whose mission includes funding basic research, e.g. DARPA or the Office of Naval Research (ONR). Treating all DoD-funded payloads as defense articles, whether or not there are national security considerations, will make it difficult for many universities to accept DoD contracts of this nature. Some universities, including many of the top research universities, do not accept research which carries restrictions on the ability to publish research results or require the exclusion of individuals on the basis of nationality or citizenship; as a result in some cases DoD will not have access to the researchers best qualified to address a particular issue or research question. We suggest that classification of research satellites or spacecraft should be based primarily on their technical capabilities and characteristics (*i.e.* do they possess parameters or characteristics that will provide an exclusive military or intelligence application?). However, should the Department determine that additional review and oversight is necessary, we recommend the approach used in Category VIII(f) (see final rule published April 16, 2013) be adopted and propose the following text for a Note to paragraph XV(e)(18): Paragraph XV(e)(18) does not control secondary or hosted payloads, and specially designed parts and components therefor that have been (a) determined to be

subject to the EAR via a commodity jurisdiction determination (see § 120.4 of this subchapter) or (b) identified in the relevant Department of Defense contract as being developed for both civil and military applications.

The following additional suggestions are offered to improve the readability and clarity of the final rule:

- In § 121.1(a)(7)(i), an “and” may have been omitted, we suggest: “...with less than 40 spectral bands **and** having an aperture greater than .35 meters.”
- We believe the intent of § 121.1(e)(7) is to control only those systems that are specially designed for a spacecraft identified in paragraph (a); therefore, we recommend the removal of the “and” proceeding “specially designed” to improve clarity. If we have mistaken the intent, we request additional clarification of what is covered by this subparagraph.

On a related topic, exemptions from licensing requirements exist for the export of some Category XV defense articles and defense services by U.S. institutions of higher learning; however, no such exemptions exist for any other USML category. We request the Department consider extending the license exemptions for “articles fabricated for fundamental research purposes otherwise controlled by Category XV(a) or (e)” and associated defense services currently found in § 123.16(b)(10) and § 125.4(d), respectively, to all articles fabricated for fundamental research purposes that would otherwise be subject to control under the ITAR.

#### § 120.9 The Definition of “Defense Service”

Precise definitions and consistent use of defined terms are essential to the development of clear regulations and enable exporters to confidently interpret and apply the regulations to their own activities. The new proposed definition of “defense service” provides clarification of what is and is not a defense service when the activity relies solely on public domain information. In accordance with § 120.9(a)(1) furnishing assistance (including training) to a foreign person whether in the United States or abroad, in the design, development, engineering, manufacture, production, assembly, testing, intermediate- or depot-level, modification, demilitarization, destruction, or processing of defense articles does not constitute a defense service, so long as the activities are performed using only public domain information. AUECO views the proposed paragraph at § 120.9(a)(1) as a positive clarification ensuring that institutions of higher learning can perform educational, training and fundamental research activities consistent with NSDD 189.

In contrast, § 120.9(a)(2) , specifies that regardless of whether only public domain information is used, the furnishing of assistance to a foreign person, whether in the United States or abroad, for the “integration” (as defined in the note to paragraph (a)(2)) of any item controlled on the USML or items subject to the EAR into an end item or component that is controlled as a defense article on the USML, regardless of the origin; is a defense service<sup>i</sup>.

The proposed broad inclusion of integration in the definition of “defense service” is particularly problematic for institutions of higher learning conducting basic and applied research that involves experimentation with hardware and software. Scientists and engineers routinely create, modify,

and hence, “integrate” components and parts using only public domain information to validate designs by means of experimentation, and to advance science and technology through the assembly and testing of prototype hardware and software.

For example, under a fundamental research effort funded by an ONR grant (*i.e.*, 6.1 funding; no publication restrictions (*i.e.*, specifies Distribution Statement A: publicly releasable); no foreign national restrictions; Contracting Officer and/or Program Officer have specifically stated the university effort is fundamental research; and the effort takes place solely at an accredited institution of higher learning in the US) the scope of the effort is to research various naturally occurring phenomena that interfere with the effective functioning of both civil and military GPS devices. Only public domain information is used in the effort. As part of the effort the research team creates a GPS device (‘Research GPS’) from various EAR (CCL and/or EAR99) components; the Research GPS will be used in the research effort. By happenstance the Research GPS produces navigation results above 60,000 feet altitude and at a velocity of 520 m/s, making it subject to control under Category XV(c)(2) as currently proposed. Although furnishing assistance using public domain information to a foreign person in the design, engineering, manufacture, assembly, etc., of the Research GPS would not be a controlled defense service under § 120.9(a)(1), it appears that providing assistance using solely public domain information to the foreign person in the integration of the various CCL and/or EAR99 components to create the Research GPS would constitute a defense service under § 120.9(a)(2). Is this an accurate application of the proposed definition? If so, it is difficult to imagine any of the activities listed in § 120.9(a)(1), other than “design” activities that do not involve hardware or software, being feasible without some degree of “integration.”

Scenarios like the one above are not uncommon in fundamental research efforts. It is our position that researchers should not be expected to make personnel and information control decisions, *i.e.* jurisdictional determinations, based on whether or not they believe an experimental device being constructed for fundamental research purposes will meet or exceed USML technical specifications; rather, the device should only be subject to control once it has been built and testing has shown that it meets or exceeds the USML technical specifications. Likewise, we do not believe that foreign national participation in the construction of experimental devices should be restricted unless the development is funded by a contract or other funding authorization that indicates the device is being developed for a specific military or intelligence use or application warranting control under the ITAR. The unintended consequence of the proposed definition will be to unnecessarily restrict fundamental research efforts by requiring licenses for integration activities even when all information is in the public domain.

Beyond the apparent conflict with NSDD 189’s policy directive that “the mechanism for control of information generated during federally-funded research in science, technology, and engineering at colleges, universities, and laboratories is classification”, the “integration” rule also appears to render the exemption from the registration requirements in paragraph § 122.1(b)(4) useless, as persons who “engage in the fabrication of articles for experimental or scientific purpose, including research and development”, will in fact be prohibited from involving foreign persons in these experimental or scientific processes (any research and development activities involving “integration” of items into a defense article) without an export license, even when all of the information relied upon is in the public domain. Any person engaging in these activities (beyond

“plug and play”) will now be required to register if they choose to involve foreign persons in “integration” activities even when all of the information is found in the public domain.

The impact of the proposed rule for persons who engage in fundamental research or participate only in the fabrication articles for experimental or scientific purpose are not trivial. Without correction or clarification, they undermine major pillars of the federal government’s social contract with higher education to not regulate fundamental research; principles assiduously supported in the past by the Department of State (e.g., 67 FR 15099 (March 29, 2002)).

### §120.3 Policy on designating or determining defense articles and defense services on the U.S. Munitions List

In its final rule 78 FR 22754 (Tuesday, April 16, 2013), DDTC amended section § 120.3 Policy on designating or determining defense articles and services on the U.S. Munitions List to add the following requirement:

- (a) For purposes of this subchapter, a specific article or service may be designated a defense article (see § 120.6 of this subchapter) or defense service (see § 120.9 of this subchapter) if it:
  - (2) Provides the equivalent performance capabilities of a defense article on the U.S. Munitions List.

Although this analysis can be done for USML entries that detail the properties peculiarly responsible for achieving the controlled performance levels, characteristics or functions, it will be difficult for the numerous categories where no positive performance characteristics are provided. For example, how is an exporter to know whether or not their unarmed unmanned aerial vehicle (UAV) provides equivalent performance capabilities to an unarmed military UAV controlled under Category VIII(a)(5)? USML category entries without positive parameters will not provide clear guidance to US exporters of when a commodity or technology is controlled using solely the equivalence criteria of 120.3(a)(2). AUECO recommends that when performance parameters are provided that sufficient guidance is included in the USML and in the relevant CCL listings to ensure that this “equivalence requirement” does not lead to an overly broad interpretation of the ITAR’s jurisdiction. We also want to point out that it will be impossible for exporters to evaluate the “equivalence” of their item(s) to ones controlled solely due to the fact that they are “developmental” articles funded by the Department of Defense, e.g., Developmental aircraft controlled by Category VIII(f).

### The Need for Harmonized Definitions

The definitions of terms used in the export regulations are vital to the interpretation and implementation of the export control regulations by exporters. Many of the key concepts that universities rely upon in determining the applicability of the regulations, including the proposed rules, to our activities ultimately rely on how certain terms are defined; any changes to those key definitions will substantially impact AUECO’s responses to this and other requests for public comment. AUECO is concerned that without final definitions of terms such as public domain/publicly available, fundamental research, and technology/technical data we cannot

appropriately analyze the proposed rules under consideration as part of the export reform initiative.

AUECO recommends that the proposed harmonized definitions be released prior to the release of any further proposed revisions and/or final rules to the USML. We would further ask that the export community be provided the opportunity to comment not only on the proposed definitions once released, but also on previously closed proposed regulatory changes when the proposed definition may impact the interpretation and/or implementation of the rule, whether proposed or final.

### In Conclusion

AUECO thanks DDTC for its proposed steps to remove some satellites and spacecraft from the USML; this will enable a great deal of space-related educational and research activities to be conducted at United States accredited institutions of higher learning without intersection with ITAR defense articles and defense services. However, we request that DDTC reconsider some Category XV satellites and spacecraft proposed to remain on the USML, and to reevaluate the “defense service” definition in light of its potential negative impact on fundamental research at institutions of higher learning.

Sincerely,



Kelly Hochstetler  
Chair  
Association of University Export Control Officers  
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<sup>i</sup> In note to paragraph (a)(2): “Integration” means the systems engineering design process of uniting two or more items in order to form, coordinate, or blend into a functioning or unified whole, including introduction of software to enable proper operation of the article. This includes determining where to integrate an item (e.g., integration of a civil engine into a destroyer which requires changes or modifications to the destroyer in order for the civil engine to operate properly; not plug and play). “Integration” is distinct from “installation,” which means the act of putting something in its place and does not require changes or modifications to the item in which it is being installed (e.g., installing a dashboard radio into a military vehicle where no changes or modifications to the vehicle are required).”



## COMMENTS OF THE SATELLITE INDUSTRY ASSOCIATION TO THE DEPARTMENT OF STATE REGARDING THE REVISION OF U.S. MUNITIONS LIST CATEGORY XV AND DEFINITION OF “DEFENSE SERVICE”

The Satellite Industry Association (SIA), on behalf of its member companies,<sup>1</sup> hereby files its comments in response to the U.S. Department of State proposed rule concerning revisions to Category XV (Spacecraft Systems and Related Articles) of the U.S. Munitions List (USML) and the revision of the definition of “defense service.”<sup>2</sup> SIA is a U.S.-based trade association providing worldwide representation of the leading satellite operators, service providers, manufacturers, launch services providers, and ground equipment suppliers. Since its creation more than eighteen years ago, SIA has advocated for the unified voice of the U.S. satellite industry on policy, regulatory, and legislative issues affecting the satellite business.

SIA applauds the Administration’s comprehensive proposal to right-size the rules that govern exports of satellites and their parts and components. SIA has long supported rigorous, effective, predictable, and transparent U.S. export control policies and practices, and is pleased to see reform brought to a system that has had the unforeseen consequence of disadvantaging U.S. spacecraft and component manufacturers in the global marketplace. We support U.S. space leadership and competitiveness as a key national security objective, and we look forward to the speedy

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<sup>1</sup> SIA Executive Members include: Artel, LLC; The Boeing Company; The DIRECTV Group; EchoStar Satellite Services LLC; Harris CapRock Communications; Hughes Network Systems, LLC; Intelsat S.A.; Iridium Communications Inc.; Kratos Defense & Security Solutions; LightSquared; Lockheed Martin Corporation.; Northrop Grumman Corporation; Rockwell Collins Government Systems; SES Americom, Inc.; and SSL. SIA Associate Members include: AIS Engineering, Inc.; Astrium Services Government, Inc.; ATK Inc.; Cisco; Cobham SATCOM Land Systems; Comtech EF Data Corp.; DRS Technologies, Inc.; Encompass Government Solutions; Eutelsat, Inc.; Globecom Systems, Inc.; Inmarsat, Inc.; IIT Exelis; Marshall Communications Corporation.; MTN Government Services; NewSat America, Inc.; O3b Networks; Orbital Sciences Corporation; Panasonic Avionics Corporation; Spacecom, Ltd.; Row 44; Spacenet Inc.; TeleCommunication Systems, Inc.; Telesat Canada; The SI Organization, Inc.; TrustComm, Inc.; Ultisat, Inc.; ViaSat, Inc., and XTAR, LLC. Additional information about SIA can be found at <http://www.sia.org>.

<sup>2</sup> See Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service,” Proposed Rule, 78 Fed. Reg. 31,444-31,451 (May 24, 2013) (to be codified at 22 C.F.R. pts. 120, 121, and 124).

implementation of new regulations that will aid the competitiveness and health of the U.S. space industrial base.

According to SIA's 2013 State of the Satellite Industry Report<sup>3</sup>, global satellite manufacturing revenues reached \$14.6 billion in 2012. The U.S. market share as measured by revenues was 56 percent in 2012, and has fluctuated between 30 percent and 60 percent over the past 5 years. It is notable, however, that 61 percent of U.S. satellite manufacturing revenues was derived from U.S. government business, and thus the 60 percent overall market share figure does not necessarily indicate U.S. companies' ability to win contracts open to international competition. The SIA State of the Satellite Industry Report also speaks to other indicators that help characterize the health of the U.S. space industrial base. As prior iterations of the report have documented<sup>4</sup>, U.S. private sector satellite manufacturing employment peaked in 2006 at 32,368, but by the third quarter of 2012 had fallen to 24,274, a decline of 25 percent. The aggregate downward trend in overall satellite manufacturing employment is consistent with widespread anecdotal indications that U.S. space manufacturing companies have been going out of business, ceasing or reducing production runs of space-qualified products, or otherwise exiting the market. SIA and its members look to reform of the U.S. export control framework for satellites and related items as a crucial action in support of the entire satellite industry. Reform will provide particular value to companies in the space supply chain that will no longer be shut out of major European and allied markets due to the actual complications and stigma associated with the International Traffic in Arms Regulations (ITAR).

SIA strongly supports and welcomes the proposals made by the Department of State to reform USML Category XV. The proposed rules represent a substantial improvement over the existing export control system for satellites and related items. After undertaking a thorough review of the proposed rules, SIA has identified several areas in which modifications would enhance the regulations' focus on the technologies of greatest concern, provide additional clarity, and enhance the intended benefits of reform for the U.S. satellite sector and overall U.S. space industrial base.

SIA urges the Department to ensure that the revised export control system for satellites and related items does not establish a "double licensing" requirement for certain items, where both a Commerce Department and a State Department license would be required for export. (We discuss one exception to this general principle below, in our comments on hosted payloads in the technical discussion.) In general, "double licensing" requirements run contrary to the goal of streamlining and simplifying the

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<sup>3</sup> See Satellite Industry Association, 2013 State of the Satellite Industry Report, June 2013, [http://www.sia.org/wp-content/uploads/2013/06/2013\\_SSIR\\_Final.pdf](http://www.sia.org/wp-content/uploads/2013/06/2013_SSIR_Final.pdf).

<sup>4</sup> State of the Satellite Industry Reports from previous years are available at: <http://www.sia.org/state-of-the-satellite-industry-report/>.

existing export control system. One step that would help avoid the establishment of a “double licensing” requirement would be to clarify the application of the see-through rule to items listed under the revised USML Category XV. As described in the technical discussion in greater detail, there are several paragraphs within Category XV which, depending on their interpretations, may capture components that are frequently incorporated into satellites proposed for control under Commerce Control List (CCL) Export Control Classification Number (ECCN) 9A515. Clarification on how the see-through rule would apply in cases such as these would help reduce confusion within the commercial satellite industry while also easing the burden placed on licensing officers in the Departments of State and Commerce.

While the proposed Category XV(x) would also help avoid a “double licensing” requirement in some instances, U.S. manufacturers may still be exposed to double licensing because the purchase documentation requirement for this paragraph is unlikely to be satisfied by standard satellite purchase documentation. Satellites primarily controlled under the Export Administration Regulations (EAR) but which incorporate some USML-controlled components are unlikely to have the latter components specifically listed in the purchase order. Therefore, SIA recommends creating a note that provides for Commerce Department control of USML-controlled components that are incorporated into completed spacecraft prior to export.

SIA notes that there is precedent for accommodating this request. For a period of time in the 1990s, when commercial communications satellites were controlled under paragraph .a of CCL ECCN 9A004, there was a technical note to this paragraph that clarified the application of the see-through rule with respect to CCL-controlled satellites which incorporated USML-controlled components. The note stated that:

“Commercial communications satellites are subject to Commerce licensing jurisdiction even if they include the individual munitions list systems, components, or parts identified in Category XV(f) of the USML. In all other cases, these systems, components, or parts remain on the USML...”<sup>5</sup>

SIA believes that components integrated into completed spacecraft prior to export pose little or no national security risk independent of the spacecraft itself. Individual components cannot easily be accessed once integrated into spacecraft, and when these spacecraft are physically exported, they are destined for a launch site. This requires a USML license, as well as the special export controls designed specifically for this type of defense service. Therefore, SIA believes that the re-establishment of such a technical note with respect to specific items listed under paragraph (e) of USML Category XV,

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<sup>5</sup> Commercial Communications Satellites and Hot Section Technology for the Development, Production or Overhaul of Commercial Aircraft Engines, 61 Fed. Reg. 54,540-54,544 (Oct. 21, 1996) (to be codified at 15 C.F.R. pt. 774).

CCL ECCN 9A515, or both, would be a clear and simple way of addressing the issue of double licensing that would not pose a national security risk.

SIA also strongly recommends the codification of the USML licensing practice or policy by which a satellite manufacturer or operator could obtain a single cradle-to-grave program license that would cover all manufacturer-client interactions, beginning with marketing and sales activities and including contract discussions, delivery negotiations, and on-orbit support. Even if a separate license for launch services would also be required, a single license covering all other activities would be invaluable.

In addition to these general concerns, SIA also offers the following edits, comments, and requests for clarification on the proposed rule in order to ensure that the future regulatory environment is as clear and effective as possible. The proposals from the Federal Register notice have been reproduced in the indented, italicized paragraphs, with SIA's comments in the subsequent paragraph(s). Where applicable, SIA's recommended edits to the proposed rule are depicted in red within the italicized paragraphs, with a justification for these recommendations included in the subsequent paragraph(s).

## Technical Discussion

### **PART 120 – PURPOSE AND DEFINITIONS**

#### **§ 120.9 Defense service.**

*Paragraph (a)(2) “The furnishing of assistance to a foreign person, whether in the United States or abroad, for the integration of any item controlled on the U.S. Munitions List (USML) (see §121.1 of this subchapter) or items subject to the EAR (see §120.42 of this subchapter) into an end item (see §121.8(a) of this subchapter) or component (see §121.8(b) of this subchapter) that is controlled as a defense article on the USML, regardless of the origin;*

*Note to paragraph (a)(2): “Integration” means the systems engineering design process of uniting two or more items in order to form, coordinate, or blend into a functioning or unified whole, including introduction of software to enable proper operation of the article. This includes determining where to integrate an item (e.g., integration of a civil engine into a destroyer which requires changes or modifications to the destroyer in order for the civil engine to operate properly; not plug and play). “Integration” is distinct from “installation,” which means the act of putting something in its place and does not require changes or modifications to the item in which it is being installed (e.g., installing a dashboard radio into a military vehicle where no changes or modifications to the vehicle are required).*

Clarification on the status of EAR items that are integrated into USML components or end items would be helpful. The draft language is unclear about whether such items lose their EAR designation entirely and indefinitely, or if the definition of a “defense service” under this paragraph is specific and limited to the integration process. For example, if an EAR-controlled communications payload is being tested after it has been integrated onto a USML-controlled man-rated spacecraft, is the testing data from the communications payload now ITAR-controlled? And in the event that further discussions with the manufacturer of the EAR item were required, would a USML TAA be required?

Additionally, the note to paragraph (a)(2) defines and differentiates between the terms “integration” and “installation.” It would be helpful to know if these definitions apply to other paragraphs in section 120.9, including specifically paragraph (a)(5).

*Paragraph (a)(5) “The furnishing of assistance (including training) to a foreign person in the integration of a satellite or spacecraft to a launch vehicle, including both planning (excluding discussions or negotiations on the definition or terms of the launch service to be provided) and onsite support, regardless of the jurisdiction of, the ownership of, or the origin of the satellite or spacecraft, or whether technical data is used”*

SIA suggests editing this paragraph so that it more accurately reflects standard industry practices. When satellite operators procure launch services, they typically do not provide technical specifications, but rather only specify their delivery requirements (e.g., deliver the satellite to a specified orbital location by a specified date and time). The Department should consider adding a note or caveat to paragraph (a)(5) to specifically exclude contract negotiations from the definition of planning, as suggested above. SIA also recommends the insertion of the phrase “to a foreign person,” similar to its inclusion in section 120.9 paragraph (a)(2) of the ITAR, to make clear that only launch integration services provided to foreign persons are considered to be defense services exports.

Additionally, some aspects of this paragraph are unclear. Would the spacecraft data required by the launch vehicle manufacturer for their pre-launch analyses still be considered to be regulated under the EAR? Furthermore, in practice, if such spacecraft data retains its CCL classification, would a single TAA issued by the Department of State cover both the USML-classified assistance and the EAR-classified data? If so, and EAR-classified data is exported under a USML TAA, would it still retain its EAR classification? Finally, would such a pre-launch transaction be eligible for a single license under paragraph (x) of USML Category XV?

