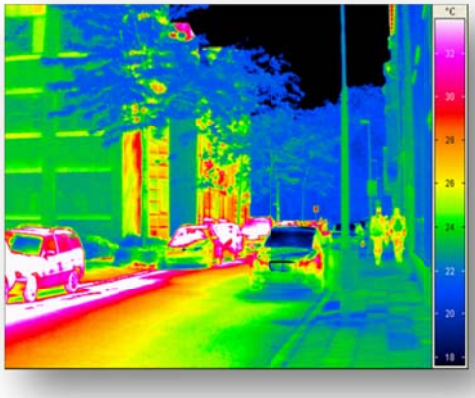
Critical Technology Assessment:

Night Vision Focal Plane Arrays, Sensors, and Cameras



Office of Technology Evaluation
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Critical Technology Assessment:
Night Vision Focal Plane Arrays, Sensors and Cameras

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PREPARED BY

U.S. DEPARTMENT OF COMMERCE
BUREAU OF INDUSTRY AND SECURITY
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I. Executive Summary

The Bureau of Industry and Security (BIS) conducts critical technology assessments to examine the impact of export controls on key existing or emerging technologies that are subject to the Export Administration Regulations (EAR).

This assessment examines night vision equipment controlled under Category XII of the United States Munitions List (USML) and Export Control Classification Numbers (ECCNs) 6A002 and 6A003 of the Commerce Control List (CCL). This equipment includes focal plane arrays (FPAs), image intensifier tubes (IITs) and low light level (LLL) sensors, and cameras and direct-view equipment incorporating these FPAs, IITs and sensors for the purposes of cooled and uncooled infrared or near-infrared imaging.

To conduct this assessment, BIS developed a survey to determine the nature of night vision sensor components and imaging equipment manufactured for military-use-only and dual-use (for both commercial and military use).[1] The survey included questions on the number of product lines sold in 2010 and projected to be sold in 2011-2012, the specific applications for the components and equipment, the differences between military-use-only and dual-use items, non-U.S. competitors, and 2007-2010 sales.[2] BIS surveyed 45 night vision component and equipment manufacturers, divisions, and sellers.

Based on the survey responses, BIS developed the following findings:

State of Controlled Night Vision Market:

1. **The number of current and projected dual-use product lines for night vision sensor components and imaging equipment is greater than the number of military-use-only product lines.** The exception to this is cooled infrared cameras.
2. **The sales data provided by survey respondents show volatility in the market.** The survey data does not identify a cause for this, but the volatility is likely due to the global recession, increased competition, export controls, and unsteady/unpredictable military sales.
3. **From 2007-2010, dual-use exports of all night vision components and equipment have increased**, from 310,389 to 498,406 components and equipment**.**
4. **Non-U.S. companies have a strong presence in the U.S. market, with 44 percent of survey respondents purchasing some sensor components from non-U.S. suppliers:** 52 percent of uncooled infrared camera companies, 64 percent of cooled infrared camera companies, 33 percent of image intensification tubes (IIT) imager companies and 78 percent of low light level (LLL) imager companies source some sensor components from non-U.S. sellers.

[1] For the purpose of this assessment, the terms "military-use-only" and "dual-use" do not indicate the jurisdiction of night vision components and equipment. Survey respondents chose if their night vision products fell into the military-use-only or dual-use categories.
[2] The full survey instrument is in Appendix D.

5. **Dual-use uncooled infrared FPAs are moving toward larger formats, but the majority of available models are in the lower format range.** Uncooled infrared FPAs were predominately sold in the United States; there were no exports of military-use-only uncooled infrared FPAs, and very few exports of dual-use uncooled infrared FPAs.
6. **There has been a spike in both U.S. and non-U.S. dual-use uncooled infrared camera sales from 2009-2010.** This spike in sales coincides with the implementation of the 2009 rule that reduced licensing requirements to some regime partners for dual-use uncooled infrared cameras controlled under ECCN 6A003.
7. **The number of cooled infrared FPA product lines increased, with dual-use product lines experiencing the largest increase.** However, cooled infrared FPA sales were dominated by U.S. military-use-only sales. There were almost no exports of dual-use cooled infrared FPAs and limited military-use-only exports.
8. **The number of military-use-only cooled infrared camera product lines has increased, and there are more than twice as many military-use-only as dual-use product lines.** However, dual-use cooled infrared camera exports have grown at a higher rate than military-use-only exports. In the United States, a larger number of dual-use than military-use-only cooled infrared cameras were sold, although the sales value for the dual-use cameras was much smaller than the sales value for the military-use only exports.
9. **IIT manufacturing appears to be very concentrated, with few respondents reporting manufacturing capability.** Sales quantities for both military-use-only and dual-use IITs in the U.S. increased steadily during the survey period; there were no exports of military-use-only IITs. In addition, there are no military-use-only Gen II IIT models available, and the vast majority of Gen III and higher IIT models are dual-use.[3]
10. **There are a larger number of dual-use IIT imager models than military-use-only, and there are projected to be more dual-use models in 2011-12.** Similar to IITs, there are no military-use-only Gen II IIT imager models available, and the vast majority of Gen III and higher IIT imager models are dual-use. There have been more domestic than export sales of IIT imagers, but dual-use exports have been increasing dramatically.
11. **LLL sensor components and LLL imagers are currently a fraction of the night vision market.** There are more dual-use LLL sensor and imaging equipment product lines than military-use-only. In the United States, there are more dual-use than military-use-only LLL sensor components and LLL imagers sold.

Department of Defense (DOD) Sales and R&D Funding:

1. Approximately 38 percent of survey respondents sold some military-use-only night vision components and equipment to DOD. The largest number of companies sold military-use-only cooled infrared cameras to DOD.
2. Approximately 36 percent of survey respondents sold some dual-use night vision components and equipment to DOD. The largest number of companies sold dual-use IIT imagers to DOD.

[3] Generation (Gen) classification is an aspect of IITs and associated imagers used to characterize the devices. In general, an image is brighter and sharper at higher generations. For the purpose of this assessment, IIT size is divided into two categories: Gen II, and Gen III or higher.

3. Approximately 27 percent of survey respondents received some level of research and development (R&D) funding from DOD for their recent night vision component or equipment products.
4. The number of companies selling night vision components and equipment to DOD, along with the low levels military-use-only exports, indicates that the majority of end-users are not predominately or exclusively military.

Control List Jurisdiction:

1. Military-use-only night vision components and equipment have different physical and technical characteristics than dual-use night vision components and equipment (e.g., weapons mounting, stability software, special packaging), which could be used as a discriminator in controlling items on the USML and CCL.
2. Uncooled infrared FPA size is not an indication of military application.
3. IIT Generation is not an indication of military application.
4. There are numerous applications that are specific to military-use-only components and equipment that are not shared by dual-use components and equipment, and vice-versa.

Non-U.S. Competitors:

1. There is widespread availability of night vision components and equipment among Wassenaar Arrangement regime members.
2. There is evidence that certain items across all types of night vision components and equipment are available from outside of regime members. These countries include Belarus, China, India, Israel, Singapore, and Taiwan.
3. There is clear evidence that foreign availability exists outside of regime members at all size ranges for uncooled FPAs, uncooled cameras, and IIT imagers.

II. Introduction

A. Assessment Overview

In 2009, President Obama initiated a broad-based interagency review of the U.S. export control system to identify possible reforms in order to strengthen and update the system and enhance U.S. national security. The review found that the current system is overly complicated, contains too many redundancies, and tries to protect too much, affecting the U.S. Government's (USG) ability to adequately control and protect key items and technologies that are crucial to U.S. national security. As a result, the Administration launched the Export Control Reform Initiative (ECR Initiative) to reform the U.S. export control system.

One of the goals of the ECR Initiative is to create a single export control list. There are currently two primary control lists, the Commerce Control List (CCL) under the Export Administration Regulations (EAR) and the United States Munitions List (USML) under the International Traffic in Arms Regulations (ITAR). In order to accomplish this goal, the USG is working on the following:

- Creating a "bright line" between the two control lists to clarify the jurisdiction of controlled items; and
- Turning the USML and as needed the CCL, into "positive lists" that describe controlled items using objective criteria.

This assessment inform the "bright line" review for night vision equipment, which includes focal plane arrays (FPAs), image intensifier tubes (IITs) and low light level (LLL) sensors, and cameras and direct-view equipment (imagers) incorporating these FPAs, IITs and sensors for the purposes of cooled and uncooled infrared or near-infrared imaging. It also examines the state of the market to continue BIS's monitoring of the health and competitiveness of this vital defense industrial base sector.

B. Current Export Control Regulations

Night vision equipment and components are controlled on the USML and the CCL. USML Category XII(c) controls: "Infrared focal plane array detectors specifically designed, modified, or configured for military use; image intensification and other night sighting equipment or systems specifically designed, modified or configured for military use; second generation and above military image intensification tubes specifically designed, developed, modified, or configured for military use, and infrared, visible and ultraviolet devices specifically designed, developed, modified, or configured for military application." USML Category XII(c) also notes that military second and third generation image intensification tubes and military infrared focal plane arrays are controlled on the CCL when part of a commercial system. The Wassenaar Arrangement's *Munitions List* (ML Category 15) controls image intensifier equipment, infrared

or thermal imaging equipment specially designed for military use, and specially designed components and accessories for such equipment.

Night vision and components are also controlled on the CCL, primarily under Export Control Classification Numbers (ECCNs) 6A002 and 6A003. Those ECCNs implement the controls from Category 6 of the Wassenaar Arrangement's *Lists of Dual-Use Goods and Technologies*. Figure II-1 illustrates how the United States has determined the jurisdiction status of night vision components and equipment subject to this assessment.

Figure II-1: Jurisdiction of Night Vision Components and Equipment

Type of Night Vision Component/Equipment	U.S. Export Control Jurisdiction
Uncooled Infrared FPAs	Predominately under ITAR/USML
Uncooled Infrared Cameras	Split between ITAR/USML and EAR/CCL
Cooled Infrared FPAs	Predominately under ITAR/USML
Cooled Infrared Cameras	Predominately under ITAR/USML
Image Intensifier Tubes	Predominately under ITAR/USML
Image Intensifier Tube Imagers	Predominately under ITAR/USML
Low Light Level Sensors	Split between ITAR/USML and EAR/CCL
Low Light level Imagers	Split between ITAR/USML and EAR/CCL

Of the countries that are not members of the Wassenaar Arrangement but produce night vision products (i.e., Belarus, China, India, Israel, Singapore, and Taiwan), Israel, Singapore, and Taiwan have identified themselves as adherents to the Wassenaar Arrangement and control such products as dual-use items.