*Paragraph (a)(6) “The furnishing of assistance (including training) to a foreign person in the launch failure analysis of a satellite, spacecraft, or launch vehicle, regardless of the jurisdiction of, the ownership of, or the origin of the satellite, spacecraft, or launch vehicle, or whether technical data is used”*

SIA recommends that this paragraph be amended to insert the phrase “to a foreign person,” similar to its inclusion in section 120.9 paragraph (a)(2) of the ITAR, to make clear that only launch failure analysis services provided to foreign persons are considered to be defense services exports.

Additionally, a definition of the term “launch failure analysis” would help to clarify this paragraph. A variety of unplanned events can occur during satellite launches, including pre-separation rocket anomalies, post-separation operational issues due to the launch environment, and the complete and catastrophic destruction of both the launch vehicle and its payload. Are all of these events included in the definition of “launch failure analysis,” or only a subset of them? Clarification on this point would be extremely helpful.

*Paragraph (b)(3) “Servicing of an item subject to the EAR (see §120.42 of this subchapter) that has been integrated or installed into a defense article”*

A definition of the term “servicing,” and a description of the difference between activities falling under paragraph (b)(3) that are not defense services and activities

governed by paragraph (a)(2) that are defense services, would add significant clarity to this paragraph.

**§ 121.1 General. The United States Munitions List.**

**Category XV – Spacecraft Systems and Related Articles**

*Paragraph \*(a)(2) “Track ground, airborne, missile, or man-made space objects using Earth-facing imaging, infrared, radar, or laser systems”*

SIA recommends the inclusion of additional language to clarify the term “space objects” (such as the phrase “man-made,” as suggested above). This qualification would exclude astronomical or celestial objects such as stars or near-Earth objects (NEOs) from the definition of “space objects.” Such objects are routinely tracked by a variety of civil and/or scientific instruments. Numerous scientific exchanges with little national security impact could be impeded if the data from these spacecraft were to be controlled on the USML by virtue of controls placed on the spacecraft themselves. SIA does not believe that such spacecraft are considered to be sensitive from a national security standpoint, and therefore they should not be retained on the USML.

An alternative or supplemental approach would be to insert a qualifying phrase such as “Earth-facing” prior to the phrase “imaging, infrared, radar, or laser systems.” Spacecraft designed to track celestial objects or NEOs would have their tracking systems located on a different side of the spacecraft bus from the communications link used to control the spacecraft (because the tracking payload would be facing away from Earth, towards its intended subjects, whereas the command link transmit/receive terminal would be facing toward Earth in order to communicate with its associated Satellite Operations Center[s]). SIA believes that the insertion of one or both of these qualifications would provide sufficient clarity to differentiate the jurisdiction of militarily-sensitive tracking satellites from those designed for scientific purposes.

SIA also believes that a note excluding spacecraft specially designed to dock with and bring cargo to the ISS from control under paragraph (a)(2) will need to be created in order to avoid overlap with CCL ECCN 9A004. See SIA’s comments on paragraph (a)(11) for a more detailed description of this proposal.

*Paragraph (a)(4): “Provide space-based logistics, assembly or servicing of any spacecraft (e.g., refueling)”*

SIA is unclear on the rationale for the control of these spacecraft, and on the type of capabilities intended for control. Definitions of the terms “logistics,” “assembly,” and “servicing” would be helpful, as they could potentially include a wide variety of activities. While some of the technology required to effectively perform missions that

would meet these definitions may have military applications, there are also numerous civilian applications for these technologies. As such, the technologies with clear dual-use applications, such as space-based servicing or refueling, should be considered for control on the CCL, with appropriate restrictions.

In general, SIA members' interests in this technology are not based on a business model by which spacecraft with space-based logistics capabilities would be sold to international customers, who would then employ these spacecraft more or less independently from the U.S. spacecraft manufacturer. Rather, SIA members intend to manufacture, launch, and operate space-based logistics spacecraft, and offer the on-orbit capabilities that they could provide as a service that would be purchased by spacecraft operators. Under this business model, the control of the space-based logistics vehicle would not be transferred to any third party. However, the provision of services using such a vehicle would require the real-time sharing of telemetry data between the U.S. space-based logistics provider's satellite operations center (SOC) and the customer's SOC, and the export licensing jurisdiction of this data is a major concern of SIA members.

There is a sizable addressable commercial market for space-based logistical services. There are approximately 380 satellites operating in geosynchronous orbit alone, about 260 of which are commercial communications spacecraft. In most cases, the limiting factor that determines the operational lifetime of such satellites is their supply of attitude control and station-keeping fuel. Therefore, the potential for on-orbit docking for the purposes of servicing (including inspection, repair, and/or refueling) is of substantial interest to the U.S. and international commercial satellite industries.

To ensure the control of sensitive technology, the components of greatest national security concern could be made subject to ITAR control by listing them in paragraph (e) of USML Category XV. Candidate technologies for strict control could include the sensors and thrusters that would have to be used to accomplish the close-approach, rendezvous, and docking portions of a servicing mission.

Additionally, SIA recommends the insertion of a clarifying note on the jurisdiction of activities intended to demonstrate these technologies that have been carried out on the International Space Station (ISS), such as NASA's refueling and servicing demonstrations. Clarification that data and services related to ISS demonstrations remain subject to EAR jurisdiction would be helpful.

*Paragraph \*(a)(7) "Have any of the following electrooptical remote sensing capabilities or characteristics:*

*(i) Electro-optical visible and near infrared (VNIR) (i.e., 400nm to 1,000nm) or infrared (i.e., greater than 1,000nm to*

30,000nm) with less than 40 spectral bands having an aperture greater than ~~0.35~~[0.70 < x < 1.1] meters;

(ii) Electro-optical hyperspectral with 40 spectral bands or more in the VNIR, short-wavelength infrared (SWIR) (i.e., greater than 1,000nm to 2,500nm) or any combination of the aforementioned and having a Ground Sample Distance (GSD) less than 30 meters;

(iii) Electro-optical hyperspectral with 40 spectral bands or more in the midwavelength infrared (MWIR) (i.e., greater than 2,500nm to 5,500nm) having a narrow spectral bandwidth of  $\Delta\lambda$  less than or equal to 20nm full width at half maximum (FWHM) or having a wide spectral bandwidth with  $\Delta\lambda$  greater than 20nm FWHM and a GSD less than 200 meters; or

(iv) Electro-optical hyperspectral with 40 spectral bands or more in the longwavelength infrared (LWIR) (i.e., greater than 5,500nm to 30,000nm) having a narrow spectral bandwidth of  $\Delta\lambda$  less than or equal to 50nm FWHM or having a wide spectral bandwidth with  $\Delta\lambda$  greater than 50nm FWHM and a GSD less than 500 meters;

**Note 1 to paragraph (a)(7):** Ground Sample Distance (GSD) is measured from a spacecraft's nadir (i.e., local vertical) position.

**Note 2 to paragraph (a)(7):** Optical remote sensing spacecraft or satellite spectral bandwidth is the smallest difference in wavelength (i.e.,  $\Delta\lambda$ ) that can be distinguished at full width at half maximum (FWHM) of wavelength  $\lambda$ .

**Note 3 to paragraph (a)(7):** An optical satellite or spacecraft is not SME if non-earth pointing."

Paragraph (e)(2) "“Space-qualified” optics (i.e., lens or mirror), including optical coating, having active properties (e.g., adaptive or deformable), or having a largest lateral dimension of the clear aperture greater than ~~0.35~~[0.70 < x < 1.1] meters"

SIA proposes changes to the minimum aperture size of electrooptical satellites subject to ITAR control. We believe that a higher threshold of between 0.7 and 1.1 meters is more appropriate than the specified threshold of 0.35 meters, and that these thresholds should apply to both paragraph (a)(7)(i) and paragraph (e)(2) – our comments on both paragraphs are consolidated here because they share a common rationale.

The proposed aperture size threshold of 0.35 meters does not reflect the current market for earth observation (EO) satellites. The first U.S. commercial EO satellite system, IKONOS, had a telescope aperture of 0.70 meters, and was developed in the mid-1990's. Today's U.S. commercial EO satellites have a much greater aperture size of 1.1 meters. Therefore, moving systems with apertures of 0.70 or less – the level of technology available in the mid-1990s – to the CCL would enhance the competitiveness of U.S. firms in international markets. In addition, as demonstrated by Figure 1, this level of remote sensing technology is already widely available to international customers from four non-U.S. manufacturers. Transferring commercial EO satellites with apertures

between 0.35 and 0.70 to the CCL would not result in any qualitative change to the capabilities available on the international market.

<b>Figure 1. Open Source International EO Satellite Systems with Aperture 0.65m or Greater</b>				
<b>Country</b>	<b>System</b>	<b>Aperture (m)</b>	<b>Launch</b>	<b>Optics Company/Organization</b>
India	CartoSat-2A	0.70	2007	Indian Space Research Organisation (ISRO)
India	CartoSat-2B	0.70	2010	Indian Space Research Organisation (ISRO)
France	Pleiades-1A	0.65	2011	Thales Alenia Space
France	Pleiades-1B	0.65	2012	Thales Alenia Space
Korea	Kompsat-3	0.72	2012	Thales Alenia Space
Israel	Ofeq 10	0.70	2013	Elbit Systems Electro-Optic (Elop)
Turkey	Gokturk-1	0.65 (est.) <sup>6</sup>	2013	Thales Alenia Space
Japan	ASNARO-1	0.70	2013	NEC Corporation

Additionally, SIA observes that the selection of this technical threshold entails a tradeoff between two national security concerns. Selecting an aperture size at the lower range of what is currently available internationally would help protect U.S. remote sensing technology, but at the expense of U.S. competitiveness and the health of the remote sensing industrial base. As foreign remote sensing satellite manufacturing capabilities continue to improve, the U.S. EO technology available through a Commerce license will gradually become obsolete in comparison, which would in turn place negative pressure on U.S. competitiveness in this area. If, on the other hand, an aperture size on the higher end of our proposed range were selected, U.S. competitiveness would be enhanced for the foreseeable future. However, this would obviously entail making U.S. EO satellites with larger aperture sizes more available on the international market. Ultimately, SIA believes that it is the purview of the U.S. government to select an aperture size that appropriately balances these competing concerns. In our view, an aperture size of between 0.7 and 1.1 meters would be appropriate.

<sup>6</sup> Estimate of 0.65 meters is based on open source reporting that the Gokturk-1 imager is similar to the imagers on Pleiades-1A and Pleiades-1B. See Peter de Selding, "Thales Alenia Begins Work on Turkish Sat," *Space News*, September 7, 2010. Available at <http://www.spacenews.com/article/thales-alenia-begins-work-turkish-sat-0#.UdGsmW3y2So>.

SIA also requests clarification on the jurisdiction of certain non-earth pointing hyperspectral scientific satellites. Because non-earth pointing satellites do not have a GSD parameter, if they fall outside the other thresholds specified in the paragraph, one might conclude that they would be subject to EAR control. For example, would a non-earth pointing spacecraft with an electro-optical hyperspectral sensor with 50 spectral bands or more in the midwavelength infrared (MWIR) (*i.e.*, greater than 2,500nm to 5,500nm) and a wide spectral bandwidth with  $\Delta\lambda$  greater than 20nm FWHM be controlled under paragraph (a)(7)(iii), given that it does not meet the definition of having both a wide spectral bandwidth and the specified GSD parameter? Clarification on this point would be helpful, as it would more clearly establish the jurisdiction of certain scientific satellites.

Finally, with respect to paragraph (e)(2), SIA recommends the insertion of quotation marks around the term “space-qualified” to provide consistency with other paragraphs, and to reference the definition of this term applicable to paragraph (e). We also recommend that the aperture size limit be applied to an optic’s clear aperture. Optics are typically manufactured to a larger diameter than the useful clear aperture of the finished satellite, and it is the latter technical parameter that is relevant to the satellite’s performance.

*Paragraph (a)(9) “Provide Positioning, Navigation, and Timing (PNT)*

*Note to paragraph (a)(9): This paragraph does not control a satellite or spacecraft that provides only a differential correction broadcast for the purposes of positioning, navigation, or timing.”*

SIA requests clarification on the jurisdiction of satellites with payloads designed to supplement the signals produced by other satellite-based or terrestrial navigation systems for specific geographic areas or terrestrial applications. Examples of such satellites include Japan’s Quazi-Zenith Satellite System, which augments the signals transmitted by the U.S. GPS system for reception by Japanese users.

*Paragraph (a)(11) “Are man-rated sub-orbital, orbital, lunar, interplanetary or habitat, other than the International Space Station, or spacecraft which are specially designed to dock with and bring cargo to the International Space Station”*

SIA proposes the addition of qualifying language to paragraph (a)(11) that specifically excludes the International Space Station (ISS) or spacecraft specially designed to dock with and bring cargo to the ISS. The ISS is currently controlled under CCL ECCN 9A004, and a failure to specifically exclude it here would create unnecessary confusion as to the export control jurisdiction of the ISS. SIA notes that creating an exemption for spacecraft specially designed to dock with and bring cargo to the ISS may require creating a corresponding exemption to paragraph (a)(2). Specifically, the language in

that paragraph that makes spacecraft that track “space objects” subject to the ITAR would likely capture spacecraft designed to dock with and bring cargo to the ISS unless a specific carve-out is incorporated, as such spacecraft will necessarily have the ability to track the space station with which they are designed to dock.

SIA is also unclear about the definition of “man-rated,” and the rationale for controlling these spacecraft on the USML. A craft can be man-rated (for example, to allow it to dock with the ISS) without having the ability to transport humans through space. Is the term “man-rated” intended to include craft capable of transporting humans only, or the broader definition? SIA believes that regardless of which interpretation of the term “man-rated” is intended to apply to this paragraph, the term itself is overly broad. Man-rated spacecraft may employ atmospheric re-entry technology and make use of propulsion technology that may also be applicable to ballistic missile re-entry vehicles and co-orbital anti-satellite weapons, respectively. Enumerating this re-entry and thruster technology under paragraph (e) of USML Category XV would more clearly focus these regulations on the technologies of concern, while allowing less sensitive subsystems, such as those related to life support systems (e.g., atmospheric control systems and radiation shielding), to be controlled on the CCL. This refinement would result in a more focused and tailored approach to the control of “man-rated” technology and components.

*Paragraph \*(a)(12) “Are classified, contain classified software or hardware, are manufactured using classified production data, or are being developed using classified information (e.g., having classified requirements, specifications, functions, or operational characteristics or include classified cryptographic items controlled under USML Category XIII of this subchapter). “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 international organization.”*

*Paragraph \*(e)(20) “Any part, component, accessory, attachment, equipment, or system that:*

- (i) is classified;*
- (ii) Contains classified software; or*
- (iii) 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 or international organization.”*

SIA is very concerned about the possible applicability of the language in paragraphs (a)(12) and (e)(20) to NSA-approved, releasable telemetry, tracking, and control (TT&C) encryption technology. Our comments on both paragraphs are consolidated here

because they share a common rationale. The satisfactory clarification of these provisions is one of SIA's highest priorities.

The U.S. Department of Defense (DoD) purchases satellite bandwidth and satellite-based communications services worth hundreds of millions of dollars annually from commercial satellite operators and satellite service providers. The Department imposes numerous requirements on these vendors of satellite capacity and services that compete for these contracts that must be met or waived prior to contract execution. One common requirement is that the spacecraft providing the bandwidth that supports communications services to DoD users must be controlled in space using encrypted TT&C devices. This protection feature is also being requested increasingly by the commercial customer community. Numerous commercial enterprise customers of commercial satellite operators and service providers are developing requirements for increased information assurance capabilities on the satellites which carry their communications traffic. These enterprise customers include banks and retail networks that use satellite communications networks to carry financial transaction data.

This trend is one that the Department of Defense should view favorably because of its relative size in the marketplace. SIA estimates that the DoD as a customer contributes well under ten percent of the global revenues earned by the satellite services sector. While DoD requirements have some ability to affect spacecraft technology investment decisions, the perceived need to incorporate encrypted TT&C onto commercial communications spacecraft is much stronger when additional commercial customers also have similar requirements. In contrast to DoD users, private sector customers of the satellite industry have historically exchanged their detailed technical requirements with satellite operators during the satellite design phase, making their preferences more influential and more easily accommodated when satellite operators make decisions about telemetry encryption.

SIA is concerned that if paragraph (a)(12) and/or paragraph (e)(20) restricts the availability of the TT&C devices required by commercial satellite operators to meet the requirements of the DoD and enterprise customers, these rules may have the unintended consequence of reducing the number of eligible providers or reducing the security embedded into satellites carrying sensitive national security or financial communications traffic.

SIA strongly recommends the insertion of notes to paragraph (a)(12) and to paragraph (e)(20) specifying that if a spacecraft includes a component with some classified element, but the component has been approved for release to the commercial industry by the relevant government agency, it is not controlled by these paragraphs. Alternatively, the notes could specify that if a TT&C encryption device using classified technology is integrated into a completed spacecraft that is otherwise subject to the CCL prior to its export, the spacecraft remains subject to the CCL after the inclusion of this

technology (see SIA's comments on the "double licensing" issue in the introductory section for one possible way of implementing this suggestion).

*(c) Global Positioning System (GPS) receiving equipment specifically designed, modified, or configured for military use; or GPS receiving equipment with any of the following characteristics:*

- (1) Designed for encryption or decryption (e.g., Y-Code) of GPS precise positioning service (PPS) signals;*
- (2) Designed for producing navigation results above 60,000 feet altitude and at 1,000 knots velocity or greater;*
- (3) Specifically designed or modified for use with a null steering antenna or including a null steering antenna designed to reduce or avoid jamming signals;*
- (4) Designed or modified for use with unmanned air vehicle systems capable of delivering at least a 500 kg "payload" to a "range" of at least 300 km.*

SIA recommends the insertion of a note to paragraph (c)(2) excluding from ITAR control standard GPS receivers that are integrated into spacecraft designed to operate in low earth orbit (LEO) and not otherwise on the USML by virtue of paragraph (a). Alternatively, SIA recommends establishing an exemption to the see-through rule for LEO spacecraft with integrated GPS receivers. Nearly all LEO spacecraft (including science spacecraft, commercial communications spacecraft, and smaller cubesats and nanosats) contain a GPS receiver. This requirement could therefore require substantial changes in the manufacture and operation of all spacecraft operating in LEO. Because roughly half of all operational spacecraft are in low earth orbit, this proposal could have a significant and unintended impact on manufacturers and operators of LEO spacecraft. There are also emerging commercial applications for GPS receivers for GEO or GEO transfer orbit mission profiles. Additionally, the rationale for the inclusion of paragraph (c)(2) is unclear. SIA believes that paragraphs (c)(1), (c)(3), and (c)(4) are sufficient to protect the GPS technology that is most important to U.S. national security.

*Paragraph (e)(1) "Antennas as follows:*

- (i) Having ~~a diameter~~with an apparent circular aperture greater than 25 meters in diameter;*
- (ii) ~~Are actively scanned~~Employing an Active Electronically Scanned Array (AESA);*
- (iii) Are adaptive beam forming; or*
- (iv) Are for interferometric radar"*

SIA suggests a technical edit to paragraph (e)(1)(i) to clarify the precise technical parameter to which the 25 meter threshold applies. Large space-based antenna reflectors are typically elliptical, not circular. Thus, they have two diameters to which this specification could apply - the diameter along the major axis and the diameter along the minor axis. The specification in the proposed rule implies that if *either* the

major or minor axes of an antenna is greater than 25 meters in diameter, the antenna is subject to the ITAR. However, when deployed for use, large antenna reflectors are tilted along their minor axes such that the apparent diameters of the major and minor axes are the same. Because antennas of this type are tilted to reduce the effective diameter of their major axes, the technical parameter that controls their performance is the antenna's minor diameter. Hence, the phrase "apparent circular aperture" more precisely captures the parameter of technical concern than the term "diameter."

Additionally, SIA proposes replacing the phrase "Are actively scanned" in paragraph (e)(1)(ii) with the phrase "Employing an Active Electronically Scanned Array (AESA)", so as to bring the definition in the proposed rule into alignment with the technical term that is most widely used by industry and government radar experts.

Finally, it is unclear whether the language in paragraph (e)(1)(iii) is intended to control reconfigurable antennas or antennas with ground-based adaptive beam forming capabilities on the USML. These technologies have a different level of technological sensitivity, and therefore should be considered for differentiated regulatory treatment – either through a more precise definition that specifically excludes ground-based adaptive beam-forming from the USML, or through a note to paragraph (e)(1)(iii) specifically identifying ground-based beam-forming as being subject to EAR control. SIA notes that the Administration has previously received a commodity jurisdiction request with respect to ground-based beam forming technology, and issued a determination that it is subject to EAR control. Therefore, exempting ground-based beam-forming technology from USML control would reaffirm and codify existing policy.

Paragraph (e)(3) "~~Space-qualified~~ focal plane arrays (FPA) capable of >100 kRad (Si) operation and having either:

(i) a peak response in the wavelength range exceeding 900nm and greater than  $4 \times 10^6$  pixels; or

(ii) a peak response in the wavelength range exceeding 5000 nm; and readout integrated circuits (ROICs) specially designed therefor"

SIA recommends that this paragraph be modified to include a radiation hardness limit rather than the generic term "space-qualified," and that the technical thresholds be altered to track more closely with the level of technology that is available internationally. Focal plan arrays (FPAs) with peak responses in the 1000 to 5000 nm spectral range are available from several non-U.S. suppliers. However, the key technological capability where U.S. suppliers have a clear lead is in manufacturing highly sensitive, large format FPAs (*i.e.*, those greater than 2048 x 2048 pixels) with high frame rates. Figure 2 demonstrates that while FPAs with a peak response in the wavelength range above 5000 nm are currently available from three foreign suppliers, none of the three currently offer large format FPAs in this spectral range.