A rule issued in 2009 introduced several changes to the EAR for uncooled infrared cameras controlled under ECCN 6A003.[4] The changes included the removal of most CCL-based license requirements for cameras described in 6A003.b.4.b that have FPAs of 111,000 pixels or less, a frame rate of 60 Hz or less, and are not being exported or reexported to military end-users or to be embedded in civil products to countries in the European Union, Australia, Iceland, Japan, New Zealand, Norway, South Africa, South Korea, and Turkey. All companies that take advantage of this change must submit a semiannual report to BIS to verify correct use of the rule.

The effect of the BIS rule is similar, for certain types of cameras, to the European Union's (EU) Community General Export Authorization (CGEA) and Japan's Bulk License, which cover most dual-use items, including night vision products. EU companies can export sensors and cameras to end-users within the EU, Australia, Canada, Japan, New Zealand, Norway, Switzerland and the United States without obtaining individual licenses. Such exports are only subject to post-shipment reporting requirements defined by a particular Member State who approves a CGEA.[5] Similarly, Japan authorizes the use of Bulk Export Licenses for companies to export night vision products to Argentina, Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland,

[4]United States, Department of Commerce Bureau of Industry and Security, Revisions to License Requirements and License Exception Eligibility for Certain Thermal Imaging Cameras and Foreign Made Military Commodities Incorporating Such Cameras, 74 FR 23941 (Washington: GPO, 2009). The full text of this rule is in Appendix C.

[5] *See* Part 1, Annex II, Community General Export Authorization No EU001, EC Regulation No 428/2009 of 5 May 2009, Official Journal of the European Union, L 134/253 (May 29, 2009).

France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, South Korea, Spain, Sweden, Switzerland, the UK, and the United States.

C. Survey Instrument

To conduct this assessment, BIS developed a survey to determine the nature of night vision components and equipment manufactured for military-use-only and dual-use (for both commercial and military use). The survey included questions on the number of product lines sold in 2010 and projected to be sold in 2011-2012, the specific applications for the components and equipment, the differences between military-use-only and dual-use items, non-U.S. competitors, and 2007-2010 sales.[6] BIS surveyed 45 night vision component and equipment manufacturers, divisions, and sellers.

It is important to note that for the purpose of the survey and this assessment, the terms "military-use-only" and "dual-use" do not indicate the export control jurisdiction of night vision components and equipment. Survey respondents selected whether their night vision products fell into the military-use-only or dual-use (for both commercial- and military-use) survey categories based on their sales.

III. Product Description

This assessment focuses on two aspects of night vision equipment: sensor components (e.g., FPAs, IITs, LLL sensors) and imaging equipment incorporating sensor components. Sensor components are the key elements of the imaging systems that create images from infrared and/or near-infrared radiation or low light levels.

There are two methods of *infrared radiation detection*. Cooled infrared radiation detection is based on a direct photon conversion, and sensors require a cryocooler (or other cooling method) to reduce detector noise, effectively increasing detector sensitivity. Additional methods are also typically employed to reduce background radiation to further enhance imager performance. Uncooled infrared radiation detection is operated at or near room temperature, with the detecting elements (e.g., microbolometers) using a thermal process to sense the incident radiation. Uncooled infrared cameras are smaller and less expensive than cooled infrared cameras, but have a lower sensitivity.

One specific characteristic of infrared FPAs and cameras examined in this assessment is FPA size. The size of infrared FPAs is characterized by array format, or pixel count.[7] In general, an FPA with more pixels produces a clearer image with more detail. Infrared FPAs come in a wide variety of formats, with vastly different numbers of pixels. There are not well-established standard sizes for cooled FPAs, but specific generations of products have emerged based largely

[6] The full survey instrument is in Appendix D.
[7] A pixel is the smallest individual image element on an FPA, arranged in a rectangular grid to form and complete an image.

on array format for uncooled FPAs. For the purpose of this assessment, uncooled FPA size is divided into three categories: FPAs with 111,000 or less pixels, also referred to as FPAs of 320 x 240 or less; FPAs with more than 111,000 pixels but less than or equal to 310,000 pixels, also referred to as FPAs between 320 x 240 and 640 x 480; and FPAs with more than 310,000 pixels, also referred to as FPAs larger than 640 x 480.

There are several methods of *light amplification or intensification*. Traditional IITs use a photocathode to convert visible and near-infrared radiation into electrons, a microchannel plate to amplify the signal, and a phosphor screen to convert the amplified signal into visible light. Recently developed LLL sensor components use solid state detectors/arrays, such as an Electron Multiplying Charge Coupled Device (EMCCD) or Avalanche Photodiode (APD), or combine a solid state detector with elements of a traditional IIT, such as the Electron Bombarded Complementary Metal-Oxide Semiconductor (EBCMOS), to detect visible and near-infrared radiation. Compared to direct view devices using traditional IITs, using LLL sensor components have the flexibility associated with processing an electronic signal, but are often bulkier and require more power. Traditional IITs can also be coupled to solid state detectors/arrays or cameras to produce a similar electronic signal.