**Figure 2. International Availability of Focal Plan Arrays With Peak Response Above 5000 nm**

Vendor	Country	Largest IR focal plane array ( $\lambda_c \geq 5\mu\text{m}$ )
Sofradir	France	2048 x 1024, "Jupiter MW"
IAM	Germany	640 x 512 MW, 1024 x 256 SW
Semiconductor Devices	Israel	1920 x 1536 pixels, "Blackbird", MW

Establishing a technical threshold that falls substantially short of what is generally considered to be the "baseline" capability would make it difficult for U.S. manufacturers to talk to foreign suppliers about the performance of their components, for example during source selection. Because technical exchanges regarding smaller format or a lower spectral range would not involve sensitive U.S. technology, the proposed rule should be adjusted to focus on the FPA technology that is technologically significant and differentiated from that available internationally.

*Paragraph (e)(4) "Space-qualified" mechanical cryocooler, active cold finger, and associated control electronics specially designed for spacecraft listed in paragraph (a) of this categorytherefor;*

SIA recommends adding qualifying language to paragraph (e)(4) to focus the control of cryocooler components on the technology of greatest concern. Space-qualified mechanical cryocoolers are currently available from suppliers located in the following countries: China, France, Germany, Japan, Russia, and the United Kingdom. These components are frequently used for the thermal control of scientific and meteorological satellites that are not otherwise proposed for control on the USML. Therefore, because this technology is not exclusive to the United States and is dual-use, it should be treated as such – with specific military applications subject to the ITAR and dual-use applications subject to the EAR.

*Paragraph (e)(5) " "Space-qualified" active vibration suppression, including isolation and dampening, and associated control electronics therefor;"*

It is unclear from the language in paragraph (e)(5) what types of vibration suppression systems are intended to be controlled under this paragraph. For example, the integration of a hosted payload onto its host satellite typically requires the installation of a system to account for any payload vibration, and it is unclear whether systems of this sort are intended to be subject to ITAR control. If the intent of this paragraph is to

control active vibration suppression for a specific type of payload, such as optical or other remote sensing payloads, these should be specifically listed.

*Paragraph (e)(6) "Optical bench assemblies specially designed for items in paragraph (a) of this category to include and the multi-aperture assemblies; fast steering mirrors assemblies (i.e., greater than 300 rad/sec<sup>2</sup> acceleration), pushbroom assemblies, flexure mounts, beam splitters, mirror folds, focus or channeling mechanisms, alignment mechanisms, inertial reference unit (IRU), black body cavities, baffles and covers, and control electronics specially designed therefor"*

SIA recommends the addition of the qualifying phrase "specially designed" to limit the scope of this paragraph to only those components specific to satellites listed in paragraph (a). Without such a limitation, the exact same component could be ITAR-controlled for one project and EAR-controlled for another project, which would cause major compliance issues, for example in determining who can have access to and how to store data related to a component that is subject to different regulatory regimes at different times. The technical parameters set for other technologies controlled in Category XV do not necessarily require different bench assemblies or housings, so it is likely that without further adjustment, manufacturers of the components covered by this paragraph will have to choose between limiting their sales to either EAR- or ITAR-controlled satellites, or managing a compliance program that has different requirements at different times for the same product.

SIA also recommends adding additional clarifying language to paragraph (e)(6). Flexure mounts are used for both space and ground telescopes, and therefore should not be included in this paragraph unless some qualification is added. "Fast steering mirrors," "beam splitters," and "mirror folds" are optical components covered by XV(e)(2) and should not be listed under this paragraph. Listing the same components in both paragraphs would create redundant controls, which would be confusing and unnecessary.

Additionally, the term "Optical bench assemblies" should be defined, because it is used in the commercial industry to refer to a variety of items (including both telescopes and internal support structures within them) with drastically different levels of technological sensitivity. It is unclear if this paragraph is intended to capture telescopes, specific bench assemblies within a telescope, or some combination of both. Additionally, it is not clear if the term "inertial reference unit (IRU)" includes gyros. SIA therefore recommends the insertion of a note clarifying that gyros are not included in this paragraph.

Finally, the inclusion of "covers" in this paragraph does not appear to be consistent with the Department's intent to protect technologies critical to national security and to avoid the inclusion of generic, "catch-all" terms in the USML.

*Paragraph (e)(7) “Non-communications space-qualified directed energy (e.g., lasers or RF) systems and specially designed for a spacecraft in paragraph (a) of this category”*

SIA recommends that the abbreviation “RF” be defined to provide additional clarity about the scope of paragraph (e)(7), and that power levels or other technical parameters be specified for these components. Both lasers and RF systems, however defined, can be used for both communications and offensive counterspace missions, depending on their power levels and other technical characteristics. The inclusion of technical parameters relevant to offensive counterspace missions is therefore of vital importance, to ensure that communications technology is clearly excluded from this paragraph.

Also, it is unclear whether this paragraph is intended to include space-qualified LIDAR components, which were previously excluded from paragraph (e) of USML Category XV and controlled instead by ECCN 6A998. If LIDAR components are not intended to be controlled by this paragraph, the addition of a Note to paragraph (e)(7) would add a helpful clarification and cross-reference. Additionally, it is unclear whether laser-ranging components, which are generally not considered to be sensitive and have numerous civil and scientific applications, are intended to be captured by this paragraph. Clarification on this point would also be helpful. Again, the specification of a power level would help capture components with offensive counterspace applications and exclude those components with other applications.

*Paragraph (e)(8) “~~“Space-based-qualified”~~ kinetic systems or charged particle energy systems, including power conditioning and beam-handling/switching, propagation, tracking, or pointing equipment, and specially designed parts and components therefor”*

SIA recommends using the term “space-qualified,” to take advantage of the definition of this term that is applicable to paragraph (e). If the term “space-based” was selected to intentionally differentiate the items controlled under this paragraph from “space-qualified” items, then a definition of “space-based” should be provided.

SIA also requests the addition of a note to paragraph (e)(8) clarifying that electric propulsion or ion engine systems and subsystems are not considered to be “charged particle energy systems” for the purposes of this paragraph.

*Paragraph (e)(10) “Attitude determination ~~and~~ control systems, ~~and specially designed parts and components therefor~~, that provide earth location (geo-location) accuracy without using Ground Location Points better than or equal to:*

- (i) 5 meters (Circular Error of 90%/CE90) from low earth orbit (LEO);*
- (ii) 30 meters (Circular Error of 90%/CE90) from medium earth orbit (MEO);*
- (iii) 150 meters (Circular Error of 90%/CE90) from geosynchronous orbit (GEO);*

*or*

(iv) 225 meters *(Circular Error of 90%/CE90)* from high earth orbit (HEO)”

SIA recommends editing this paragraph to clarify its scope and use terminology that is common in the commercial satellite industry. The word “geolocation” is more commonly used in the industry than the phrase “earth location” to refer to the capability to locate an object on the ground from orbit. In either case, the terms “accuracy” is unclear, as is how this parameter would be measured. Geolocation accuracy numbers are almost always specified as “Circular Error (CE)” and “Linear Error (LE).” This paragraph does not refer to either term, and thus it is not clear to which type of error it refers.

Additionally, geolocation accuracy is usually given to 90% certainty, which is roughly the same as two-sigma. However, it is sometimes given to three-sigma performance, which would result in the numerical error values being “worse” without the component having a different performance level. This issue could be addressed by inserting the parenthetical (Circular Error of 90%/CE90) after each of the distance values listed in subparagraphs i, ii, iii, and iv. Additionally, it is unclear at which point accuracy would be measured for the purposes of determining a system’s export licensing jurisdiction. There may also be differences in the actual or specified performance of an attitude determination and control system at various points during the design phase, before and after it is integrated onto a spacecraft bus, or when integrated onto different spacecraft buses. Clarification about how and when the performance of items that could be controlled under this paragraph should be measured to determine their export control jurisdiction would be helpful.

Finally, it is unclear whether this paragraph is intended to apply only to attitude determination and control systems specific to remote sensing satellites, for which there is a clear national security reason for control, or if systems for weather or navigation satellites are also intended to be controlled under this paragraph. The addition of a clarifying note on this point would be helpful in understanding the scope of this paragraph.

*Paragraph (e)(12) “Thrusters (e.g., rocket engines) that provide for orbit adjustment greater than 150 lbf (i.e., 667.23 N) vacuum thrust”*

SIA recommends editing this paragraph or inserting a note with the purpose of excluding apogee kick motors intended to move a commercial spacecraft from its geostationary transfer orbit to geostationary orbit. Most apogee kick motors exceed the specified lbf performance level threshold. Therefore, this rule could have the unintended consequence of causing a wide variety of commercial communications satellites to be retained on the USML unless the definition is changed or some kind of exception is provided. Additionally, the term “orbit adjustment” is unclear, and should be defined.

*Paragraph (e)(13) "Control moment gyroscope"*

SIA recommends modifying paragraph (e)(13) to base the jurisdiction of control for moment gyroscopes on their technical specifications (e.g., control moment gyroscopes with a torque greater than 10 Newton-meters are subject to ITAR control) or their application (e.g., subject to ITAR control only when incorporated into satellites listed in paragraph (a)). Control moment gyroscope technology has become commercialized to the point where it is sufficiently affordable and available to be incorporated into several low-cost cubesat designs. The revised USML Category XV and CCL ECCN 9x515 should therefore reflect the more widespread commercialization and dual-use applications of this technology by ensuring that some less significant control moment gyroscopes are eligible for export under a CCL license.

~~*Paragraph (e)(14) "Space-qualified" monolithic microwave integrated circuits (MMIC) that combine transmit and receive (T/R) functions on a single die as follows:*~~

~~*(i) Having a power amplifier with maximum saturated peak output power (in watts),  $P_{sat}$ , greater than 200 divided by the maximum operating frequency (in GHz) squared [ $P_{sat} > 200 \text{ W} \cdot \text{GHz}^2 / f \text{GHz}^2$ ]; or*~~

~~*(ii) Having a common path (e.g., phase shifter digital attenuator) circuit with greater than 3 bits phase shifting at operating frequencies 10 GHz or below, or greater than 4 bits phase shifting at operating frequencies above 10 GHz;*~~

SIA recommends that "space-qualified" monolithic microwave integrated circuits (MMICs) not be controlled under USML Category XV, but rather under Category XI and CCL ECCN 3A611. In general, MMICs that are integrated into spacecraft are not designed as "space-qualified" but rather "upscreened" after manufacture to ensure that they can be used for space applications. Because Note 2 to paragraph (e) specifies that for articles in a single production run or model series, only the individual items that are specifically tested for use at altitudes greater than 100 km above the Earth's surface are considered to be "space-qualified," the application of this paragraph is likely to be extremely limited, and its implementation would run counter to the goals of providing predictability and clarity.

~~*Paragraph (e)(16) "Space-qualified" star tracker or star sensor with angular accuracy less than or equal to 1 arcsec in all three axes and a tracking rate equal to or greater than 3.0 deg/sec, and specially designed parts and components therefor (MT)"*~~

It is unclear how the term "angular accuracy" would be measured so as to determine the export licensing jurisdiction of star trackers and star sensors. Angular accuracy is typically measured as a three-sigma number, but occasionally can be measured as a one-sigma number. There may also be differences in the performance ceiling of a star tracker or star sensor before and after it is integrated onto a spacecraft bus. The pairing

of the same physical component with different software packages can also affect its actual performance. Clarification about how and when the performance of star trackers and star sensors should be measured to determine their export control jurisdiction would be helpful.

*Paragraph \*(e)(17) Secondary or hosted payload, and specially designed parts and components therefor, that perform any of the functions described in paragraph (a) of this category;*

SIA requests clarification on the applicability of the see-through rule in the event that a payload controlled under paragraph (e)(17) is integrated onto a spacecraft that is otherwise subject to EAR control. If the see-through rule does apply, it would also be helpful to articulate how the value of a spacecraft with a payload controlled under this paragraph would be calculated for the purpose of determining whether Congressional notification is required. SIA's understanding is that the calculation would include only the value of the ITAR-controlled payload, rather than on the full value of the spacecraft, including the bus and primary payload in addition to the hosted payload. Based on SIA's review of the Proposed Rule, the policies for calculating the value thresholds that trigger Congressional notification have not been explicitly stated. This omission should be corrected in the final rule to provide additional clarity and certainty.

If the see-through rule does apply to hosted payloads controlled under paragraph (e)(17), and the host spacecraft would be subject to ITAR control after the integration of such a payload, SIA would note that this rule could present an unintended consequence of dis-incentivizing the incorporation of military hosted payloads on commercial host satellites. This would run counter to the ongoing efforts of the Department of Defense to explore and encourage the acquisition and deployment of military hosted payloads. In the forefront of these efforts is the Hosted Payload Solutions (HoPS) acquisition, which is being developed by the Hosted Payload Office of the U.S. Air Force's Space and Missile Systems Center.<sup>7</sup> Accordingly, SIA recommends that the Department add a note to this paragraph exempting hosted payloads designated for end-use by a U.S. government entity from USML licensing and Congressional notification.

SIA also notes another potential complication resting on the application of the see-through rule with respect to hosted payloads controlled by this paragraph. Many of the spacecraft hosting military payloads will be subject to the EAR, as will the communications ground equipment (*e.g.*, base band units) communicating with the commercial and military payloads. The Department should ensure that base band units communicating with military hosted payloads are not made subject to the ITAR by virtue of their transmissions to and from the payload. This could cause ground

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<sup>7</sup> See Government Payloads on Commercial Host Spacecraft, Solicitation Number 13-36, January 28, 2013, <https://www.fbo.gov/?s=opportunity&mode=form&id=b2ae9db2cbd5b1f93707cf8c2c0e26ce&tab=core&cvview=0>.

equipment to have different jurisdictions depending on the source of the bytes of information being handled by the item at any given time, which would be extremely difficult to manage from a compliance standpoint. Ground equipment for military hosted payloads should only be subject to the ITAR if specially designed for the specific military payload, as opposed to temporarily configured to communicate with it (*e.g.*, by pointing it towards the payload or altering its polarization settings).

Finally, irrespective of the Department's decisions on the application of the see-through rule and the establishment of a U.S. government end-use exemption, SIA requests that the Departments of State and Commerce allow for two types of licensing practices for satellites with hosted payloads controlled by USML Category XV(e)(17). We believe that companies should have the option of obtaining a single USML license for the spacecraft bus and military hosted payload, and also the option of obtaining a USML license for the payload in addition to a CCL license for the EAR-controlled spacecraft and associated data. Hosted payloads that would be controlled by this paragraph would likely be segregated from the rest of the payload on the satellite (*i.e.*, they would communicate with a different network operations center, have a distinct contract for the services or data provided, etc.), and therefore the two-license option would be viable from a compliance standpoint. Additionally, having the option to maintain the same compliance program for the EAR-controlled portion of the payload would avoid creating a situation when a spacecraft bus and many components would be ITAR-controlled for one transaction and EAR-controlled for most others. Jurisdictional consistency is an important prerequisite of a successful compliance program, and thus the creation of a two-license option would be consistent with the Department's goal of creating a system that is reliable, predictable, and clear.

~~Paragraph \*(e)(18) "Department of Defense funded secondary or hosted payload, and specially designed parts and components therefor"~~

SIA strongly recommends the deletion of paragraph (e)(18). The source of the funding for a specific payload or satellite should have no bearing on the jurisdiction of the item. The implementation of this proposal would run counter to the thrust of the Export Control Reform initiative by reducing clarity, due to the ambiguity about what types of financial transactions constitute "funding," particularly in an evolving arena such as hosted payloads. For example, if the Department of Defense made a pre-launch commitment to lease a transponder on a commercial communications satellite otherwise controlled by the CCL, would the financial commitment by the DoD effectively change the export licensing jurisdiction of the spacecraft? SIA is also concerned that a transaction could fit the definition of "funding" at certain times and not at others (*e.g.*, pre-launch leases vs. post-launch leases), irrespective of the technology involved. Furthermore, it is unclear whether "Department of Defense" refers to the U.S. Department of Defense alone, or would also extend to non-U.S. defense ministries.

This proposal would introduce additional uncertainty and unintended consequences to the execution of satellite programs that include hosted payloads. For example, the U.S. Department of Defense is currently considering the provision of funds to a foreign space agency to support the procurement of two civil payloads (for which U.S. companies may submit proposals) which are proposed for control under CCL ECCN 9A515. If paragraph (e)(18) were implemented, Department of Defense funding would have the effect of subjecting these two payloads to ITAR control for the purposes of this single transaction only, which would be extremely problematic from a compliance management standpoint.

As an additional example of the unintended consequences that this rule would cause if fully implemented, consider the recent case where a commercial communications satellite was designed with a military communications hosted payload, despite the fact that no government entity had committed to purchase or lease it. The payload was subsequently leased to the government of a U.S. ally. If this business model were repeated in the future, the company may have to acquire an export license well in advance of either the U.S. government or foreign government's decision to lease the payload. If paragraph (e)(18) comes into effect as written, this would put the satellite operator in the position of potentially having the jurisdiction of the hosted payload or entire host satellite shift due to a business transaction that occurs after an export license is sought or issued. Such a jurisdictional shift could theoretically happen after the satellite is on orbit and operational. Arranging for proper compliance with respect to technical data related to the payload in that case would be nearly impossible.

In SIA's view, the technical capabilities of a secondary or hosted payload should govern its regulation under the EAR or ITAR, not the source of its funding. If the Department feels strongly that a catch-all paragraph is needed for hosted payloads that use technology developed by the Department of Defense, there are alternative formulations of this paragraph that might be far more limited and far less problematic.

*Paragraph (x) Commodities, software, and technical data subject to the EAR (see § 120.42 of this subchapter) used in or with defense articles controlled in this category.*

***Note to paragraph (x):** Use of this paragraph is limited to license applications for defense articles controlled in this category where the purchase documentation includes commodities, software, or technical data subject to the EAR (see § 123.1(b) of this subchapter).*

It is unclear how paragraph (x) is intended to apply to USML Category XV. In other categories, it typically applies to spare parts which are acquired through the same purchase order as the defense article for which they are used. However, it is difficult to see how the spare part scenario would apply to Category XV, as satellites generally are

not repaired after launch. Is the intention for this category to apply to ground systems for spacecraft listed in Category XV that are acquired through the same purchase order?

## Conclusion

Once again, SIA strongly supports and welcomes the proposals made by the Department of State to reform USML Category XV. SIA believes that with some adjustments and clarifications, the revised Category XV will support U.S. national security by controlling sensitive technologies and promoting the international competitiveness of the U.S. space industry. SIA strongly endorses these reforms, and urges the Department to publish a final rule as soon as possible.

SIA thanks the Department for the opportunity to comment on these important changes to USML Category XV, and would welcome the chance to discuss our comments in greater detail should further clarification be required.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Patricia Cooper". The signature is fluid and cursive, written in a professional style.

Patricia Cooper  
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July 8, 2013



## *The University of Oklahoma*<sup>®</sup>

VICE PRESIDENT FOR RESEARCH

July 8, 2013

Office of Defense Trade Controls Policy  
U.S. Department of State

RE: RINs 1400-AC80 and 1400-AD33 (ITAR Amendment – Category XV Spacecraft Systems and Related Articles and “Defense Services”)

To Whom It May Concern:

The University of Oklahoma (OU) is providing the following comments in response to the proposed revisions to the International Traffic in Arms Regulations (ITAR) relating to U.S. Munitions List Category XV and defense services. As a university, our mission is to provide the best possible educational experience for our students through excellence in teaching, research and creative activity, and service to the state and society. As an academic institution focusing on weather and radar research, we appreciate the opportunity to provide our thoughts, and hope that the following comments are helpful.

OU would first like to commend the Directorate of Defense Trade Controls (DDTC) for their efforts in developing bright lines between items controlled by the International Traffic in Arms Regulations (ITAR) and those regulated by the Export Administration Regulations (EAR). It has been noted for many years that jurisdictional confusion has adversely impacted university research in the United States. OU would also like to commend DDTC for excluding from the definition of “defense services” activities involving only public domain information. OU is encouraged by these proposed changes. However, we remain concerned about several points that we feel could negatively impact university research, educational activity and scientific communication. With these concerns in mind, we submit the following for consideration:

### Concerns with Defense Services

As currently drafted, §120.9(a)(2) could be interpreted as holding that the furnishing of assistance to a foreign person in the “integration” of any item controlled on the USML or of items subject to the EAR into a USML-controlled end item or component is a defense service, *regardless of whether only public domain information is involved*. The residual catchall of “integration” would appear to have a significant detrimental impact on university-based educational activities and scientific communication. A scientist’s ability to validate by means of experimentation would be chilled significantly by an interpretation that “integration” of components and parts is a defense service, regardless of whether public domain information was used. OU strongly encourages DDTC to evaluate the constitutional implications of attempting to regulate scientific communication and public domain information in this manner.

OU would also like to take this opportunity to provide an additional observation about “defense services” and the interconnection to the license exemption found in 125.4(b)(10). In relevant part, 125.4(b)(10) eliminates the licensing requirement for the exportation of controlled technical data to certain university employees that qualify for the exemption. However, in years past some have asserted that while 125.4(b)(10) eliminates the need to obtain a license for the *technical data export*, the same activity still requires a license *as a defense service* under 120.9. It is unclear why the ITAR would create such a licensing redundancy by virtue of the definition of defense services. OU respectfully requests that the

relationship between 120.9 and 125.4(b)(10) be clarified to prevent any antithetical application of licensing requirements.

#### Concerns with Category XV

OU understands that the Association of University Export Control Officers (AUECO) is providing comments on the following points. We agree with and support their position, and incorporate several of their observations along with our comments below:

- “Objects” in 121.1(a)(2) should be defined such that only man-made objects are captured. Without such a clarification, it could be interpreted as including naturally-occurring phenomena such as exoplanets or weather systems. As a result, research and scientific satellites will be captured.
- 121.1(a)(9) should be clarified to specify that satellites and spacecraft that merely use GPS to verify their location are not captured.
- 121.1e(1)(ii) specifies antennas that are “actively scanned”. However, if the intent behind the proposed rule is to control “actively electronically scanned arrays” this should be clarified. As currently drafted, this provision could be interpreted as capturing antennas that physically rotate, which are used in space and weather research satellites.
- 121.1(e)(6) may control the optical bench assembly for items in (a). However, OU agrees with AUECO’s suggestion that beam splitters, fold mirrors, and flexure mounts are widely used components without unique U.S. technology and as such would be more appropriate for control under the EAR.
- 121.1(e)(18) is concerning in that it appears to treat all DoD-funded payloads as defense articles, regardless of the purpose of funding of the research (which may include basic research).

In closing, OU hopes that these comments will lead to improvement in clarity and application of the proposed changes, and appreciates the opportunity to provide comments.

Sincerely,



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Vice President for Research  
Regents' Professor of Meteorology and Weathernews Chair Emeritus  
Roger & Sherry Teigen Presidential Professor



Gretta Rowold  
Executive Director of Secure Research Operations  
Office of Legal Counsel

**Before the**  
**DEPARTMENT OF STATE**  
**DIRECTORATE OF DEFENSE TRADE CONTROLS**

In the Matter of	)	
	)	
Amendment to the International Traffic	)	Docket No. Public Notice: 8329
in Arms Regulations: Revision of U.S.	)	
Munitions List Category XV and	)	
Definition of Defense Service –	)	
Proposed Rule	)	
	)	

**COMMENTS SUBMITTED ON BEHALF OF INTERESTED MEMBERS OF  
THE SATELLITE INDUSTRY**

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July 8, 2013

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## Introduction

On behalf of interested members of the satellite industry (the “Commenting Parties”), Milbank, Tweed, Hadley & McCloy LLP hereby respectfully submits the following Comments in response to the Department of State’s proposed amendments<sup>1</sup> to the regulations<sup>2</sup> governing the export of satellites and related items as authorized by the National Defense Authorization Act for Fiscal Year 2013<sup>3</sup>.

## Discussion

### **I. THE DEPARTMENT OF STATE SHOULD RECONSIDER THE INCLUSION OF CERTAIN CATEGORIES OF ANTENNAS ON THE USML**

As part of the Proposed Amendments, the Department of State intends to revise Category XV of the U.S. Munitions List (the “USML”)<sup>4</sup> to provide for application to antennas “(i) [h]aving a diameter greater than 25 meters; (ii) [a]re actively scanned; (iii) [a]re adaptive beam forming”.<sup>5</sup> The Commenting Parties believe that inclusion of these categories of antennas on the USML would be unnecessarily protective, would inhibit legitimate commercial activity and would be contrary to the purposes of the Proposed Amendments.

In formulating the Proposed Amendments, the U.S. Government was guided by the stated policy objectives of protecting the U.S. national security through the export

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<sup>1</sup> See *Amendment to International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service”*, Proposed Rule, 78 Fed. Reg. 31444 (2013) (the “Proposed Amendments”).

<sup>2</sup> 22 C.F.R. Parts 120-130 (the “Regulations”).

<sup>3</sup> Pub. L. 112-239.

<sup>4</sup> 22 C.F.R. 121.1.

<sup>5</sup> See Proposed Amendments, proposed paragraph (e)(1) of Category XV of 22 C.F.R. 121.1.

control of certain sensitive articles and services and removing unnecessary restrictions on commercial activities that do not implicate the U.S. national security. The Proposed Amendments specifically provide that:

[a]lthough the proposed revisions to the USML do not preclude the possibility that satellites and related items in normal commercial use would or should be ITAR-controlled because, *e.g.*, they provide the United States with a critical military or intelligence advantage, the U.S. Government does not want to inadvertently control items on the ITAR that are in normal commercial use. The public is thus asked to provide specific examples of satellites and related items, if any, that would be controlled by the revised USML Category XV that are now in normal commercial use.<sup>6</sup>

We find that all three of the aforementioned categories of antennas concern antennas that are or will be in legitimate commercial use and that do not afford any military or intelligence advantage.

A. *Antennas Having a Diameter Greater than 25 Meters*

With respect to the category of antennas having a diameter greater than 25 meters, the specified maximum diameter could result in the unintended application of this provision of the USML, in the future, to commercial satellites. At present, larger antennas (*i.e.*, those exceeding 25 meters in diameter) are employed in lower frequency missions, such as for L-band and S-band applications, which are currently of little interest to commercial operators. It should be noted, however, that there is an inverse relationship between satellite beam size and satellite antenna size and, noting the trend of commercial satellite service providers worldwide developing and operating higher capacity and throughput satellites, the need to reduce beam sizes is growing increasingly important. As a result, it is expected that, in the future, commercial satellites will employ significantly larger antennas in order to generate smaller beams. Accordingly, the

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<sup>6</sup> See Proposed Amendments, Revision of Category XV.

Commenting Parties submit that the inclusion of this category of antennas having a diameter of greater than 25 meters, in of itself and without distinction as to end-use or mission type, will carry unintended consequences of subjecting such antennas to control on the USML. To avoid these unintended consequences, we respectfully recommend that this category of antennas be eliminated.

**B. *Actively Scanned Antennas***

As regards the category of antennas that are actively scanned (*a.k.a.* phased array antennas), we note that such antennas are already commercially available and have been used for many years on commercial satellites. Per the Department of State's request, we offer the following satellites as examples of commercial satellite that employ actively scanned antennas: (i) Spaceway 1, 2 and 3, Thuraya 1, 2, and 3 and MSV-1 and MSV-2 (all manufactured by Boeing Satellite Systems); (ii) ICO-G1 and Terrestar-1 and Terrestar-2 (all manufactured by Space Systems/Loral); (iii) Garuda-1 and AMC-14 (both manufactured by Lockheed Martin Commercial Satellite Systems); and (iv) Inmarsat 4F1, F2 and F3 and Alphasat-1 (all manufactured by EADS Astrium). In light of the fact that actively scanned antennas are commonly employed on commercial satellites manufactured by both U.S. and non-U.S. satellite prime contractors and used for commercial applications, the Commenting Parties respectfully recommend that such antennas be removed from the USML.

**C. *Adaptive Beam Forming Antennas***

With respect to the category of antennas that are adaptive beam forming, the Commenting Parties submit that control of such antennas on the USML is not necessary

or advisable given the widespread commercial utilization of such antennas. As with actively scanned antennas, adaptive beam forming antennas have been commercially available for quite some time.<sup>7</sup> Over the past decade, these antennas became more commonly utilized in commercial contexts. It is expected that adaptive beam forming antennas will be increasingly incorporated on commercial satellite payloads going forward given the need for commercial satellite services providers to offer customers more specific and tailored coverage while maintaining spectral efficiency, particularly given the widely-recognized limitations on spectrum availability for satellite broadcast, broadband and general communications service offerings. Specifically, adaptive beam forming antennas have been incorporated on the MSV-1 and MSV-2 satellites (both manufactured by Boeing Satellite Systems) and on the ICO-G1, Terrestar-1 and Terrestar-2 satellites (all manufactured by Space Systems/Loral). The inclusion of adaptive beam forming antennas on the USML will effect the strict regulation of technology that has long been and continues to be commercially available and will inhibit the ability of commercial satellite services providers to meet expanding commercial demand for satellite-based communications services.

Additionally, the Commenting Parties believe that it is unclear what antennas would be covered under this category. Proposed paragraph (e)(1)(iii) of Category XV of the USML defines this category of antennas only as “are adaptive beam forming”<sup>8</sup> without providing further detail. At a minimum, the Commenting Parties believe that this

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<sup>7</sup> See, e.g., Barry D. Van Veen & Kevin M. Buckley, *Beamforming: A Versatile Approach to Spatial Filtering*, IEEE ASSP MAGAZINE, April 1988. This article, written over 25 years ago, is one of many scholarly works published on “beamforming” and serves to illustrate that the knowledge and technology associated with adaptive beam forming antennas has been widely available for many years.

<sup>8</sup> See Proposed Amendments, proposed paragraph (e)(1)(iii) of Category XV of 22 C.F.R. 121.1.

category of antennas should specifically exclude Ground-Based Beam Forming (GBBF) systems, such as those incorporated on the MSV-1 and MSV-2 satellites (both manufactured by Boeing Satellite Systems) and those incorporated on the ICO-G1, Terrestar-1 and Terrestar-2 satellites (all manufactured by Space Systems/Loral).

As all three of the aforementioned categories of antennas are currently or will be in the near future incorporated on commercial satellite payloads for purposes of providing legitimate commercial communications services, and do not carry any critical military or intelligence advantage, we respectfully request that the Department of State reconsider the inclusion of these three categories of antennas on the USML. Removal of these three categories of antennas from the USML will more effectively balance the policy interests of safeguarding U.S. national security and not restricting unnecessarily the ability of the U.S. commercial space industry, and U.S. satellite prime contractors and satellite communications services providers, to meet rapidly expanding customer demand for high-capacity and high-speed satellite-based services.

## **II. THE DEPARTMENT OF STATE SHOULD CLARIFY THAT COMMERCIALLY AVAILABLE COMMAND DECRYPTION UNITS WILL NOT BE CONSIDERED “CLASSIFIED”**

As part of the Proposed Amendments, the Department of State intends to revise Category XV of the USML to provide for application to:

(a) Spacecraft . . . that: . . . (12) Are classified, contain classified software or hardware, are manufactured using classified production data, or are being developed using classified information (*e.g.*, having classified requirements, specifications, functions, or operational characteristics or include classified cryptographic items controlled under USML Category XIII of this subchapter).<sup>9</sup>

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<sup>9</sup> See Proposed Amendments, proposed paragraph (a)(12) of Category XV of 22 C.F.R. 121.1.

Proposed paragraph (a)(12) of Category XV of the USML would capture commercially available command decryption units if such commercially available command decryption units are considered “classified”<sup>10</sup>. Commercially available command decryption units (*i.e.*, such as CARIBIOU units and their equivalents currently used on commercial spacecraft) have been widely incorporated on commercial satellites and, to date, have not carried any known adverse implications to the U.S. national security. As the purpose of the Proposed Amendments is not to inadvertently control the export of items that are in normal commercial use and do not raise national security concerns, the Commenting Parties respectfully request clarification from the Department of State that that commercially available command decryption units are not considered “classified” for purposes of this proposed paragraph (a)(12). To the extent that such commercially available command decryption units are not considered “classified”, the Commenting Parties do not have any concerns regarding the proposed paragraph (a) of Category XV of the USML.

### **III. THE DEPARTMENT OF STATE SHOULD RESTATE THE ACCURACY STANDARD APPLICABLE TO STAR TRACKERS AND STAR SENSORS**

As part of the Proposed Amendments, the Department of State intends to revise Category XV of the USML to provide for application to ““Space-qualified”<sup>11</sup> star

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<sup>10</sup> The proposed paragraph (a)(12) of Category XV of 22 C.F.R. 121.1 provides that “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 international organization”.

<sup>11</sup> Note 2 to proposed paragraph (e) of Category XV of 22 C.F.R. 121.1 provides that “an article is “space-qualified” if it is designed, manufactured, or qualified through successful testing, for operation at altitudes greater than 100 km above the surface of the Earth.

tracker[s] or star sensor[s] with angular accuracy less than or equal to 1 arcsec in all three axes . . . and specially designed parts and components therefor (MT)”<sup>12</sup>. While the Commenting Parties appreciate the Department of State’s intentions in qualifying the control of such star trackers and star sensors based on accuracy, we submit that it would be more effective to specify the applicable standard of accuracy as “greater than” a certain measure rather than as “less than or equal to” a certain measure. As a result, the Commenting Parties respectfully request that the Department of State restate the standard of accuracy applicable to star trackers and star sensors controlled on the USML to provide a formulation in terms of accuracy that is “greater than” a certain measure.

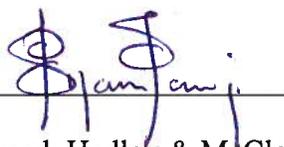
### **Conclusion**

For the reasons stated herein, the Commenting Parties respectfully request that the Department of State: (i) reconsider its inclusion of antennas having a diameter greater than 25 meters, antennas that are actively scanned and antennas that are adaptive beam forming on the USML; (ii) clarify that commercially available command decryption units will not be considered “classified”; and (iii) restate the standard of accuracy applicable to star trackers and star sensors controlled on the USML to provide a formulation in terms of accuracy that is “greater than”, rather than “less than or equal to”, a certain measure.

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<sup>12</sup> See Proposed Amendments, proposed section (e)(16) of Category XV of 22 C.F.R. 121.1.

Respectfully submitted on behalf of the  
Commenting Parties

By:   
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July 8, 2013

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of "Defense Service."

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0003

Comment on DOS\_FRDOC\_0001-2421

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## General Comment

Specifically calling out "man-rated" spacecraft for regulation as munitions is an example of backwards logic.

If anything, a crewed spacecraft has less in common with weapon systems, and more in common with aircraft, than an automated system.

If this regulation is enacted, it will hamper the development of human spaceflight capabilities by American companies. This, in turn, provides a strategic advantage to our adversaries, who are not similarly hampered.

Innovation, creativity, and ingenuity are national assets whose value cannot be overstated. There is no weapon, no tactic, no military advantage that cannot be overcome through sufficient application of human mindpower. It is only through continued innovation that the United States can ensure its place as a world leader.

The crewed systems currently under development, and contemplated for the near future, are

designed for civilian use. The authors of this regulation apparently believe that the technologies for such vehicles might, in the future, be adapted for use in military vehicles. If that case, however, it is essential that we ensure that the United States remains the leader in the developing such technologies. Any regulation which threatens the industrial base, on which technology develop rests, injures the United States first.

Regulations which are overly broad are also difficult to enforce and more prone to leaks. National security and technological readiness require a focused approach, with rules that are tightly defined to fit their purpose. The US government should adopt regulations which encourage the development of new technologies, while at the same time preventing the unauthorized export of those systems that have direct military applications. The broad-brush definition in the proposed regulation does not achieve that purpose.

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service.”

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0005

Comment on DOS\_FRDOC\_0001-2421

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## General Comment

ITAR provides many functions. Its regulatory powers directly address the usage of various types of invasive technologies. As we enter the radical dimensions of the space/information age, many aspects of international relations become subjected to new tensions, new types of competition and new kinds of problem solving effects. There is no doubt that the fast pace of modern technological innovation will reflect upon the methods and processes of international alignments. Owing to this catalytic condition is appropriate for the ITAR body to consider, not only the requirement for national security but also the requirement for non-proliferation as being balanced portions of the productive outcomes. One potential that acts for support of the mutual objectives is found through the collaborative basis. The further levels of space development including the exploration basis will bring many of these advanced technological arenas to light within national and international paradigms. A revised, sophisticated and available ITAR platform will have considerable ability to act for optimal and expedient partnership conditions within regulatory frameworks while avoiding intransigent and counter productive armaments escalation. The forthcoming chapters are optimistic ones that lend themselves to productive methodologies of pacific nature and social prosperity.



**COMMENTS ON MAY 24, 2013 PROPOSED RULE: Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service” RINs 1400–AC80 and 1400–AD33**

§ 120.9 Defense service

- Respectfully request inclusion of modifying language “to a foreign person” in proposed § 120.9 (a) (5), so as to read:

The furnishing of assistance (including training) to a foreign person (see § 120.16 of this subchapter), whether in the United States or abroad, in the integration of a satellite or spacecraft to a launch vehicle, including both planning and onsite support, regardless of the jurisdiction of, the ownership of, or the origin of the satellite or spacecraft, or whether technical data is used;

Without this additional language a defense service would include a U.S. person providing to another U.S. person assistance (including training) in the integration of a satellite or spacecraft to a launch vehicle, even a U.S. launch vehicle to be launched from the U.S. Including such assistance under the definition of defense service is contrary to the long-standing definition of “defense service” as certain types of assistance a U.S. person provides to a foreign person.

- Respectfully request inclusion of modifying language “to a foreign person” in proposed § 120.9 (a) (6), so as to read:

The furnishing of assistance (including training) to a foreign person (see § 120.16 of this subchapter), whether in the United States or abroad, in the launch failure analysis of a satellite, spacecraft, or launch vehicle, regardless of the jurisdiction of, the ownership of, or the origin of the satellite, spacecraft, or launch vehicle, or whether technical data is used.”

Again, without this additional language a defense service would include a U.S. person providing to another U.S. person assistance (including training) in the launch failure analysis of a satellite, spacecraft, or launch vehicle, even if a U.S. satellite, spacecraft, or launch vehicle launched from the U.S. Including such assistance under the definition of defense service is contrary to the long-standing definition of “defense service” as certain types of assistance a U.S. person provides to a foreign person.

- To provide clarity, respectfully request an explicit statement regarding technical assistance relating to items being moved from the USML to the CCL under the EAR, other than as provided in proposed § 120.9(a)(2). Specifically, request adding to § 120.9(b), “The following is not a *defense service*”:

(6) Except as provided in subsection (a)(2), the furnishing of assistance (including training) to a foreign person (see § 120.16 of this subchapter), whether in the United States or abroad, in the design, development, engineering, manufacture, production, assembly, testing, intermediate- or depot-level maintenance (see § 120.38 of this subchapter), modification, destruction, or processing of any item subject to the EAR.

For instance, it is clear that the furnishing of assistance (including training) in the integration of a satellite or spacecraft to a launch vehicle, including both planning and onsite support, regardless of the jurisdiction of, the ownership of, or the origin of the satellite or spacecraft, or whether technical data is used is proposed to be a “defense service.” Respectfully request that it be made equally clear that “the furnishing of assistance (including training) to a foreign person, whether in the United States or abroad, in the design, development, engineering, manufacture, production, assembly, testing, intermediate- or depot-level maintenance, modification, destruction, or processing” of spacecraft proposed to be controlled subject to the EAR, or any related commodities controlled under any ECCN, is *not* a “defense service.”

§ 121.1 General. The United States Munitions List.  
Category XV—Spacecraft Systems and Related Articles

- Paragraph (a) (2). This proposed language would control on the USML certain commercial applications for communication systems -- including inter-satellite links. Respectfully request explicitly defining applications excluded from subsection (a) (2), *e.g.*, “other than for establishing and maintaining multi-satellite commercial communications architectures.” There are numerous examples of public domain information on this topic of multi-satellite commercial communications links, for example: Parameterized Analysis of Optical Inter-Satellite Links for High Resolution Satellite Communication, Glettlter MIT 2009; <http://hdl.handle.net/1721.1/53314>.
- Paragraph (b) proposes to potentially control on the USML standard but satellite-specific database ingest into ground systems. Respectfully request making “common to” in the existing note to paragraph (b) a defined term, re-numbering the existing note to paragraph (b) to be “Note 1 to paragraph (b),” and adding a second note to paragraph (b), as follows:

Note 2 to paragraph (b): “Common to” does not exclude standard but satellite-specific telemetry, tracking, and control input into ground control systems such as databases, frequency and location information, and flight software information necessary to utilize ground systems and simulators.

The above suggested change would minimize the possibility of controlling on the USML information not intended to be controlled on the USML.

- Paragraph (e) proposes specific limits that generally represent current state of the art. Commercial development of improved capability can reasonably be expected over the next 1 - 3 years. As proposed, certain parts of the paragraph will soon apply to commercial activity, potentially hampering competitiveness of U.S. space industrial base -- which is contrary to ECR effort and Section 1248 Report.

- Paragraph (1)(i) Commercial capability currently in orbit is at 22m; respectfully suggest revising limit upwards to at least 30m to allow for continued commercial development without ITAR control.
- Paragraph (2) As written, this proposed paragraph may include commercial thermal radiator surfaces; respectfully suggest adding an exclusion to this paragraph to read as follows”

Space-qualified optics, (i.e., lens or mirror), including optical coating, but not including standard thermal radiator surfaces, having active properties (e.g., adaptive or deformable), or having a largest lateral dimension greater than 0.35 meters;

Ref: Variable Emittance Skins for Active Thermal Control in Spacecraft Based on Conducting Polymers, Ionic Liquids and Specialized Coatings.  
[http://proceedings.aip.org/resource/2/apcpcs/1208/1/99\\_1](http://proceedings.aip.org/resource/2/apcpcs/1208/1/99_1)

- Paragraph (13) As written, this proposed paragraph potentially impacts commercial applications using control moment gyroscopes that are commercially available from both US and non-US sources, including Surrey Satellite Technology Limited which has, for instance, flown control moment gyroscopes on BILSat. Respectfully suggest explicitly excluding from paragraph (13) control moment gyroscopes used solely on commercial space systems, *i.e.*, “Control moment gyroscope, except as used exclusively on spacecraft subject to the EAR.”
  - Paragraph (18) With respect to ITAR control of DOD-funded hosted payloads on commercial satellites, hosting such payloads on commercial platforms offers a unique opportunity for increased capability at reduced cost. Respectfully submit that control on USML of payloads to be hosted on spacecraft subject to the EAR based solely on DoD as a funding source is both unnecessary and counter to the ECR initiative.
- Paragraph (f). To parallel the above suggested clarification to § 120.9, respectfully suggest an explicit statement regarding technical assistance regarding spacecraft systems and related articles being moved from the USML to the CCL, other than as provided in proposed § 120.9(a)(2). Specifically, request adding a note to proposed paragraph (f) as follows:

Note to paragraph (f): The following is not a *defense service*: Except as provided in subsection § 120.9 (a)(2), the furnishing of assistance (including training) to a foreign person (*see* § 120.16 of this subchapter), whether in the United States or abroad, in the design, development, engineering, manufacture, production, assembly, testing, intermediate- or depot-level maintenance (*see* § 120.38 of this subchapter), modification, destruction, or processing of any spacecraft system or related article not identified in paragraphs (a) through (e) of this category.