One specific aspect of IITs and associated imaging equipment used to characterize the devices in this assessment is the generation (Gen) classification, which indicates materials used to manufacture the tube and certain characteristics. In general, an image is brighter and sharper at higher generations. For the purpose of this assessment, IIT size is divided into two categories: Gen II, and Gen III or higher.[8]

[8] Gen I IITs are not controlled under U.S. export control regulations, and are therefore not included in this assessment.

IV. State of the U.S. Night Vision Market

A. Overall Market

The U.S. night vision industry has averaged approximately $5 billion a year in sales from 2007-2010. Most companies are focused on either infrared imaging or light amplification components and equipment; 13 survey respondents (28.9 percent) manufacture or sell both types of night vision products. The largest number of survey respondents sells uncooled infrared cameras, followed by cooled infrared cameras (see Figure IV-1). On the opposite end of the spectrum, the smallest number of survey respondents manufactures or sells IITs and/or LLL sensors. The data also show that there are more companies that sell cameras than sell sensing components.

Figure IV-1: Number of Night Vision Component and Equipment Manufacturers and Sellers

Type of Night Vision Component/Equipment	Number of Companies
Uncooled Infrared FPAs	11
Uncooled Infrared Cameras	31
Cooled Infrared FPAs	10
Cooled Infrared Cameras	20
Image Intensifier Tubes	4
Image Intensifier Tube Cameras	9
Low Light Level Sensors	4
Low Light Level Imagers	12

Source: U.S. Department of Commerce (DOC), Bureau of Industry and Security (BIS), *Night Vision Focal Plane Arrays, Sensors and Cameras* survey, August 2011

In general, the number of current and projected dual-use product lines for all types of night vision components and equipment is greater than the number of military-use-only product lines (see Figure IV-2). The exception to this is cooled infrared cameras. The number of current and projected military-use-only cooled infrared product lines is more than double the number of dual-use product lines. This finding is likely due to the degree of specialization of cooled military imaging products. It should also be noted that there are almost three times as many dual-use uncooled infrared camera product lines as there are military-use uncooled infrared camera product lines. The number of product lines for some types of night vision components and equipment is predicted to remain the same between 2010 and 2011-12, and there are no projected decreases.

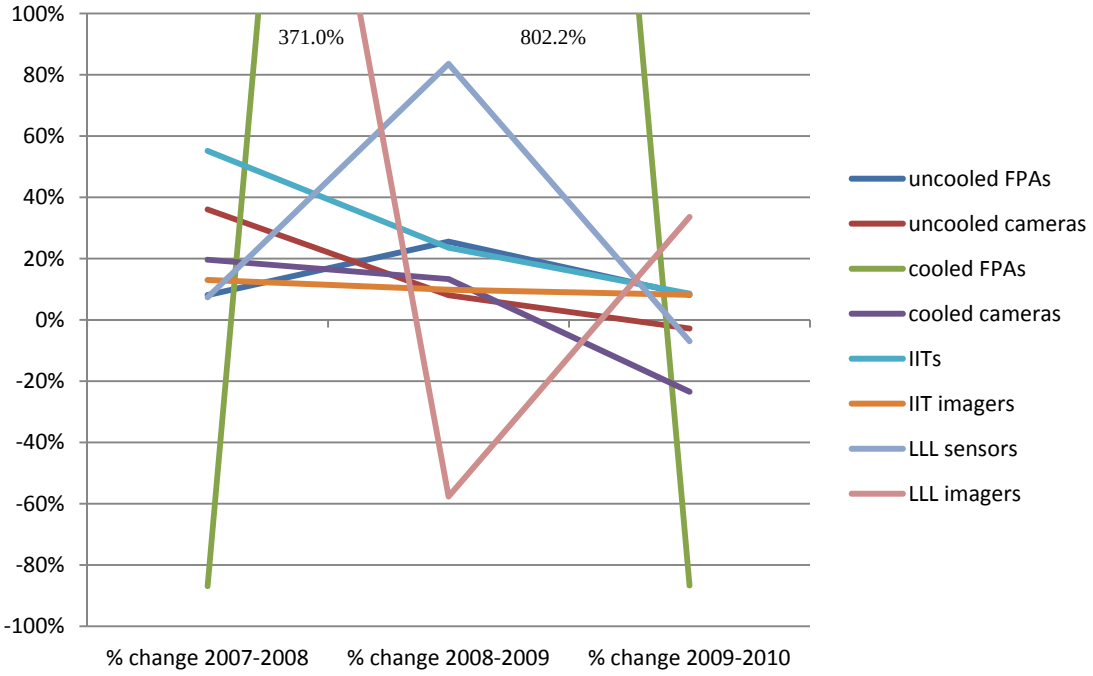
Figure IV-2: Number of Night Vision Component and Equipment Product Lines