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08 July 2013

Office of Defense Trade Controls Policy  
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PM/DDTC, SA-1, 12<sup>th</sup> Floor  
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Subject: **RIN 1400-AD33, ITAR Amendment – USML Category XV and Defense Services**

Alliant Techsystems Inc. (ATK) appreciates the opportunity to comment on the subject proposed rule to transfer certain satellites and satellite components from the USML to the CCL and revise the definition of ITAR Section 120.9 Defense Service. ATK strongly supports the proposals made by the Department of State to reform USML Category XV. The proposed rules represent an improvement over the existing export control system for satellites and related items. ATK provides the following comments for areas of further consideration based on our review of the proposed rule.

- Proposed **§120.9(a)(1)** and **(b)(1)**

The proposed definition of Defense Service in §120.9(a)(1) includes furnishing of assistance (including training) in intermediate- or depot-level maintenance; while proposed §120.9(b)(1) excludes training in organizational-level maintenance. ATK requests DDTC revise proposed §120.9(b)(1) to state, in-part: “The furnishing of assistance (including training) in organizational-level (basic-level) maintenance...” By making this change to proposed §120.9(b)(1), the language is consistent with proposed §120.9(a)(1) and clarifies that organizational-level maintenance is not a Defense Service.

- Proposed **§121.1 Category XV(a)(4)** covers “Provide space-based logistics, assembly or servicing of any spacecraft (e.g., refueling)”

ATK is unclear on the rationale for the control of these spacecraft, and on the type of capabilities intended for control. A definition of the terms “logistics,” “assembly,” and “servicing” would be helpful. While some of the capabilities required to effectively perform missions that would meet these definitions may have military applications, there are an equal number of civilian applications for these capabilities. ATK requests DDTC consider restating “logistics, assembly or servicing” into a positive list of capabilities that DDTC desires to retain on the USML; and therefore moving some of the capabilities that may be captured under those broad terms to the CCL.

- Proposed §121.1 Category XV(e)(2) covers “Space-qualified optics (i.e., lens or mirror), including optical coating, having active properties (e.g., adaptive or deformable), or having a largest lateral dimension greater than .35 meters”

ATK supports recommendations made by others in industry proposing changes to the minimum aperture size of electro-optical satellites subject to ITAR control. We concur that a higher threshold is more appropriate than the specified threshold of 0.35 meters. The proposed aperture size threshold of 0.35 meters does not reflect the current market for earth observation satellites. Therefore, increasing the aperture size threshold and moving systems with a lesser aperture size to the CCL would enhance the competitiveness of U.S. firms in international markets.

Once again, ATK strongly supports the proposals made by the Department of State to reform USML Category XV. We believe that with some adjustments and clarifications, the revised Category XV will support U.S. national security by controlling sensitive technologies and promoting the international competitiveness of the U.S. space industry.

ATK thanks the Department for the opportunity to comment on these important changes to USML Category XV.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Robert Schuettler', with a stylized flourish at the end.

Robert Schuettler  
Vice President, International Trade Operations  
Alliant Techsystems Inc.

***Comments on the Department's proposed changes to USML Cat XV and the definition of defense services, as published in the Federal Register on 5/24/2013.***

Thank you for the opportunity to comment on the Department's proposed changes. The following relate specifically to the proposed 120.9(b)(4).

1. Please reconsider the Department's decision to include the provision of law enforcement, physical security and personal protective services that do not rely only on public domain information within the definition of defense services.

The Department states on page 31446 of the Federal Register Notice that this recommendation was not accepted because, "The use of technical data is a controlled activity, regardless of the type of service provided." This reasoning appears to contradict the department's exclusion of basic operations and maintenance from the proposed definition of a defense service. Certainly, this activity is a "use of technical data," and yet the Department is stating that it shall not be controlled.

When discussing law enforcement, physical security and personal protective services as services that should not be included in the new definition of defense services; I specifically mean the performance or provision of these services by US persons for foreign persons. In other words, the US person's would only "use technical data" in the sense that they would perform based on their knowledge and training. And this would not be controlled as a defense service, so long as they would not disclose that knowledge to the foreign person who has hired them for law enforcement, physical security, or personal protective services.

Now, if the US person's contract requires exporting their technical data ("other than public domain information") so as to improve the foreign person's capability to protect himself, then that export is understandably controlled as a defense service, and would require an agreement.

I liken the provision of security services to foreign persons without exporting technical data to the sale of a new or repaired defense article to foreign persons without exporting technical data. In such instances the Department licenses the export of the new or repaired defense article, and not the "use of technical data" by the US person that occurred in its production or repair.

2. If the Department insists on controlling the export of defense services, such as law enforcement, physical security, or personal protective services, that "use technical data," even when none of the data will be transferred to a foreign person, then please consider authorizing such activities with a license instead of an agreement.

In other words, please consider licensing exports of services without transfers of technical data as you already license the export of defense articles without the inclusion of technical data.

3. If the Department maintains its proposal to include as defense services the provision of law enforcement, physical security or personal protective services using other than public domain data, then where do these services fall under the proposed definition? Are they to be considered 120.9(a)(3) as "...assistance... in the tactical employment of a defense article?" Or would it be (a)(4), "Conducting direct combat operations for a foreign person?"

**[Editor's Note:** Anonymous submission.]

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service.”

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0009

Comment on DOS\_FRDOC\_0001-2421

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## General Comment

Planet Labs Inc. (“Planet Labs”), a U.S. based commercial satellite manufacturer/operator, offers the following commentary. At a high level, Planet Labs supports this reform and lauds the efforts of industry and government to maintain sensible regulations.

Planet Labs supports the proposed modifications to § 121.1 Category XV (a)(7)(i) and (e)(2). The proposed definition correctly excludes a class of “small satellites” whose remote sensing capabilities have limited tactical use, and are primarily suited for the monitoring of large scale features such as weather, agriculture and deforestation.

Planet Labs strongly objects to the proposed § 121.1 Category XV (c)(2). This definition places an extraordinary burden on a basic satellite subsystem that is currently widely used by satellites operating in Low Earth Orbit. Examples of such satellites already using GPS receivers include the University of Michigan’s student-built RAX satellite, and the AMSAT OSCAR-40 (AO-40) amateur satellite.

Firstly, many GPS receiver designs already exist in the public domain as “open-source”

designs\*. Secondly, basic satellite orbit determination and knowledge is essential for collision avoidance, and thus orbital debris mitigation, at top national and international priority. Lastly, Planet Labs believes mitigating the use of GPS positioning for nefarious purposes is adequately covered by § 121.1 Category XV (c)(1),(3) and (4).

Planet Labs proposes § 121.1 Category XV (c)(2) be modified to the following:

“Designed for producing navigation results above 60,000 feet altitude and at 1,000 knots velocity or greater, except for use by satellites operating in stable, Low Earth Orbits;”

\*the following are links to examples of open-source GPS receiver designs freely available on the internet:

<http://hackaday.com/2011/10/01/make-your-own-gps-receiver/>

<http://www.rtklib.com/>

<http://ccar.colorado.edu/gnss/>

**NSS Response to State Department NOPR DOS\_FRDOC\_0001-2421**  
**on**  
**International Traffic in Arms: Revision of U.S. Munitions List**  
**Category XV and Definition of Defense Service**

**General Comments**

The National Space Society (NSS) hereby urges the State Department to make changes in the proposed new Munitions List, so as to more completely fulfill the guidance from Congress and the Administration, accounting for guidance from PL 112-239 (section 1261), from the [National Export Initiative](#) and from bipartisan guidance on the importance of energy and environment issues in defining current threats to national security (see [Climate Change, National Security, and the Quadrennial Defense Review](#); [The Climate and Energy Nexus: Challenges and Opportunities for Transatlantic Security](#); and [Climate Change and National Security](#)).

These policies clearly call for strong encouragement of exports of goods and services from US companies, not only in established markets but in new and potential markets, *in all cases* where such goods and service would (A) not be used as weapons by other nations; and (B) not support the development of weapons by other nations, except when such goods and services are already available for present or future delivery on the open market. Special efforts should be made to encourage such exports, and dispel any ambiguity about their legality, when these exports help address major issues of energy and environment, which are part of the national security consideration. Criteria (A) and (B) will be referred to in the specific recommendations below.

NSS urges special attention to editing the Munitions List (and section 120.9) so as to maximize five new markets for US companies with especially large potential: (1) the provision of space launch services, for *all* benign civilian purposes; (2) the effort to develop affordable, safe electricity to be beamed from space to Earth, as proposed in the [Kalam-NSS Energy Initiative](#) building on extensive prior work supported by the US government (see [National Academy of Sciences: Laying the Foundation for Space Solar Power](#) and [NASA-NSF-EPRI Joint Investigation of Enabling Technologies for SSP](#)) and by international collaborations including the US (see [International Academy of Astronautics: The First International Assessment of Space Solar Power](#)); (3) all forms of support (including refueling) for civilian manned space activities, such as space tourism and other activities by humans in space habitats, similar to the International Space Station (ISS), whenever these habitats are operated by transparent companies or organization, public or private, domestic or international and have little potential to be used as weapons; (4) open international efforts to develop geoengineering technology, which many leading scientists view as necessary insurance to cope with the worst case risks of climate change, regardless of the causes of climate change; and (5) vast increase in international

communication, related both to internet technology and advanced potential improvements in space-based communication technology.

The authoritative citations above dispel many popular misconceptions about space solar power in particular.

NSS and the scientific societies we work with also see an urgent need to reform the treatment of information in general under ITAR, in order to account for changes in the global community and reflect the full spirit of [National Security Directive NSDD 189](#).

### **Specific Comments on Category XV – paragraph (a)**

**a(4):** Please change a(4) to “Provide space-based logistics, assembly or servicing of any spacecraft designated as a munition under the USML.”

*Comment:* prohibiting support such as refueling to peaceful international habitats, similar to the ISS, whether public or private, is not consistent with the guidelines NSS has provided above. More precisely, in those cases where the spacecraft itself is not a munition, support for it is not either (criterion A). Another decisive consideration: space launch capability to carry fuel to space is not something available only from the US (criterion B); for example, the capacity to refuel satellites in orbit is [now being developed by a Canadian company, MacDonald Dettweiler](#). Treating such technology as a munition in the US would simply exclude US companies from this emerging market, without any benefit to national security. The absence of US companies servicing this market would encourage other nations to develop technologies for engaging with other satellites which would do more harm than good for US national security.

**a(11):** Please change a(11) to: “Man-rated rocket-powered spacecraft with enough propulsion capability and re-entry shielding to be directed to selected locations on Earth at will, **or habitats designed to carry contain weapons such as missile bays or directed energy weapons. Launch services provided by companies organized in the US will be treated as defense services only when the cargo to be transported would itself be prohibited for export under ITAR; the international operations of such launch service companies shall be restricted only to the extent that international cargo service airlines are.**”

*Comment:* Without this change, if all man-rated habitats were treated as weapons, ITAR would restrict the International Space Station, private space hotels, or other habitats like the ISS (criterion A) even though they do not have the capability to deliver weapons to great distances. In general, it would restrict all support to expand the human presence in space, which is not only an important export opportunity but an important hope for the future of humanity. Likewise, suppose a British company decides to send a safe and peaceful expedition to Mars, using

propulsion which could not be targeted to points on Earth any more than the falling SkyLab could. US national security does not require that US companies be excluded from the opportunity to support that effort.

*Additional comment:* All these recommendations have been discussed widely in NSS and its advisory committees, which include experts in national security. One of the problems here is that the US is on course to having “100% of nothing” in the area of reusable launch. US companies do have key technologies now, which they will protect anyway as part of intellectual property (IP) policy, but many of the most crucial technologies are being lost due to lack of investment. There is at least some hope (as in the Kalam-NSS Energy Initiative) that well-controlled new US ventures, selling to civilian world markets, could restore these capabilities to the US. The risk to national security is very limited, under this proposed wording, but without new investment the risk of our losing the technology is very great indeed. US national security will be much better off with “50% of something” rather than “100% of nothing.” Commercial launch service markets outside the US are currently dominated by foreign competitors (criterion B).

### **Specific Comments on Category XV – paragraph (e)**

**e(1):** Please change “Antennas” to “Antennas for receiving RF information.”

*Comment:* This is one of our strongest concerns, because the present language would completely exclude large space structure technology that is crucial to emerging civil space applications such as advanced communication satellites and space solar power using the safest low-frequency beaming of power to Earth (at frequencies under 50 GHz). Such technology is being developed in several countries for civil use.

If it is impossible to distinguish between an antenna intended for receiving information, versus a transmission antenna, some NSS members would suggest it is better to scrap this clause altogether, because other nations already can supply this market (criterion B); however, in specific cases where a US company applies for an export license, it should be able to get clarity on who is buying the antenna, for what purpose, if it is a legitimate power satellite or civilian communication satellite.

**e(2):** Please change “.35” meters to “1.5 meters,” and, before the semicolon, insert: “**not to include lightweight plastic or inflatable mirrors suitable for focusing light from the sun for civilian applications.**”

*Comment:* The US remote sensing industry reports that mirrors of larger aperture are already being sold by our competitors on the world market (criterion B). Restricting antenna size was once a way to avoid helping other nations build large aperture radars. However, for radar applications, use of an array of smaller

apertures now provides more capability for the same price; thus this restriction is no longer so effective as it once was.

The change in bold is especially important, to remove all aperture restrictions **for the specific cases where a large aperture is specifically part of a design to provide energy, remote sensing or broadband communication. It is also crucial to the hope of developing geoengineering capabilities (ability to quickly reverse the worst impacts of global warming in case we discover that this is urgent, as predicted by many scientists such as James Hansen).**

It may be important to open the door to developing these capabilities now, while there is time; they are essentially a form of relatively low cost insurance against the worst case risks we are facing. Likewise, in the Kalam-NSS Energy Initiative, leading scientists in India have expressed great interest in forms of space solar power relying on lightweight mirrors, and in the maturation of technology needed to make the price tag affordable.

**e(3):** Please insert the words “receiving” before the word “array.” Also insert: “at frequencies above 50 GHz” after “900nm.”

*Comment:* In the recent International Academy of Astronautics (IAA) report cited above ([The First International Assessment of Space Solar Power](#)), it is proposed to use phased array technology at safe frequencies (under 50 GHz) for transmitting electric power to Earth. Japan already has that technology (criterion B), but it would be good for US companies to be able to compete. Of course, the wavelength of 50GHz RF vastly exceeds 900 nm. As the IAA report shows, phased array technology allows focusing and splitting RF power, to send it to markets of greatest need and value which will be especially important in the initial deployment of SSP technology. Many who use the term “focal plane array” assume that such arrays are used as receivers only, by definition; however, the clarification is needed because, from a physical point of view, focal plane arrays do include phased arrays (see Wikipedia article on [Focal Plane Arrays](#)) which are fundamental to the IAA design for space solar power.

**e(5):** Before the final semicolon, please insert: “, except for use on habitats or other satellites operated by international consortia whose designs are openly available and validated well enough to verify that they cannot be used as weapons.”

*Comment:* The technology to stabilize large space structures such as large communications or solar power satellites should not be a concern as such technology cannot be used as weapons. The provision of wider internet access and nonnuclear sources of 24-hour electricity to other nations would be of great positive value to US national security

**e(7):** Please change “ (e.g. lasers or RF) systems” to **“systems (e.g. lasers or systems to transmit RF at frequencies above 50GHz) which can be used as a weapon.”**

*Comment:* It is most important to our community that no one exclude solar power satellites operating at geosynchronous orbit from transmitting useful energy in the form of RF in frequencies somewhere in the range between 2 and 50 GHz, from antennas inherently unable to focus that energy enough to provide a weapon (due to size, distance and frequency).

**e(10):** Please insert “or retrograde feedback signals from Earth” after Ground Location Points.

*Comment:* It is important, when beaming useful energy to Earth, that it goes to the right place. Retrograde feedback signals are an important tool in reaching the required accuracy. Weapons would be unlikely to use that technique, since it requires that the people being attacked help the attacker.

## **Specific Comments on the General Section (120)**

**Please add a new subsection:** Notwithstanding any other provisions in this section, there shall be no restriction on the free transmittal of technical data, papers or talks unless such release of information entails either: (1) knowing release of classified information that was either known or should have been known to be classified; or (2) release of intellectual property (IP) by those not authorized to release such IP, as determined by the owner of the IP.

*Comment:* These proposed change to the ITAR draft have been thoroughly reviewed in multiple committees of the National Space Society, and in other communities we work with. The outpouring of support for this “free speech” provision was great, even among those very familiar with technical national security issues and committed to the superiority of US industry. For example, there was feeling that we already have two highly refined systems for determining what is sensitive information and what is not, and we do not need a third fuzzier and more subjective system. Some of us considered whether there should be a third exception, for true nuclear technology information, where we wish ITAR could have cracked down on certain folks trying to promote risky nuclear technologies around the world; however, on balance, a public discussion of what is truly dangerous and what is not in the nuclear area might itself constitute an ill-advised release of information at this time; on balance, we feel that adding a third category would hurt more than it helps.

*Additional comment:* The new guidance from Congress and the White House clearly calls for major changes in ITAR. But in defense of the old system, many would say: (1) if a cake can explode and be used as a weapon, it is important to control the recipe itself, and not just the cake; (2) in specific cases, when international technical communications are needed, arrangements can be negotiated.

The problem here has to do with a presumption of secrecy versus a presumption of free speech, in specific cases which have yet to be negotiated. There is an analogy

here to the criminal code, where in the US there is a presumption of innocence and guilt has to be proven. The sheer volume and complexity of international technology discussions worldwide (e.g. via the internet) has become so great that it would simply not be practical to require the time and expense of negotiations, especially for the normal kinds of discussions which occur within scientific societies, between universities, and at conferences. It is far more efficient if “bad recipes” (information on how to make weapons not available outside the US) are specifically labeled as such, through the security classification scheme, with ongoing clarity, rather than require ambiguous case-by-case prosecution, which can put a serious damper on engineers and scientists working in the US. The damage to the US of relying so heavily on a “third system” for classifying information (beyond security classification and IP) is now much greater than the benefits.

**Also please add a subsection:** All results and published papers from research funded by the National Science Foundation or from 6.1 or 6.2 research funding shall automatically count as fundamental research and public domain for purposes of ITAR.

*Comment:* We have discussed these recommendations with colleagues in IEEE, the world’s largest society of engineers (including research engineers). They agree that White House officials in both political parties have supported their recommendations in their [2002 letter to OSTP](#) but that there is an ever more urgent need for ITAR regulations to dispel a pernicious ambiguity which currently inhibits US research and weakens it much more than it weakens any potential adversaries. They tell us that heads of OSTP from Reagan’s time to Holdren have reaffirmed their support for this principle as stated in [National Security Directive NSDD 189](#).



ViviSat LLC, a United States owned and operated company, is pleased to comment on the Department of State, Directorate of Defense Trade Controls (DDTC) proposed rule concerning revisions to Category XV (Spacecraft Systems and Related Articles) of the U.S. Munitions List (USML) and the revision of the definition of “defense service” as described in the proposed Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service,” Proposed Rule, 78 Fed. Reg. 31,444-31,451 (May 24, 2013) (to be codified at 22 C.F.R. pts. 120, 121, and 124).

ViviSat, [www.vivisat.com](http://www.vivisat.com), is a joint venture of U.S. Space LLC and ATK Incorporated (ATK: NASDAQ). Our company provides a commercial satellite life extension service to U.S. government and commercial geosynchronous altitude satellites, e.g. communications satellites. We have obtained agreements from enough customers to produce and launch an initial set of Mission Extension Vehicles (MEV). The MEV is an independent satellite that can semi-autonomously rendezvous, dock and remain attached to a client satellite to provide auxiliary propulsion capabilities. Our MEV will dock and un-dock multiple times during its mission life to service multiple customer satellites. Our near future plans include robotic servicing of major satellite components, e.g. solar array replacement, while our long term goal is to provide space logistics involving transportation, maintenance and on-orbit construction of space based systems. In light of our business roadmap, we would like to comment on the proposed rule listed below.

***§ 121.1 General. The United States Munitions List.***

***Category XV – Spacecraft Systems and Related Articles***

*Paragraph (a)(4): “Provide space-based logistics, assembly or servicing of any spacecraft (e.g., refueling)”*

We do not understand the rationale for the control of these spacecraft and the type of capabilities intended for control. A definition of the terms “logistics,” “assembly,” and “servicing” would be helpful. While some of the technologies required to effectively perform missions that would meet these definitions may have military applications, there are also numerous commercial applications for these technologies, as described in the ViviSat business model above. ViviSat



suggests the technologies with clear dual-use applications, such as space-based servicing or refueling, should be considered for control on the CCL, with appropriate restrictions.

ViviSat will not sell to foreign customers our spacecraft with space-based logistics capabilities, to avoid having these customers employing the spacecraft independently from our U.S. based manufacturing and operations business model. As stated above, ViviSat intends to manufacture, launch, and operate space-based logistics spacecraft, and offer the on-orbit capabilities that they can provide as a commercial service to be purchased by commercial spacecraft operators and the U.S. government. The control of the space-based logistics vehicle, our Mission Extension Vehicle (MEV) and its successors, will not be transferred to a third party. However, providing services using our MEV and its successors will require the real-time sharing of telemetry data between our U.S. based satellite operations center (SOC) and the customer's SOC, and the export licensing jurisdiction of this data is a major concern of ours.

There is a large addressable commercial market for space-based logistics services. There are approximately 380 satellites operating in geosynchronous orbit alone, about 260 of which are commercial communications spacecraft. In most cases, the limiting factor which determines the operational lifetime of such satellites is their supply of attitude control and station-keeping fuel. Therefore, the potential for on-orbit docking for the purposes of servicing (including inspection, repair, and refueling) is of substantial interest to the U.S. government and international commercial satellite industries.

To ensure the control of sensitive technology, the components of greatest national security concern could be made subject to ITAR control by listing them in paragraph (e) of USML Category XV. Candidate technologies for strict control could include the sensors and thrusters that would have to be used to accomplish the close-approach, rendezvous, and docking portions of a servicing mission.

Additionally, ViviSat recommends the insertion of a clarifying note on the jurisdiction of activities intended to demonstrate these technologies that have been carried out on the International Space Station (ISS). One example includes NASA's refueling and servicing demonstrations. Clarification that data and services related to ISS demonstrations remain under EAR jurisdiction would be helpful.



The ViviSat team appreciates the opportunity to comment on this proposed change to the United States Munitions List. We look forward to discussing our comments and rationale in more detail, if desired.

Sincerely,

A handwritten signature in black ink that reads 'Craig P. Weston'. The signature is fluid and cursive, with the first letters of each word being capitalized and prominent.

Craig P. Weston  
President & CEO



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July 3, 2013

ATTN: DDTC Response Team – Regulatory Change, USML Category XV and Defense Services

Subject: ITAR Amendment – USML Category XV and Definition of “Defense Services” -  
Comments on Proposed Regulatory Change to 22 CFR Parts 120, 121 and 124

Reference: Public Notice: 8329; RIN: 1400-AD33

Dear Ms. Heidema:

The General Electric Company, acting through its GE Aviation business unit (GE), respectfully submits the following comments to the referenced proposed changes to 22 CFR Parts 120, 121 and 124.

GE appreciates and supports the Department’s export control reform efforts, as well as its effort to clarify the terms of the proposed rule.

Our comments in this letter are set forth in two sections:

- Comments pertaining to the proposed definition of “Defense Services”; and
- Comments related to the proposed rewritten USML category.

#### **COMMENTS PERTAINING TO THE PROPOSED DEFINITION OF “DEFENSE SERVICES”**

While GE believes that the clarifications and changes proposed by the Department to the definition of “Defense Services” are significant improvements to the earlier proposed definition published in the April 13, 2011 Federal Register, we believe that additional clarifications are necessary before a final rule is implemented.

For convenience, GE has segregated its comments in line with the two main §120.9 paragraphs:

#### ***Comments related to §120.9(a)***

1. Definition of “public domain” as used in §120.9(a)(1)
2. Distinction between the words “in” and “for”
3. Clarification regarding the term “installation”
4. Definitions of Organization, Intermediate and Depot-levels of Maintenance

5. Clarification of paragraphs (a)(5) and (a)(6)

**Comments related to §120.9(b)**

6. The requirements imposed on a US Person employed by a foreign company
7. The mere furnishing of information without otherwise furnishing assistance
8. Clarification regarding administrative services

**Specific Comments on §120.9(a)**

1. *Definition of “public domain” as used in §120.9(a)(1)*

The definition of “public domain” is integral to the operation of paragraph 120.9(a)(1). However, the current definition of that term, unchanged since 1993 is outdated<sup>1</sup>.

Given the anticipated increase in programs that include both transitioning and non-transitioning articles and data under mixed ITAR and EAR authorizations, GE believes that it is important there be a common definition of “Public Domain” for both regulatory regimes. A harmonized definition is consistent with the overall Export Control Reform goals.

Alternatively, the Department should consider altering the definition in §120.9(a)(1) to make clear that any defense service generally must involve the use or transmission of ITAR-controlled technical data. This approach would avoid the public domain issue in this context, avoid confusion in programs that involve both EAR- and ITAR-controlled articles and simplify the issue of employment of US persons. If the Department deems it necessary to regulate certain activities regardless of whether technical data would be provided, it should clearly outline the boundaries of such controls as it has done in § 120.9(a)(3).

2. *Distinction between the words “in” and “for” as used in §120.9(a)(1) and (2)*

The current §120.9 definition of “defense service” uses the word “in” as the function word to indicate the relationship between the regulated action (“furnishing assistance”) and the regulated activities (e.g. design, development etc.). The proposed §129.9(a)(1) uses the word “in” consistent with the current regulation. But the new §120.9(2), uses the word “for” instead of “in” in the same functional role within the definition. It is not clear what the difference is between furnishing assistance “in” a development activity under (a)(1), or “for” an integration activity under (a)(2). To avoid any confusion, GE recommends that the Department uses the word “in” in both §120.9(1) and (2) for the sake of consistency and clarity.

3. *Clarification regarding the term “installation”*

GE appreciates that the Department has clarified that activities related solely to installation of an item into a defense article are not included in the controls applied to integration. We also commend the Department’s inclusion of a definition for “installation” in the Note to paragraph (a)(2) to help

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<sup>1</sup> In 1993, the availability of information to very large and broad audiences through simple web searches did not exist and the dominance of the internet as a source of information was only imagined by a few.

distinguish between one and the other. However, GE believes that one additional clarification is needed to avoid any confusion regarding whether certain installation activities are defense services.

In the commentary contained in the May 24, 2013 Federal Register Notice, the Department expressed its agreement that mere plug and play installation activities should not be considered a defense service. But we note that, as currently drafted, the same plug and play installation activities stated in the (a)(2) Note could be deemed to be assistance in development<sup>2</sup>, manufacture, production, assembly, or maintenance under (a)(1)<sup>3</sup>. Since GE believes that this was not the Department's intention, we think a clarification is needed.

GE recommends including a clarifying note to paragraph (a)(2) as follows:

**Note 2 to paragraph (a)(2):** For the avoidance of doubt, activities meeting the definitions of 'integration' and 'installation' in Note 1 to paragraph (a)(2) are not included in the activities described in paragraph (a)(1)."

#### 4. Definitions of Organization, Intermediate and Depot-levels of Maintenance

In the original April 13, 2011 proposed rule, DDTC included definitions in §120.38 for "organization-level maintenance", "intermediate-level maintenance", and "depot-level maintenance". In the current proposed definition, reference is made to those definitions in both 120.9(a)(1) and (b)(1). However, although the Department has requested further comments to the definition of "defense Services"; it has not indicated whether it intends to use the original April 13, 2011 draft definitions.

As such, GE takes this opportunity to request clarifications to the April 13, 2011 definitions as follows:

- a. GE recommends the following changes to §120.38(a) (red text indicates changes):

"a. Organizational-level maintenance (or basic level maintenance) is the first level of maintenance **capable of being performed in the field of operation by an end-user unit or organization** "on-equipment" (directly on the defense article or support equipment) **or otherwise for re-installation or replacement on the defense article using tools and techniques available in the field, on an item** assigned to the inventory of the end-user unit or organization. Its phases consist of **troubleshooting, fault diagnosing,** repairing, inspecting, servicing, ~~or~~ calibration, testing, lubricating and adjusting equipment, as well as

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<sup>2</sup> The term "development" is defined in the new definition of "specially designed" to include "all stages prior to serial production, such as: design, design research, design analyses, design concepts, assembly and testing of prototypes, pilot production schemes, design data, process of transforming design data into a product, configuration design, integration design, layouts". Although the definition of "development" is only legally applicable in the new §120.41, its existence creates the temptation to refer to it for insight into its interpretation in other contexts.

<sup>3</sup> Some activities meeting the definition of "installation", such as merely furnishing an installation manual for a commercial product to a manufacturer while they are designing a defense article (e.g. a manual for a dashboard radio being contemplated for inclusion in a military vehicle still in the design phase) would fall into those stages contemplated by the "development" definition. be added to the definition that any activity meeting the definition of "installation" in the Note is not nevertheless a "defense service" by operation of (a)(1)

fitting and replacing line-replaceable End Items, Components, Accessories, Attachments, Parts, Firmware, Software, and Systems [see §121.8] ~~minor parts, components, assemblies and line-replaceable spares or units.~~"

GE believes this definition should not be a function of by whom or where the maintenance is performed. Performance of maintenance is not more advanced by virtue of being performed by an independent service provider, such as an overhaul and repair facility or a manufacturer's field rep, than the same work performed by an end user unit. Similarly, simple maintenance is not more advanced simply because it is performed in a location other than the field of operation. The definition should focus on the activity rather than the actor or the location so that the use of the definition in §120.9 can be clear.

GE also proposes language in the third and fourth lines above to focus the definition of basic maintenance on those maintenance actions, such as "pull and replace", that can be done on the flight line or in the field using tools and procedures available at that level. The language will also help distinguish between the other levels of maintenance.

The addition of the terms "troubleshooting" and "fault diagnosing" in line 6 is to recognize that this activity is performed at all levels of maintenance. The amount of sophistication in this activity at O-level maintenance is distinguished in this definition by the tools and procedures available at this level.

There are two changes in the last part of the definition. The first is to recognize that some accessories and attachments can be fitted or attached to equipment at the operational level. The second is to recognize that equipment operators routinely "pull and replace" items capable of being replaced in the field of operation as O-Level tasks using simple tools<sup>4</sup>. By restricting O-Level to minor "parts" and "components", flight line engine or module swaps would be considered a Depot-level function.

b. GE recommends the following changes to §120.38(b):

"b. intermediate-level maintenance is the second-level of maintenance capable of being performed "off-equipment" (on removed components, parts, or equipment) by designated maintenance shops or centers, tenders, and mobile teams in direct support of end-users units or organizations using tools and techniques not available at the organization level. This level does not involve manufacturing or the complete overhaul or rebuilding of defense articles. Its phases consist of: troubleshooting, fault diagnosing, repairing, inspecting, servicing, or calibration, testing, lubricating and adjusting equipment, as well as fitting and replacing End Items, Components, Accessories, Attachments, Parts, Firmware, Software, and Systems [see §121.8] ~~calibration, repair, or testing and replacement of damaged or unserviceable minor parts, components, assemblies and line-replaceable spares or units.~~"

The rationale for the changes recommended in this paragraph is similar to O-level. We believe the emphasis should be placed on capability and tools rather than specific location. These proposed changes will also help clarify the distinction between O and I-Level maintenance

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<sup>4</sup> For example, some gas turbine engines can be replaced in the field by using simple, commercial tools. The GE T700 engine is designed as a modular item, enabling replacement of modules in the field with a simple tool kit.

activities. The focus is on the complexity of the tools and capabilities needed to perform the tasks rather than a list of specific tasks performed at a specific location.

c. GE recommends the following changes to §120.38(c):

c. Depot-level maintenance is ~~the third-level of maintenance not capable of being performed in the field of operation or at an Intermediate-level maintenance shop and required to be performed on- or off-equipment at or by a major repair facility, shipyard, or field team with extensive equipment and personnel of higher technical skill in direct support of end user units or organizations.~~ It consists of providing evaluation or repair beyond unit or organizations ~~or I-level~~ capability. Its phases include: inspection, testing, calibration or repair, including overhaul, ~~complete manufacturing of Components, Accessories, Attachments, Parts, Firmware, Software, and Systems [see §121.8],~~ reconditioning and one-to-one replacement of any defective items, parts or components. ~~and excluding any~~ In addition, modification, enhancement upgrade ~~or~~ and other ~~form~~ forms of alteration or improvement that ~~enhances~~ enhance the performance or capability of the defense article ~~can be performed at this level.~~

The proposed changes distinguish between O and I-Level on the basis of skills, tools and facilities needed. In addition, GE recommends deleting the phrase "in direct support of end-user units or organizations". This phrase appears to exclude the involvement of contractors who routinely perform maintenance and repair activities at all levels, on behalf of the end user.

Including the phrase "complete manufacturing of components . . ." more accurately describes common industry practice for Depot-Level maintenance shops and aligns with the definition of Depot-Level maintenance found in DoDI 4151.20 and 4151.21.

Finally, modifications, enhancements and upgrades to equipment are typically performed at the Depot level. We do not believe excluding those activities from the definition is necessary because assistance at this level is a "defense service".

##### 5. Clarification of paragraphs (a)(5) and (a)(6)

GE notes that the proposed new paragraphs (a)(5) and (a)(6) do not specify that the assistance furnished be to a foreign person.

GE believes that this was likely an oversight, and we recommend that the words "to a foreign person, whether in the United States or abroad" be included in both paragraphs.

#### **Specific Comments on §120.9(b)**

##### 6. The requirements imposed on a US Person employed by a foreign company

GE supports the clarification that the act of employing a natural US Person by a foreign person is not automatically a defense service, but believes that there are still serious issues and questions that need to be addressed related to US Person activities undertaken for a foreign employer. Foreign companies engaged in defense-related activities that are authorized under the ITAR (when applicable)

and under domestic laws employ US Persons. The proposed rule takes a firm position on the treatment of US person employees of foreign entities that will greatly complicate such legitimate trade. Some of the complications include:

- How a foreign employer can determine who their US person employees are, and thus ensure compliance with any requirements associated with defense services received from those employees, if discrimination and privacy laws of their country severely restrict inquiry into a person's nationality when they can otherwise show that they have a right to work<sup>5</sup>.
- Whether treating the work of a US employee in a defense related program as a defense service will result in US person employees being discriminated against by foreign employers<sup>6</sup>.
- Who will bear the responsibility, and what will be the logistics, for registration of US person employees.
- What will be, and who will hold, the proper authorization for a US person employee to render a defense service.

While the mechanisms in Sections 124.16 and 126.18, which were adopted to address similar issues around determination of nationality in the context of dual national employees working under Agreements, are not applicable, they are informative because they show that national security and export regulatory concerns can be addressed by consideration of differing paradigms in other countries.

All of these issues could be avoided if the Department would rethink its position on deeming a US person's work for a foreign person a defense service. The regulation of assistance related to defense articles is driven largely by the need to prevent unauthorized export of technical data, either directly or indirectly. We believe that the approach reflected in this rule<sup>7</sup> creates significant burdens on the legitimate activities of both employees and employers, and that adequate control of technical data can be attained by focusing on the release or transfer of technical data<sup>8</sup>. As the Department itself has noted in commentary to this Rule, the act of assisting in many activities of necessity requires use of technical data.

GE proposes that an employee's use of skills and experience in performing his duties as an employee of a foreign defense contractor without actually transferring any technical data under the jurisdiction of DDTC not be deemed a defense service<sup>9</sup>. As such, we recommend the following alternate language to §120.9(b)(2):

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<sup>5</sup> For example, without being able to ask, it would be very difficult for employers to know that an individual born, educated and employed wholly outside the US, is a US Person because his parents are U.S. Citizens. They could employ a US person without knowing it.

<sup>6</sup> There may be discrimination against the hiring of US persons by foreign employers who want to avoid the risks and troubles associated with managing the defense services received from US individuals. This is possibly another place where non-US companies will seek to keep their programs and products "ITAR-free".

<sup>7</sup> As well as in DDTC's Agreement Guidelines, revision 4.0, that was released in April of this year.

<sup>8</sup> The EAR considers whether there is a release of technology or technical data when determining whether a license is required for technical assistance. In light of ECR and the many programs that will involve both transitioning and non-transitioning items, it is worthwhile considering the benefits of having similar approaches under both the ITAR and EAR.

<sup>9</sup> If a US person were able to work for a foreign employer using other than technical data, there is no compelling reason to regulate their employment outside of the United States.

“(2) ~~Here~~ Employment of a natural U.S. Person by a foreign person **provided such employment does not involve the export, disclosure, release or transfer of technical data under the jurisdiction of the Department of State;**”

Alternatively, the Department could alter the definition in 120.9(a) to make clear that ITAR-controlled technical data must generally be transferred for activity to qualify as a defense service, unless a specific activity is listed (such as in the proposed §120.9(a)(3)). This approach would simplify interpretations and be much easier to administer.

If one of the above changes is not adopted, then GE requests that the Department adopt mechanisms for regulation of defense services by natural US persons that are flexible and streamlined. The Department should allow coverage of US individuals on licenses obtained by US applicants.

#### *7. The mere furnishing of information without otherwise furnishing assistance*

GE notes that, in the proposed definition, the Department has removed furnishing of technical data to foreign persons as a defense service<sup>10</sup>. Consistent with that removal, the Department should clarify that the mere provision of information does not constitute a defense service. Rather, simply transferring technical data is properly considered an export of that data, and is controlled under the applicable rules pertaining to the export of data. The Department should confirm this understanding in its final rule.

Exporters often provide high-level information at the beginning phase of a potential sale. If that information is solely related to commercial products, there cannot be confusion that providing such information constitutes a defense service. This is true even if the commercial items will ultimately be integrated into a defense article.

The Department should clarify that mere furnishing of information should not be viewed as assistance in the design, development or production of an item.

#### *8. Clarification regarding administrative services*

The original April 13, 2011 proposed rule, in paragraph (b)(5), stated that providing certain types of non-technical assistance is not a defense service. In May 24, 2013 FRN proposed definition, that paragraph has been omitted. As noted above “development” activities can be construed to include a very broad spectrum of services. Therefore, GE believes that the clarification is necessary and should be included.

Accordingly, GE recommends that the paragraph be added back to the definition as (b)(6) as follows:

“(6) **Providing assistance (including training) in medical, logistical (other than direct combat operations, maintenance, law enforcement, physical security and personal protection), or other administrative support services to or for a foreign person.**”

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<sup>10</sup> See the current §120.9(a)(2).

## COMMENTS RELATED TO THE PROPOSED RE-WRITTEN USML CATEGORY

Category XV, as with many (if not most) of the rewritten USML categories, uses the term “specially designed” to describe what is (or is not) included within the scope of the Category. As the definition of “specially designed” is pertinent to all USML categories that employ the term, GE would like to address two issues related to this definition that have been discovered since the publication of the April 16, 2013 Final Rule.

### 1. Clarification on the operation of the §120.41(b) release paragraphs

In the new§120.41(b), there is wording that is different than that included in paragraph (b) of the final EAR definition<sup>11</sup> of “specially designed”. The reasons for this difference were not explained in the Supplemental Information section of the April 16 Federal Register Notice. This difference has led us to notice an interpretation of the new definition that has a potentially large and unexpected impact on the operation of the catch and release mechanism. GE expected that when a part, component, accessory, attachment or software is caught by paragraph (a), it would be released if described in paragraph (b). But the actual final language implies that there is an additional layer in the definition distinguishing between 2 ways that specially designed can be used, one in which paragraph (b) releases parts, components etc., and one in which it does not.

There are several factors that contribute to this confusion:

- The lead in language to §120.41 provides that commodities and software are “specially designed” when described under paragraphs (a)(1) and (a)(2) except if they are also described in paragraph (b).
- Notwithstanding the §120.41 lead in language, the lead in language to paragraph (b) adds a qualification or limitation to paragraph (b) whereby although a part, component, etc. may be described in one or more of paragraphs (b)(1) through (b)(5), it will still remain controlled under paragraph (a) if it is described in a USML paragraph that is not a “catch-all” paragraph.
- In the supplemental information contained in the April 16 Federal Register Notice (page 22744), DDTC stated that if the answer to the question of whether a commodity or software is within the scope of paragraph (a) is “yes”, then “the exporter ... must determine whether any one of the five exclusions in paragraph (b) ... applies. *If any one of the five paragraph (b) exclusions applies, then the commodity or software is not specially designed [emphasis added]*”.
- In that same notice the Department stated (page 22745) that paragraphs (a) and (b) are inextricably linked and that paragraph (b) codifies the principle in 120.3 that, in general, a commodity should not be ITAR controlled if it has a predominant civil application or has a performance equivalent ... to a commodity used for civil applications.

Although statements were made in the Supplemental Information indicating a policy to move commodities that have predominant civil applications from the USML to the CCL and not to cause commodities currently subject to the EAR to be pulled onto the USML, there is very specific wording in the Note to paragraph (b) is inconsistent with that policy. That specific wording identifies what is a

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<sup>11</sup> The EAR definition states in the lead-in sentence of paragraph (b) that “[a] part, component, accessory, attachment or software that would be controlled by paragraph (a) is not specially designed if ...”.

“catch all” paragraph (and logically by omission what is not)<sup>12</sup>. However, there are more than those two specifically worded phrases in which the term “specially designed” appears in the rewritten USML Categories<sup>13</sup>. Thus, one may logically conclude that when the term is used in a description that doesn’t match one of those two phrases, its USML paragraph is not a “catch all” paragraph.

The term “specially designed” is used in 2 different types of references in the USML: those that reference a specifically called-out control characteristic or parameter for which the commodity has been designed<sup>14</sup>, and those that reference another commodity or commodities on the USML in or with which it is used<sup>15</sup>. GE understands that a clarification regarding the application of paragraph (b) may be needed because these release paragraphs are not intended to release the commodities described using the term “specially designed” when it is used in reference to specific control characteristics or parameters<sup>16</sup>.

Since the current wording is causing confusion<sup>17</sup> and appears to be inconsistent with ECR goals as noted above, GE believes a change is necessary. GE proposes that the note to paragraph (b) of §120.41 be revised to distinguish between the two reference types so that the release paragraphs can be used for parts, components, accessories, attachments and software that are caught by paragraph (a) but are in fact of the type always intended to be release because of being subject to a prior CJ, used on a civil end-item that is in production, documented as having been designed for use in both defense articles and items subject to the EAR, etc.

GE recommends the following changes to the note to paragraph (b):

“A “catch-all” paragraph is one that does not refer to **specific control parameters** ~~types of parts, components, accessories, or attachments~~<sup>18</sup>, but rather controls

<sup>12</sup> The note states that “for the purposes of the U.S. Munitions List, a “catch-all” paragraph is delineated by the phrases “and specially designed parts and components therefor,” or “parts, components, accessories, attachments, and associated equipment specially designed for.”