Types of Night Vision Component/Equipment	Military-use-only		Dual-Use	
	2010	2011-12	2010	2011-12
Uncooled Infrared FPAs	4	4	21	29
Uncooled Infrared Cameras	37	35	99	112
Cooled Infrared FPAs	9	10	13	24
Cooled Infrared Cameras	68	73	30	33
Image Intensifier Tubes	2	2	24	24
Image Intensifier Tube Cameras	21	22	28	28
Low Light Level Sensors	3	5	13	18
Low Light Level Imagers	11	14	18	22

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The sales data provided by survey respondents show volatility for U.S. companies. The overall value of night vision components and equipment sold varied from $5.4 billion in 2007 to $7.2 billion in 2009 before dropping to $4.6 billion in 2010. Year-to-year percent changes in value for all but three types of night vision products either fluctuated or declined into the negative (see Figure IV-3). The three types of night vision products that did not experience negative percent changes – uncooled infrared FPAs, IITs, and IIT cameras – experienced declining increases.

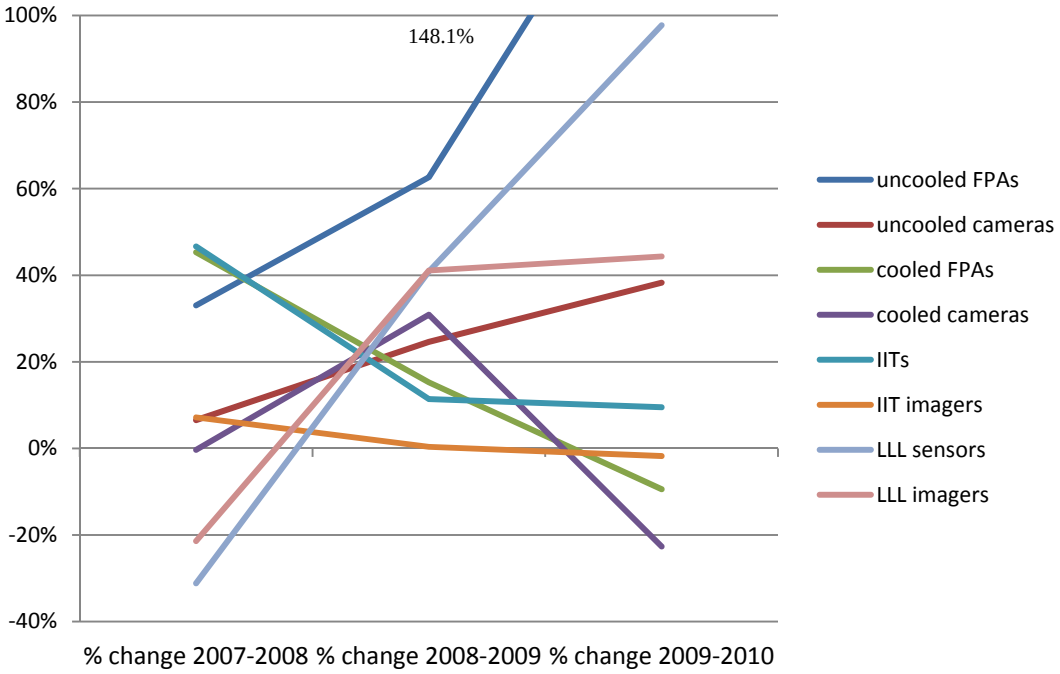
Figure IV-3: Night Vision Component and Equipment Sales – Percent Change by Value



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Year-to-year percent changes in quantity were more positive, with three types of night vision products experiencing increases (uncooled infrared FPAs, uncooled infrared cameras, and LLL sensor components) and two others retaining positive percent changes (IITs and cameras using LLL sensor components) (see Figure IV-4). Cooled FPAs, cooled infrared cameras, and IIT cameras had fluctuating or negative percent changes. Overall, the quantity of night vision components and equipment sold steadily increased between 2007 and 2010 from 310,389 to 498,406.

Figure IV-4: Night Vision Component and Equipment Sales – Percent Change by Quantity

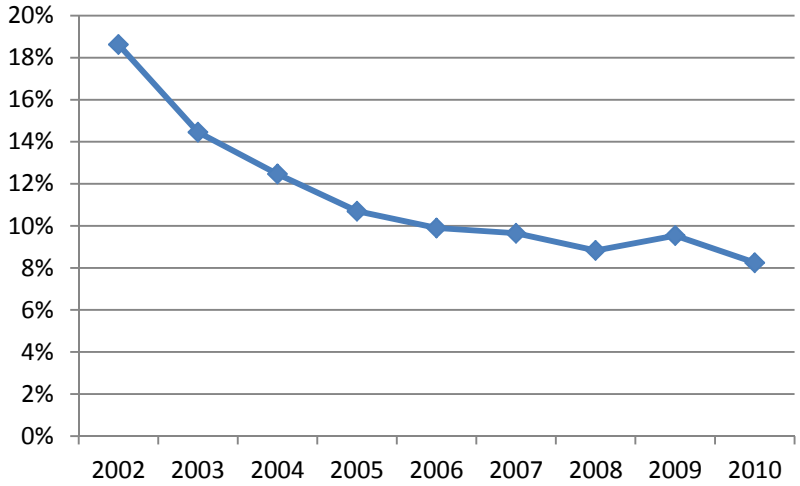


Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The impact of this volatility can be seen in the estimated U.S. share of global exports for night vision products (see Figure IV-5).[9] While the value of U.S. exports of night vision products almost consistently increased over the nine-year period, growth in global exports of these items outpaced growth of U.S. exports. The estimated U.S. market share decreased by more than half, from 18.6 percent in 2002 to 8.2 percent in 2010. Globally, China and South Korea have gained the largest market share percentage over the time period, while the European Union's market share decreased.

[9] Survey respondents provided Harmonized Tariff System (HTS) codes for their products. Estimated market share was determined by gathering U.S. export data for these HTS codes and dividing by total global exports. It is important to note that the HTS codes used encompass more than just night vision products.

Figure IV-5: Estimated U.S. Share of Global Exports for Night Vision Products (2002-2010)



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011; Global Trade Atlas data

B. Uncooled Infrared FPAs and Cameras

Summary

- No military-use-only uncooled infrared FPAs were exported from 2007-2010, while exports of dual-use uncooled infrared FPAs were in the hundreds. Some survey respondents indicated that the low number of exports is likely attributable to the fact that most uncooled infrared FPAs are currently subject to export controls under the ITAR, which discourages foreign customers.
- The largest segment of the dual-use uncooled infrared camera market is comprised of models with FPAs having less than or equal to 111,000 pixels (i.e., 320x240 or less), with more than 200 models available.
- There are no military-use-only uncooled infrared FPA models less than or equal to 111,000 pixels. However, there are a number of military-use-only uncooled infrared camera models using FPAs less than or equal to 111,000 pixels.
- ULIS of France and SCD of Israel are the largest non-U.S. competitors. Some survey respondents are concerned that continued ITAR restrictions will further the uncompetitive position of U.S. companies.

Uncooled Infrared FPAs

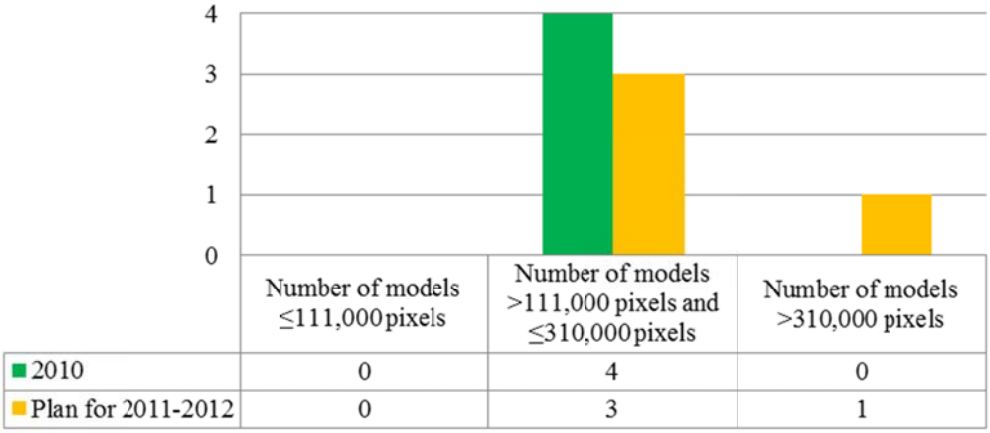
There were eight survey respondents that manufactured uncooled infrared FPAs and one respondent that was a reseller in 2010, with two additional companies planning to manufacture in 2011-12. Nine respondents reported selling or projecting to sell uncooled infrared FPAs manufactured in the United States, one company reported selling FPAs manufactured outside of the United States, and one company did not report the origin of the FPAs it sold.

There was one company that strictly sold military-use-only uncooled infrared FPAs in 2010 and projected to do so in 2011-12. One company sold both military-use-only and dual-use uncooled infrared FPAs in 2010, while two projected to sell both types of FPAs in 2011-12. The majority, comprised of seven companies, strictly sold dual-use uncooled infrared FPAs in 2010, while eight projected to sell FPAs in 2011-12.

The larger number of companies selling strictly dual-use uncooled infrared FPAs is reflected in the number of product lines available from survey respondents. Companies sold only four military-use-only product lines in 2010 and projected to sell the same amount in 2011-12, while they sold 21 dual-use product lines in 2010 and projected to sell 29 in 2011-12.

Military-use-only uncooled infrared FPAs are moving toward models of larger sizes (see Figure IV-6). For both current and projected product lines, there are no uncooled infrared FPA models less than or equal to 111,000 pixels. Most of the military-use-only uncooled infrared FPA models are within the size range of higher than 111,000 pixels and less than or equal to 310,000 pixels.