<sup>13</sup> For example, the following paragraphs do not match up to this wording: Categories 15(a)(1), 15(a)(10), 15(b), 15(c), 15(e)(4) and 15(e)(7) in the May 24 FRN proposed rule, and Categories 8(h)(7), 8(h)(14), 8(h)(17), 8(h)(21), 8(h)(22), 8(h)(23), 8(h)(24), 8(h)(25), 8(h)(26), 19(a)(1), 19(a)(2), 19(a)(4), 19(a)(5), 19(b), 19(c), 19(e), 19(f)(2), 19(f)(3), 19(f)(4) and 19(f)(5) in the April 16 FRN final rule.

<sup>14</sup> Such as Category 15(a)(1) which describes spacecraft “specially designed to mitigate effects (e.g., scintillation) of or for detection of a nuclear detonation”; and Category 19(a)(1) which describes certain engines “specially designed for thrust augmentation”.

<sup>15</sup> Such as Category 15(e)(8) which describes certain space-based kinetic systems or charged particle energy systems “and specially designed parts and components therefor”; and Category 19(f)(1) which describes parts, components, accessories, attachments, and equipment “specially designed for” the following U.S.-origin engines (and military variants thereof): AE1107C, F101, F107, F112, F118, F119, F120, F135, F136, F414, F415, J402, GE38, TF40B, and TF60.

<sup>16</sup> These, we believe, include 15(a)(1), 15(a)(10), 15(b), 15(c), 8(h)(22)(iii), 19(a)(1), 19(a)(2), 19(a)(4), 19(a)(5), 19(b) and 19(c).

<sup>17</sup> For example, although parts may have been designed for a commercial item and subsequently used on a defense article, or be the subject of a CJ followed by commercial usage on fully certified aircraft, the strict application of the note will pull any such a component caught by 19(f)(2) through (5) from its current recognized CCL classification to the USML.

<sup>18</sup> Deletion to the reference to “types of parts ...” is necessary because there are a number of paragraphs that do describe types of parts, where parts of that type that have been included in CJs or are in

parts, components, accessories, or attachments if they were specially designed for ~~another~~ enumerated item. For the purposes of the U.S. Munitions List, a 'catch-all' paragraph is delineated by ~~the~~ phrases *such as* 'and specially designed parts and components therefor,' ~~or and~~ 'parts, components, accessories, attachments, and associated equipment specially designed for ..., ' *and does not refer to specific control characteristics or parameters that describe the commodities referenced."*

## 2. Further clarification on the operation of "specially designed"

GE has discovered a situation where certain components, although of low level of technology and of the type that should be controlled on the EAR, are left on the USML simply because of a technique used in certain USML categories to specifically call out particular defense articles. Such a result is inconsistent with US Government stated Export Control Reform objectives of moving items of lower importance to the more flexible controls of the CCL.

22 C.F.R. § 121.1 Category 19(f)(1) identifies "specially designed" components for certain listed engines. Paragraphs 19(f)(2) - (5) additionally capture specific types of "specially designed" components for all engines controlled in Category 19.

A common fact pattern is the use of engine components across multiple engine lines. An example is a compressor stator vane linkage. Such a linkage is controlled on the USML if used only on a 19(f)(1) listed engine. If the linkage were used only on an engine described in Category 19(a) but not one listed in 19(f)(1), such as the F404 (a predecessor of the F414), it would not be controlled on the USML.

Similarly, in a case where such a linkage were used on both a F414 engine (listed on 19(f)(1)) as well as a commercial production engine subject to the EAR, that linkage would be 'released' from 19(f)(1) by operation of "*specially designed*" paragraph (b)(3) due to its use on a non-USML engine.

But if the linkage were used on both the F414 engine and the F404, it would be controlled on the USML under 19(f)(1) by virtue of being captured but not released under the current language of the "*specially designed*" definition. This is not an uncommon situation, as many modern engines like the F414 re-use older-design components that would be removed from the USML if not used on the more modern engine. Re-use of parts leads to lower costs and higher reliability across multiple engine platforms. Absent the need for a new part for improved or different performance, the re-use of old parts in new designs (both military and civil) is common, as the practice contributes cost reductions for expensive development programs.

A parallel situation was recognized in the new Category 8 when dealing with earlier models of F15 and F18 aircraft: Category 8(h)(1) controls components of the F-15SE and F/A-18 E/F/G aircraft, but then specifically excludes from the USML any parts, components, accessories, attachments, and equipment of the F-15SE and F/A-18 E/F/G that are common to earlier models of these aircraft, unless listed elsewhere in Category 8(h).

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production commercially. E.g. 8(h)(7), 8(h)(17), 8(h)(21), 8(h)(22), 8(h)(23), 8(h)(25), 19(e), 19(f)(2), 19(f)(3), 19(f)(4) and 19(f)(5).

GE believes that a component common to both a Category 19(f)(1) listed engine as well as other USML engines, where not otherwise described in another USML category, should be controlled on the EAR, for example under ECCN 9A619. Such a result is consistent with US Government stated Export Control Reform objectives of moving items of lower importance to the more flexible controls of the CCL.

Similarly, the Category 8(h)(1) release should be applicable not only to components common to earlier versions of F-15SE and F/A-18 E/F/G, but also to other scenarios where such components are common to USML aircraft not listed in 8(h)(1).

As such, GE recommends that in all USML categories that capture all components used in certain specified defense articles<sup>19</sup>, a notation be added that states, similar to Category 8(h)(1), that "parts, components, accessories or attachments of the *[articles specified in the applicable paragraph]* that are common to earlier model defense articles, unless listed in another paragraph in this Category, are subject to the EAR".

Thank you for the opportunity to provide these comments on the extensive export control reforms being undertaken by the Department. 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. George S. Pultz at (781) 594-3406 or by email at george.pultz@ge.com.

Sincerely,



Kathleen Lockard Palma  
Executive  
International Trade Compliance

---

<sup>19</sup> Such as the specific aircraft in Category 8(h)(1) or engines in Category 19(f)(1).

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service.”

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0013

Comment on DOS\_FRDOC\_0001-2421

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## Submitter Information

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### General Comment

On 120.9(a)(5) and 120.9(a)(6):

Clarification is requested on the definition of spacecraft, including satellites. Is this in relation to the spacecraft as described in USML Category XV(a)?

On 120.9(a)(5):

In cases where a standard adapter is used, such as the CubeSat P-POD, and the integration more closely resembles an installation, as described in note to paragraph (a)(2) of this section, is this paragraph applicable? This concern is expressed due, in part to the growing number of CubeSat launches in the USA and abroad. Further details on CubeSats and the P-POD are found at the following URLs and attached for consideration.

[http://www.nasa.gov/pdf/627972main\\_LSP-REQ-317\\_01A.pdf](http://www.nasa.gov/pdf/627972main_LSP-REQ-317_01A.pdf)

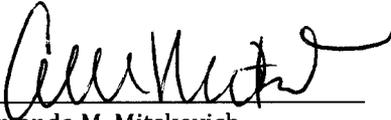
[http://www.hb9afo.ch/swisscube/20080323\\_plaquette%20swisscube/p-pod.jpg](http://www.hb9afo.ch/swisscube/20080323_plaquette%20swisscube/p-pod.jpg)



National Aeronautics and Space Administration  
John F. Kennedy Space Center, Florida  
Launch Services Program

LSP-REQ-317.01  
Revision A

**Launch Services Program  
Program Level Poly-Picosatellite Orbital Deployer (PPOD)  
and CubeSat Requirements Document**

Approved:   
Amanda M. Mitskevich  
Manager, Launch Services Program

Date: 10/13/11

<b>RECORD OF REVISIONS</b>		
<b>REV</b>	<b>DESCRIPTION</b>	<b>DATE</b>
Basic	Basic Issue	July 24, 2009
A	ERB-09-102-2(7/7/2011): <ol style="list-style-type: none"><li>1. Update 6.2.2 to remove CubeSat structural qualification requirement,</li><li>2. Update 6.2.3 and 6.3.3 to allow any sized CubeSats between 1U and 3U,</li><li>3. Update Table 1 for clarity,</li><li>4. Editorial corrections.</li></ol>	October 13, 2011

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2. Applicable Documents.....	4
3. Definitions.....	5
4. Mission Objective.....	6
5. Programmatic Requirements.....	6
6. Program Technical Requirements.....	7

## **1. Introduction**

### **1.1. Purpose**

The purpose of this document is to define the Launch Services Program (LSP) program level and technical requirements placed on California Polytechnic State University (Cal Poly) Mark III Poly Picosatellite Orbital Deployer (PPOD) and Picosatellite (CubeSats) satellites for integration on NASA LSP ELV mission. These requirements are to ensure no increase risk to the Primary Mission. The requirements within this document are generic and independent of the Launch Vehicle (LV). The technical requirements contained in the document will be either implemented or flowed down to mission specific PPOD Interface Control Documents (ICDs) as well as PPOD and CubeSats specification documents.

It is the responsibility of the LSP to provide Certification of Flight Readiness (CoFR) statements for PPODs to fly on NASA ELV missions. LSP will perform verification for the PPOD to LV ICD requirements. It is the responsibility of Cal Poly to verify the mission specific ICD between PPOD and CubeSats, with the exception of Mandatory Compliance Requirements defined by LSP. LSP will have approval authority for PPOD and the CubeSat Mandatory Compliance Requirements (MCRs) within the PPOD to CubeSat ICD. LSP will have insight into all other CubeSat development activities such as design, development, testing and integration.

### **1.2. PPOD Description**

The PPOD provides a standard interface between picosatellites class satellites and a launch vehicle. The purpose of the PPOD is to act as an interface between the picosatellites (also known as CubeSats) and the launch vehicle as well as a deployment system for the CubeSats.

### **1.3. PPOD Concept**

The CubeSat Project was developed by California Polytechnic State University, San Luis Obispo (Cal Poly) and Stanford University's Space Systems Development Lab. The Project is an international collaboration of universities, high schools, and private firms developing picosatellites containing scientific, private, and government payloads. The primary mission of the CubeSat program is to provide access to space for small payloads. The PPOD is a standard CubeSat deployment system, which ensures all CubeSat developers conform to common physical requirements, which in turn reduces cost and development time. The PPOD plays a critical role as the interface between the launch vehicle and picosatellites. The PPOD is versatile, with a small profile and the ability to mount to different launch vehicles in a variety of configurations. The PPOD utilizes a tubular design and can hold up to 34cm x 10cm x 10cm of hardware. The most common configuration is three CubeSat of equal size (typically 10 cm cubes with a mass of less than 1 kg); however, the capability exists to integrate picosatellites of different lengths. The tubular design creates a predictable linear trajectory for the picosatellites resulting in a low spin rate upon deployment. The satellites are deployed from the PPOD by means of a spring and glide

along smooth flat rails as they exit the PPOD. After a signal is sent from the launch vehicle, a spring-loaded door is opened and the picosatellites are deployed by the main spring.

## 2. Applicable Documents

All Compliance and Reference documents are compiled into this section. Documents listed herein are applicable to this document to the extent specified in the requirement.

### 2.1. Compliance Documents

- |    |                            |                                                                                                                    |
|----|----------------------------|--------------------------------------------------------------------------------------------------------------------|
| a. | AFSPCMAN 91-710            | Range Safety User Requirements Manual Volume 3 – Launch Vehicle, Payloads, and Ground Support Systems Requirements |
| b. | GSFC-STD-7000              | General Environmental Verification Standard (GEVS) for GSFC Flight Program and projects                            |
| c. | JPL D-26086D               | Environmental Requirements documents (ERD)                                                                         |
| d. | MIL-HDBK-5                 | Military Handbook 5, Metallic Materials and Elements for Aerospace Vehicle Structures                              |
| e. | MIL-STD-1540C              | Military Standard Test Requirements for Launch, Upper-Stage, and Space Vehicles                                    |
| f. | MMPDS                      | Metallic Materials Properties Development and Standardization                                                      |
| g. | NASA-STD-6016              | Standard Materials and Processes Requirements for Spacecraft                                                       |
| h. | <a href="#">NPR 8715.6</a> | NASA Procedural Requirements for Limiting Orbital Debris                                                           |

### 2.2. Reference Documents

- |    |                              |                                         |
|----|------------------------------|-----------------------------------------|
| a. | <a href="#">LSP-P-321.01</a> | <i>Engineering Review Process (ERP)</i> |
|----|------------------------------|-----------------------------------------|

### 3. Definitions

Primary Mission: All hardware, software, systems, and analysis products pertaining to the manifested primary spacecraft customer (includes both primary and secondary payloads).

Auxiliary Payload: Are considered in this document as the picosatellites or CubeSats that have no interface (mechanical, electrical or RF) with the LV.

CubeSat(s): All hardware, software, systems, and analysis products pertaining to a Cube Satellite that is intended to be installed within a PPOD. This includes CubeSat mass simulators.

PPOD(s): All hardware, software, systems, and analysis products pertaining to a Poly Pico Satellite Orbital Deployer.

PPOD System: An integrated system consisting of PPOD and installed CubeSats.

Launch Vehicle (LV): The selected Launch Vehicle for a specified PPOD mission.

Launch Services Program (LSP): The NASA Launch Services Program.

Mandatory Compliance Requirements (MCRs): Are those requirements within the PPOD to CubeSat ICD, which LSP is required to verify to sign the CoFR.

Maximum Predicted Environment (MPE):

- Dynamic Environments MPE: Envelopes a P95/50 or mean + 5 dB of flight environments.
- Thermal MPE: Derived via simulation + 11° C for uncertainty

#### **4. Mission Objective**

The LSP desires to launch Poly Pico Orbital Deployer (PPOD) as an auxiliary payload carrier.

#### **5. Programmatic Requirements**

PPOD System shall pose no increase to the baseline risk for the Primary Mission.

##### **5.1. Program Requirements**

- 5.1.1. LSP will procure integrated services and flight qualified PPOD per the requirement in this document and mission specific PPOD to LV ICD.
- 5.1.2. LSP will apply best effort for the mission success of the individual CubeSats (LSP is not responsible for mission success of the CubeSats).
- 5.1.3. PPOD mission will be approved by the Flight Planning Board before manifesting on NASA missions.
- 5.1.4. Flight Planning Board will inform the Primary Mission that PPOD has been manifested on their mission.
- 5.1.5. LSP will provide resources to accommodate the integration of selected PPOD mission (up to 3 FTEs).
- 5.1.6. LSP will not require attendance from the Primary Mission for PPOD reviews and assessments, however, the Primary Mission will be informed and invited.
- 5.1.7. LSP will have approval authority for PPODs and CubeSat MCRs and insight into all other PPOD and CubeSat development activities (e.g. design, development and test) as required.
- 5.1.8. CubeSats will be manifested per Manifesting Policy (TBD).
- 5.1.9. CubeSats will not interfere with the mission success of other CubeSats integrated in the same PPOD.
- 5.1.10. CubeSats shall be delivered to the PPOD in a time frame that does not affect the PPOD integration-processing schedule.
- 5.1.11. PPOD System shall be delivered to Launch Service Contractor in a time frame that does not affect the Primary Mission integration cycle or launch timeline.
- 5.1.12. There shall be no waivers or deviations to the requirements listed in this document. All requirement changes shall be approved by LSP Engineering Review Board.

## 6. Program Technical Requirements

This section defines the technical requirements for LSP, CubeSats, PPODs and LV.

### 6.1. LSP Technical Requirements

- 6.1.1. LSP will conduct verifications for the PPOD to LV ICD as well as the MCRs with the PPOD to CubeSat ICD.
- 6.1.2. LSP will follow their standard review process for non-conformances, new flight items, changes in qualification status etc. per [LSP-P-321.01](#) *Engineering Review Process (ERP)*.

### 6.2. CubeSat Technical Requirements

- 6.2.1. CubeSats shall be designed, and verified to the environments defined in Table 1 - *PPOD and CubeSat Test Environments Testing Table* and per Figure 1 - *PPOD and CubeSat Qualification and Acceptance Test Flow Diagram*.
- 6.2.2. CubeSat Structural qualification is adequately achieved through environmental testing only. (PR 6.3.1, Table 1) During periods where all flight loads are applied, CubeSats are considered to be internal components of the PPOD assembly.
- 6.2.3. CubeSats shall be no smaller than a 1U(10x10x10cm) and no larger than a 3U(30x10x10cm).
- 6.2.4. CubeSats shall not contain pressurized vessels.
- 6.2.5. CubeSat shall not contain propulsion systems.
- 6.2.6. CubeSats shall not contain radioactive material.
- 6.2.7. CubeSats shall not contain any explosive devices.
- 6.2.8. CubeSats hazardous material shall conform to AFSPCMAN 91-710, Range Safety User Requirements Manual Volume 3 – Launch Vehicles, Payloads, and Ground Support Systems Requirements.
- 6.2.9. CubeSats shall remain powered off from the time of delivery to LV through on-orbit deployment.
- 6.2.10. CubeSats shall not radiate RF from the time of delivery to LV through 45 minutes after on-orbit deployment.
- 6.2.11. The CubeSats shall be designed to meet at least one of the following requirements to prohibit inadvertent RF transmission.
  - 6.2.11.1. CubeSat shall be designed with one RF inhibit and have a RF power output of no greater than 1.5W
  - 6.2.11.2. CubeSat shall be designed with two independent RF inhibits
- 6.2.12. CubeSats shall be self-contained, and provide their own power, sequencing, and wiring.

- 6.2.13. CubeSats shall be designed to accommodate ascent venting per Ventable Volume/Area < 2000 inches in accordance with accepted standards such as JPL D-26086, *Revision D, Environmental Requirements Document (ERD)*.
- 6.2.14. CubeSats mission design and hardware shall be in accordance with [NPR 8715.6](#) NASA Procedural Requirements for Limiting Orbital Debris.
- 6.2.15. CubeSats materials shall be selected in accordance with NASA-STD-6016 (Section 4.2), *Standard Materials and Processes Requirements for Spacecraft*.

### 6.3. PPOD Technical Requirements

- 6.3.1. PPODs shall be designed, and verified to the environments defined in Table 1 - *PPOD and CubeSat Test Environments Testing Table* and per Figure 1 - *PPOD and CubeSat Qualification and Acceptance Test Flow Diagram*.
- 6.3.2. PPODs shall be structurally qualified in accordance with Table 2 - Strength Qualification Requirements.
- 6.3.3. CubeSat size limitations are established in 6.2.3 and occupy the full usable volume of a PPOD.
- 6.3.4. PPODs shall not violate the primary mission static and/or dynamic envelopes.
- 6.3.5. PPODs shall not affect LV avionics qualification status or architecture.
- 6.3.6. PPOD shall incorporate a sensor for door position (Open/Closed).
- 6.3.7. PPOD door release mechanism shall be designed to accept redundantly initiated signals.
- 6.3.8. PPODs shall be designed to accommodate ascent venting per Ventable Volume/Area < 2000 inches in accordance with accepted standards such as JPL D-26086, *Revision D, Environmental Requirements Document (ERD)*.
- 6.3.9. PPOD shall deploy CubeSats at a velocity sufficient to prevent re-contact with Primary Mission hardware.
- 6.3.10. PPOD shall not deploy CubeSat mass simulator(s).
- 6.3.11. PPODs shall utilize industry standards for locking methodologies on all fasteners consistent with NASA-STD-6016 .
- 6.3.12. PPOD material shall be in accordance with NASA-STD-6016 (Section 4.2), *Standard Materials and Processes Requirements for Spacecraft*.
- 6.3.13. PPODs shall conduct vehicle specific CubeSat separation analyses.
  - 6.3.13.1. The separation analysis shall determine the nominal and 3 sigma dispersion values of the impulse imparted to the LV for each CubeSat separation event to include consideration of separation system mechanism and CubeSat mass properties uncertainties.

- 6.3.13.2. The separation analysis shall confirm that deploying CubeSat(s) during the CubeSat separation event(s) remain within the allowable separation cone(s) as specified by the LV contractor.
- 6.3.14. PPOD System shall be designed to provide a minimum of 20 dB EMI Safety Margin (EMISM) for non-explosive actuator (NEA) circuits.
- 6.3.15. PPOD System shall have a fixed base frequency greater than 120 Hz.

**Table 1 – PPOD and CubeSat Environments Test Table**

Tests	Qualification by Test	Protoflight Test	Acceptance Test
<b>Random vibration</b> <sup>6</sup> (CubeSat and PPOD) Ref Mil-Std 1540C	MPE + 6 dB for (3) minutes, each of (3) axes <sup>1</sup>	MPE+3 dB for (2) minutes, each of (3) axes <sup>1</sup>	MPE for (1) minute, each of (3) axes <sup>1</sup>
<b>Sinusoidal Vibration</b> <sup>6</sup> (CubeSat and PPOD) Ref Mil-Std 1540C	MPE + 6 dB. Testing shall be performed for content that is not covered by random vibration testing	1.25 x MPE. Testing shall be performed for content that is not covered by random vibration testing	MPE. Testing shall be performed for content that is not covered by random vibration testing <sup>1</sup>
<b>Shock</b> <sup>6</sup> (CubeSat and PPOD) Ref Mil-Std 1540C	MPE + 6 dB, 3 times in both directions of 3 axes (FB 1.1.6 Dispo) <sup>1,3</sup>	MPE + 3 dB, 1 times in both directions of 3 axes <sup>1,3</sup>	N/A
<b>Thermal Vacuum Cycle</b> (PPOD Only) Ref.: MIL-STD 1540 B, GSFC-STD-7000	MPE <sup>2</sup> +/- 10° C Minimum Range = -14 -3/+0°C to +71 -0/+3°C Cycles = 8 Dwell Time = 1 hour min. @ extreme Temp. after thermal stabilization Transition = < 5° C/minute Vacuum = 1x10 <sup>-4</sup> Torr	MPE <sup>2</sup> +/- 10° C Minimum Range = -14 -3/+0°C to +71 -0/+3°C Cycles = 4 Dwell Time = 1 hour min. @ extreme Temp. after thermal stabilization Transition = < 5° C/minute Vacuum = 1x10 <sup>-4</sup> Torr	MPE <sup>2</sup> +/- 5° C Minimum Range = -9 -3/+0°C to +66 -0/+3°C Cycles = 2 Dwell Time = 1 hour min. @ extreme Temp. after thermal stabilization Transition = < 5° C/minute Vacuum = 1x10 <sup>-4</sup> Torr
<b>Thermal Vacuum Bake out</b> (PPOD Only) Ref.: MIL-STD 1540 B, GSFC-STD-7000	N/A	Min. Temp 70°C <sup>4,7</sup> Cycles = 1 Dwell Time = Min. 3 hour after thermal stabilization Transition = N/A Vacuum = 1x10 <sup>-4</sup> Torr	Min. Temp 70°C <sup>4,7</sup> Cycles = 1 Dwell Time = Min. 3 hour after thermal stabilization Transition = N/A Vacuum = 1x10 <sup>-4</sup> Torr
<b>Thermal Vac Bake out</b> (CubeSat Only) Ref.: MIL-STD 1540 B, GSFC-STD-7000	N/A	Min. Temp 70°C <sup>5</sup> Cycles = 1 Dwell Time = Min. 3 hour after thermal stabilization Transition = < 5° C/minute Vacuum = 1x10 <sup>-4</sup> Torr	Min. Temp 70°C <sup>5</sup> Cycles = 1 Dwell Time = Min. 3 hour after thermal stabilization Transition = < 5° C/minute Vacuum = 1x10 <sup>-4</sup> Torr
<b>Hardware Configuration</b>	<b>PPOD</b> – Flight identical unit (includes NEA, cable and connector)  <b>CubeSat</b> – Flight Identical unit	<b>PPOD</b> – Flight unit (includes flight NEA, cable and connector)  <b>CubeSat</b> – Flight unit	<b>PPOD</b> – Flight unit (includes flight NEA, cable and connector)  <b>CubeSat</b> – Flight unit
<p>(1) Dynamic Environments random MPE envelopes a P95/50 or mean + 5 dB of flight environments. Sinusoidal levels envelope loads predictions and flight environments. Shock MPE envelopes P95/50 for at least (3) samples, with 4.5 dB uncertainty factor applied where less than (3) samples are used.</p> <p>(2) Thermal MPE = Max predicted via simulation + 11° C for uncertainty.</p> <p>(3) Shock testing is not required when the following conditions are met: 1) The qualification random vibration test spectrum when converted to an equivalent shock response spectrum (3-sigma response for Q=10) exceeds the qualification shock spectrum requirement at all frequencies below 2000 Hz. 2) The maximum expected shock spectrum above 2000 Hz does not exceed (g) values equal to 0.8 times the frequency in Hz at all frequencies above 2000 Hz, corresponding to the velocity of (50 inches/second).</p> <p>(4) Maximum bake out temperature set to same maximum temperature for thermal cycle test for consistency, assuming bake out would be performed during same vacuum exposure.</p> <p>(5) If the CubeSat cannot achieve these temperature levels, the CubeSat shall hold a minimum temperature of 60°C for a minimum of 6 hours.</p> <p>(6) Levels are defined to be at the PPOD to Launch Vehicle mechanical interface.</p> <p>(7) <b>Thermal bake out temperatures are not to exceed qualification temperatures</b></p>			

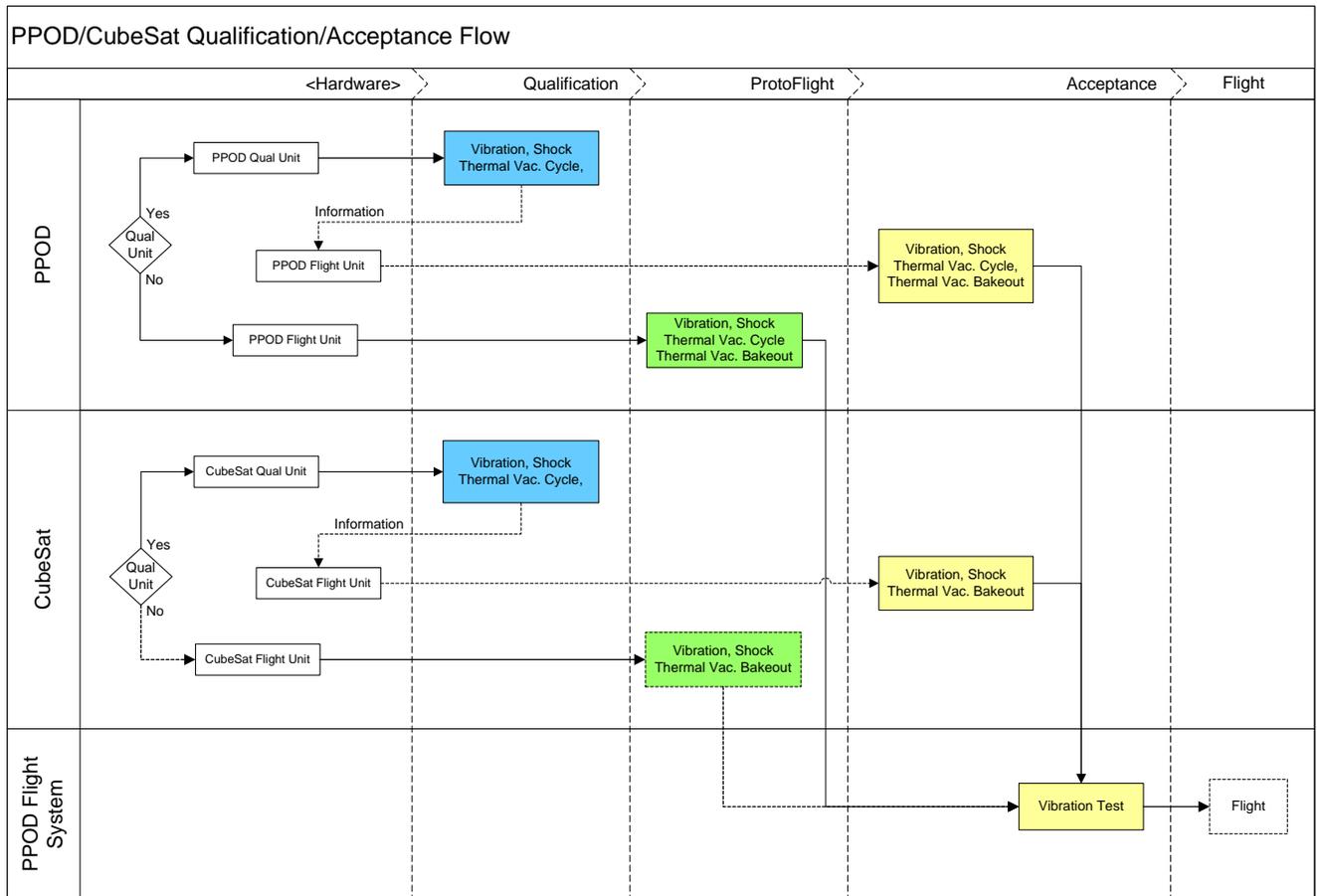


Figure 1 PPOD and CubeSat Qualification Acceptance Flow Diagram

Table 2, Strength Qualification Requirements

Qualification Method	Qualification Factors of Safety
Strength Analysis Only	1.6 X Limit load with respect to material yield strength 2.0 x limit load with respect to material ultimate strength
Structural Test*	1.1 X Limit load with respect to material yield strength with no detrimental yielding of test article 1.25 x limit load with respect to material ultimate strength with no structural failure of test article
<p>Note: Material Strength properties shall be "A" basis allowable as shown in either MIL-HDBK-5 or MMPDS. Limit loads are worst-case combination of flight loads and environments occurring during the launch phase of a mission.</p> <p>* A combination of structural test and analysis maybe used for qualification. Factors of safety used in the analysis are those shown above for Structural Test.</p>	

#### **6.4. LV Technical Requirements**

- 6.4.1.LV shall integrate and/or install PPODs System onto a NASA/Launch Vehicle Contractor agreed upon location.
- 6.4.2.LV integration of a PPODs System shall not delay primary mission integration cycle.
- 6.4.3.LV shall not modify the Primary Spacecraft interface to accommodate a PPOD.
- 6.4.4.LV shall accommodate PPOD door position indicator in the flight telemetry stream.
- 6.4.5.LV avionics shall provide redundant-separation signals to the PPOD door actuation device.
- 6.4.6.LV shall provide fault tolerance for inadvertent actuation equal to or better than that used on the primary/secondary spacecraft.
- 6.4.7.LV shall not alter the mechanical and electrical interface design of the PPODs.
- 6.4.8.LV shall design, qualify and acceptances test the LV PPOD interface.
- 6.4.9.LV shall command deployment of the PPOD's CubeSats.
- 6.4.10. LV trajectory design shall not result in LV contact with deployed CubeSats.
- 6.4.11. LV shall not deploy the CubeSats in a trajectory that will contact the Primary Mission or LV.
- 6.4.12. LV shall define the CubeSat allowable deployment cone for each PPOD.

## Appendix A

### Acronyms

<b>Cal Poly</b>	<b>California Polytechnic State University</b>
<b>cm</b>	<b>Centimeter</b>
<b>ELV</b>	<b>Expendable Launch Vehicle</b>
<b>ICD</b>	<b>Interface Control Document</b>
<b>kg</b>	<b>Kilograms</b>
<b>LSP</b>	<b>Launch Services Program</b>
<b>LV</b>	<b>Launch Vehicle</b>
<b>MCR</b>	<b>Mandatory Compliance Requirements</b>
<b>MPE</b>	<b>Maximum Predicted Environments</b>
<b>NEA</b>	<b>Non-Explosive Actuator</b>
<b>PPOD</b>	<b>Poly Picosatellite Orbital Deployer</b>
<b>RF</b>	<b>Radio Frequency</b>



[http://www.hb9afo.ch/swisscube/20080323\\_plaquette%20swisscube/p-pod.jpg](http://www.hb9afo.ch/swisscube/20080323_plaquette%20swisscube/p-pod.jpg)

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of "Defense Service."

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0014

Comment on DOS\_FRDOC\_0001-2421

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## Submitter Information

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### General Comment

On Category XV(a)(2) clarification is requested on what is meant by "track . . . objects . . .". Many remote sensing satellites gather imagery and data that is subsequently used by others for various purposes, including tracking. Does this refer specifically to satellites which actively track objects?

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

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**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0015

Comment on DOS\_FRDOC\_0001-2421

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## General Comment

Dear Sir or Madam,

I am writing to request that you reconsider the ITAR restrictions for manned spacecraft in order to facilitate the development of the commercial human spaceflight industry.

Category XV

Paragraph a(4) will hinder free access to commercial orbital facilities such as a Bigelow commercial space station or future refueling depot.

Paragraph a(11) will also hinder development of the emerging human spacelight industry including actors such as SpaceX, Sierra Nevada, Bigelow, XCOR, Virgin Galactic, Blue Origin, etc.

More specifically, human rated suborbital vehicles (with a maximum altitude of around 60-70 miles) as mentioned in XV a(11) should be removed from the DoD Munitions List and placed on the Commerce Control List because these vehicles have limited or no autonomous guidance &

control and do not have sufficient range to be considered as a threatening weapon.

I believe sufficient safeguards are already in place to control sensitive electronics or other parts which may be included on these suborbital human vehicles.

Kind regards,

Garrett Smith

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of "Defense Service."

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0016

Comment on DOS\_FRDOC\_0001-2421

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## Submitter Information

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## General Comment

Greetings,

While I applaud the removal of satellite systems from the munitions list, we cannot ignore the need to move commercial suborbital and orbital vehicles as well. The impact it will have on the growing commercial space business will be detrimental if these classes of vehicles are not moved as well.

In these times when the United States needs to be as competitive as possible, leaving the regulations in their proposed state will hurt the space sector just when it needs the most support from its government.

Let's not cause undue harm to the very firms that are wanting to keep America at the forefront of Space technology. I ask you to carefully consider amending these rules to include all commercial launch vehicles.

Thank you.

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service.”

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0017

Comment on DOS\_FRDOC\_0001-2421

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**Submitter's Representative:** Kenichi Ito

**Organization:** Hokkaido Aerospace Science and Technology Incubation Center

**Government Agency Type:** Foreign

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## General Comment

According to the 1248 Report, the review teams determined whether an item should remain USML controlled or not by the following criteria:

(1) Is the item “specially designed” for a military or intelligence application?

(2) Are the end-users of the items predominately or exclusively governments or militaries?

However, there are some concerns. In fact, it is described in p31434 of Federal Register/vol.78, No.101 as follows:

“The Departments of Defense and State have since reviewed such technology and concluded that it is not per se now subject to USML category XV. There is thus no proposal, inclusion of such technology as a general matter in either the proposed USML Category XV or the proposed 9E515.”, though I know it was written to be relevant to 9E515. As a result, you decided to include this space tourism in 14 CFD part 121.1 Category XV. It is understandable that the Departments of State and Defense put the top priority on national security, but space tourism is the furthest from the national security. Space tourism does not violate any of above criteria. I

can't find the reason why it was regulated in the draft.

We have once planned to launch a Japanese CAMUI hybrid rocket from Rocketplane, one of your suborbital vehicles. This is now halted by the chapter 7 bankruptcy of the Rocketplane Global. We are still looking forward to doing the above air launch from Hokkaido Spaceport which will be licensed by FAA AST, if it can. This new regulation seems to make such an international business become more difficult. We hope Spaceship-II or Lynx will be transported to Japan and fly and land on Hokkaido Spaceport in near future without complicated procedures for ITAR application.

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of "Defense Service."

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0018

Comment on DOS\_FRDOC\_0001-2421

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## Submitter Information

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## General Comment

Ladies and Gentlemen,

I am an investor in XCOR Aerospace. By limiting the market of manned suborbital vehicles to the US, you are potentially delaying the opening of space another 50 years. This proposal to limit suborbital operations overseas is like Spain in the 15th century saying that the caravel is too sensitive to sail to the new world.

Please consider the so-called benefits to forbidding wet leases of civilian space technology. There don't appear to be any. Weigh that against American jobs.

Best Regards,

Sam Dinkin

Austin, TX

# Florida Space Development Council

A Chapter of the National Space Society



To whom it may concern,

The Florida Space Development Council (FSDC) is concerned that rulemaking efforts in support of ongoing revisions to ITAR (RIN (1400–AD33) Rule 78 FR 31 444) might inappropriately place commercial human spaceflight vehicles into the Department of Defense Munitions List. We ask that the Department of State take special care to ensure that human spaceflight vehicles intended for commercial space tourism, research, and exploration are not adversely impacted by the proposed rulemaking.

Commercial human spaceflight is a rapidly emerging industry that holds great potential as an enterprise that can be dominated by U.S. companies. If smartly regulated, the industry -- and U.S. leadership in it -- will grow and mature over the next several decades. FSDC supports the inclusion of such human spaceflight vehicles on a more appropriate Commercial Control List under the purview of the U.S. Department of Commerce.

Thank you for your consideration.

Sincerely,

A handwritten signature in blue ink that reads "Laura Seward". The signature is written in a cursive, flowing style.

Laura Seward  
President, Florida Space Development Council

#### Corporate Members

ARES Institute - Courtyard by Marriott Cocoa Beach - Deep Space Industries - Florida Space Grant Consortium  
Golden Spike Company - GP Strategies - Micro Aerospace Solutions - Space Florida - SpaceX - Terasphere LLC  
[www.nssflorida.org](http://www.nssflorida.org)

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service.”

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0020

Comment on DOS\_FRDOC\_0001-2421

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## General Comment

As a potential future employee of the upcoming generation of suborbital spaceflight companies, I would like to note that my employment opportunities are affected by this Proposed Rule.

According to the Aerospace Industries Association, the US commercial satellite industry market share dropped from a dominant position greater than 60% in 1999 to under 30% by 2008. More than a quarter of a million jobs were lost mainly due to a previous Rule that moved commercial satellites to the DOD Munitions List. Fortunately, this Rule corrects that error, and I hope that the commercial satellite business will recover in the US.

Unfortunately, this Proposed Rule moves suborbital manned vehicles to this same munitions list that decimated the commercial satellite business.

I would request that you move suborbital manned vehicles to the Commerce Control List to prevent the same negative impacts to job creation and US leadership in the suborbital space-science research and personal spaceflight industry.

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of "Defense Service."

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0021

Comment on DOS\_FRDOC\_0001-2421

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## Submitter Information

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**Government Agency Type:** Federal

**Government Agency:** NASA

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## General Comment

The proposed rule classes spacecraft that "1) Are man-rated sub-orbital, orbital, lunar, interplanetary or habitat" as munitions. There is no historical evidence to support this decision; subsequent to the loss of the Shuttle Challenger the US military has eliminated all work on military use of manned spacecraft. On the other hand, this provision would seriously undermine the newly developing commercial human spaceflight industry, making it impossible for US companies to create the new high-tech jobs and export markets that we need to generate the tax dollars that keep our nation secure.

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of “Defense Service.”

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0022

Comment on DOS\_FRDOC\_0001-2421

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**Submitter's Representative:** N/A

**Organization:** N/A

**Government Agency:** N/A

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## General Comment

Putting suborbital and orbital people carrying craft on the munitions list will have the same affect that putting communications satellites on the list did decades ago. Namely that the industry will move to other countries and the USA will lose much of the market.

Please remove these space craft from the proposed list. It is the right thing to do for the American people.

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of "Defense Service."

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0023

Comment on DOS\_FRDOC\_0001-2421

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## Submitter Information

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## General Comment

Dear Sirs:

The addition of Manned Sub-orbital Vehicles to the ITAR list is a over stepping the needs of security.

Manned Sub Orbital Vehicles are of no use to the military. Their short range and rather limited ability to stay aloft for very long decrease their military usefulness to zero.

Adding these simple vehicles to the USML also makes them non competitive in the world market. The market segment would be destroyed before it got started.

Finally, our current air to air missiles have the capability to shot these vehicles down already. As a military weapon, they are lacking in many areas. Don't include them on the revised USML.

Yours Truly,  
Richard W. Wills,

Capt, USAFR, Retired

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of "Defense Service."

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0024

Comment on DOS\_FRDOC\_0001-2421

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## Submitter Information

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## General Comment

With regards to this section in the proposed rule:

"(11) Are man-rated sub-orbital, orbital, lunar, interplanetary or habitat; or"

By adding/retaining man-rated sub-orbital, orbital, etc vehicles in the munitions list, the rule unnecessarily restricts commerce. This is especially important in the light that these flight profiles necessarily involve potential exports, especially in abort conditions. One can easily foresee daily trans-pacific sub-orbital flights, for example, using near-term technology. It seems more reasonable to limit capabilities, such as payload in excess of 500kg (which is used elsewhere in the rules). Having a human on board does not automatically make the vehicle a weapon - if anything, the logic should work the other way as a manned space weapon doesn't make much sense.

If further restrictions are deemed necessary, we would like to suggest that a "cut out" be made that would allow manned vehicles to avoid ITAR if certain rules are followed. This would be similar to the approach taken by the FAA in PART 103 by deeming certain vehicle classes

"ultralight vehicles", that are not required to follow the more burdensome regulations that apply to larger craft. An example of such a rule:

\* Any manned vehicle meeting the following criteria shall be exempted from ITAR regulations:

1. The vehicle must have a large radar signature (more than the equivalent of a 1 meter radius steel shell)
2. The vehicle must be "limited by physics" to subsonic flight at all altitudes below 30,000 feet.
3. The vehicle must have a payload of less than 500kg, including all passengers.
4. The vehicle must have only a manually activated guidance system.

A rule cut out like this would greatly benefit the nascent aerospace vehicle industry.

Thank you for your consideration.

# PUBLIC SUBMISSION

**Docket:** DOS-2013-0015

Amendment to the International Traffic in Arms Regulations: Revision of U.S. Munitions List Category XV and Definition of "Defense Service."

**Comment On:** DOS-2013-0015-0001

International Traffic in Arms: Revision of U.S. Munitions List Category XV and Definition of Defense Service

**Document:** DOS-2013-0015-0026

Comment on DOS\_FRDOC\_0001-2421

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## Submitter Information

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## General Comment

Thank you for this opportunity to comment on the proposed changes to Cat. XV and the definition of defense services.

1. On page 31445 of the 5/24/2013 Federal Register Notice, the Department makes two statements that seem contradictory in the section regarding 'Comments on the Use of Public Domain Information in a Defense Service.' The first statement reads: "The Department confirms that a defense service involves technical data and therefore the use of publicly available information would not constitute a defense service..." The second statement, at the end of the following paragraph, reads: "The Department... intends to control as a defense service certain services that use other than technical data.

If, "a defense service involves technical data," please explain why, "the Department intends to control as a defense service certain services that use other than technical data?"

2. On page 31446, at the top of the third column, within the section titled, 'Comments on Proposed Exclusions Paragraph,' The Department states, The use of technical data is a controlled activity, regardless of the type of service provided."

I have one comment and one question regarding this statement. First the comment. Basic operations and maintenance information for defense articles is still defined as technical data, but

the use of this technical data will no longer be considered a defense service per the new definition. So not all uses of data will be a controlled activity if the proposed changes are adopted.

My question is, the "use of technical data" is not the same as acting in accordance with knowledge that would be considered technical data if conveyed, correct? For instance, if a US person in charge of protecting a foreign person was to react to a threat as trained, her reaction would not be considered a defense service, correct? Training a foreign person to react the same way, using technical data, would be though, correct?

Thank you again.