Figure IV-6: Military-use-only Uncooled Infrared FPA Models

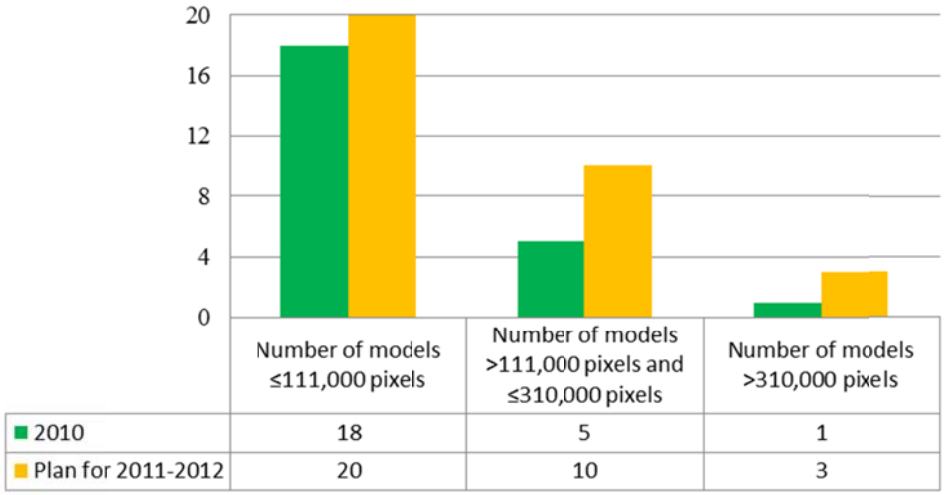


	Number of models ≤111,000 pixels	Number of models >111,000 pixels and ≤310,000 pixels	Number of models >310,000 pixels
2010	0	4	0
Plan for 2011-2012	0	3	1

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

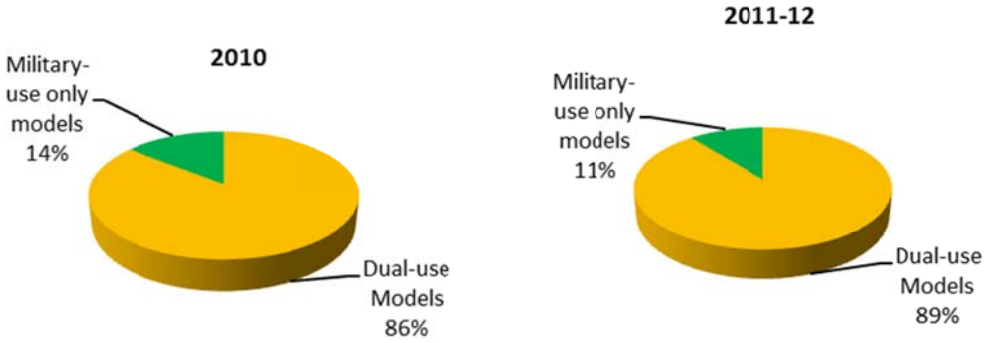
Similarly, dual-use uncooled infrared FPAs are also moving toward models of larger sizes (see Figure IV-7). Survey respondents projected that the number of available models greater than 111,000 pixels and less than or equal to 310,000 pixels would double from those available in 2010. The number of models at all sizes of uncooled infrared FPAs is projected to increase. According to this data, dual-use uncooled infrared FPA models dominate the market, and are projected to remain that way (see Figure IV-8).

Figure IV-7: Dual-Use Uncooled Infrared FPA Models



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

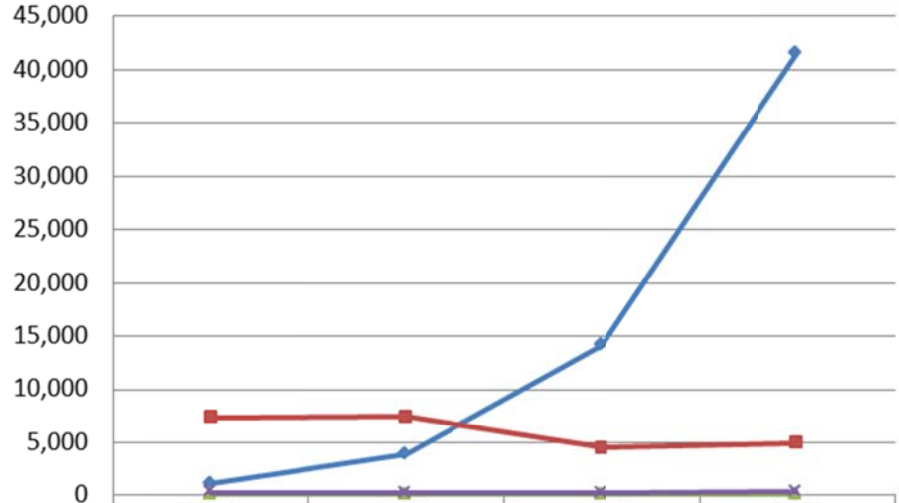
Figure IV-8: Comparison of Military-use-only and Dual-Use Uncooled Infrared FPA Models



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Based on survey respondent sales data, uncooled infrared FPAs are predominately sold in the United States. No military-use-only uncooled infrared FPAs were exported from 2007-2010, while exports of dual-use uncooled infrared FPAs were in the hundreds (see Figure IV-9). The sales quantity for military-use-only uncooled infrared FPAs in the United States increased from 1,098 units in 2007 to 41,484 in 2010. These military-use-only sales are due to one company. The quantity of dual-use uncooled infrared FPAs sold in the United States was larger in 2007 and 2008, but was eclipsed by the number of military-use-only FPAs in 2009 and 2010. Uncooled infrared camera manufacturers that produce their own FPAs did not report on their FPA production as they do not sell their FPAs as stand-alone products, and therefore the presented FPA sales figures do not represent FPA manufacturing totals.

Figure IV-9: Uncooled Infrared FPA Sales (Quantity)



	2007	2008	2009	2010
U.S. Military-Use Only	1,098	3,901	14,135	41,484
U.S. Dual-Use	7,364	7,458	4,531	4,994
Military-Use Only Exports	0	0	0	0
Dual-Use Exports	257	240	200	322

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The majority of non-U.S. uncooled infrared FPA competitors are in France, Israel, Japan, and Germany. The companies mentioned most by survey respondents were ULIS of France, NEC of Japan, and SCD of Israel.

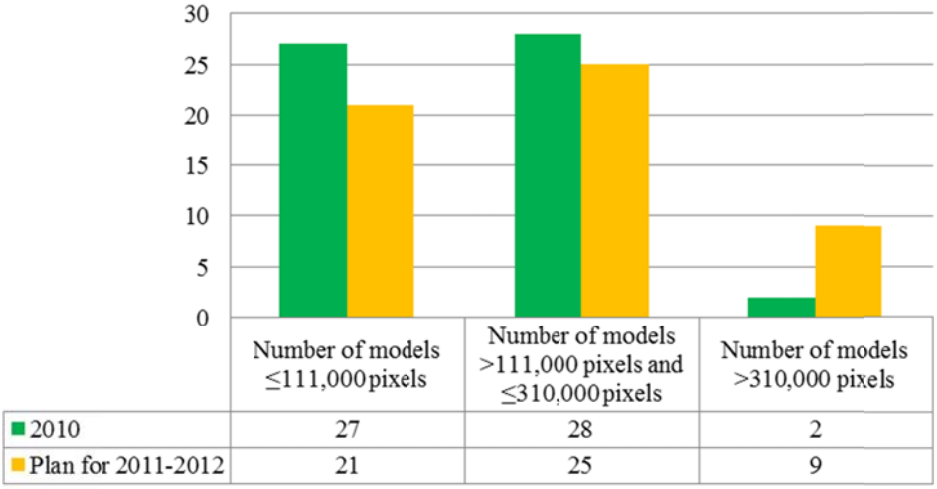
Uncooled Infrared Cameras

There were 29 survey respondents that manufactured uncooled infrared cameras and two that were resellers in 2010 and projected to remain in the market in 2011-12. Of these respondents, 22 reported selling uncooled infrared cameras manufactured in the United States, six sold cameras manufactured outside of the United States, and three sold cameras manufactured both inside and outside of the United States.

There was no change in the number of companies making military-use-only and dual-use uncooled infrared cameras from 2010 to 2011-12: two sold military-use-only cameras, four sell both military-use-only and dual-use cameras, and 25 sold dual-use cameras. However, the number of product lines is projected to change. The number of available military-use-only product lines is projected to decline 5 percent from 37 to 35, while the available dual-use product lines is projected to increase 13 percent from 99 to 112.

Unlike uncooled infrared FPAs, there are still a number of military-use-only uncooled infrared camera models less than or equal to 111,000 pixels manufactured in the United States, though that number is projected to decrease (see Figure IV-10). There is a projected increase of uncooled infrared camera models greater than 310,000 pixels.

Figure IV-10: Military-use-only Uncooled Infrared Camera Models

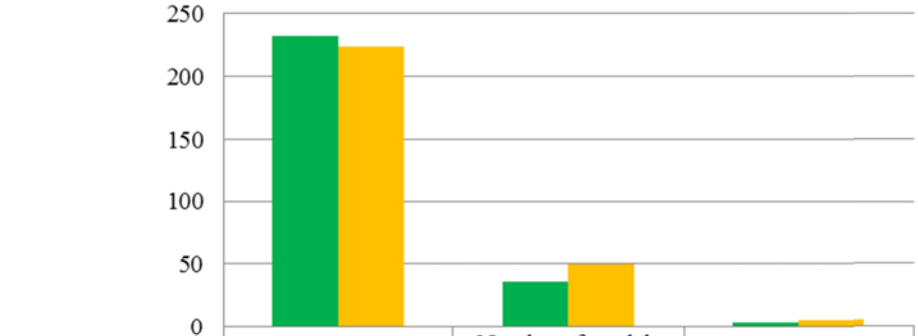


	Number of models ≤111,000 pixels	Number of models >111,000 pixels and ≤310,000 pixels	Number of models >310,000 pixels
2010	27	28	2
Plan for 2011-2012	21	25	9

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The largest segment of the dual-use uncooled infrared camera market is models with FPAs less than or equal to 111,000 pixels, with more than 200 models available (see Figure IV-11). Uncooled infrared camera models greater than 111,000 pixels and less than or equal to 310,000 pixels and models greater than 310,000 pixels are projected to increase in 2011-12. According to this data, dual-use uncooled infrared camera models predominate the market, and are projected to continue to do so (see Figure IV-12).

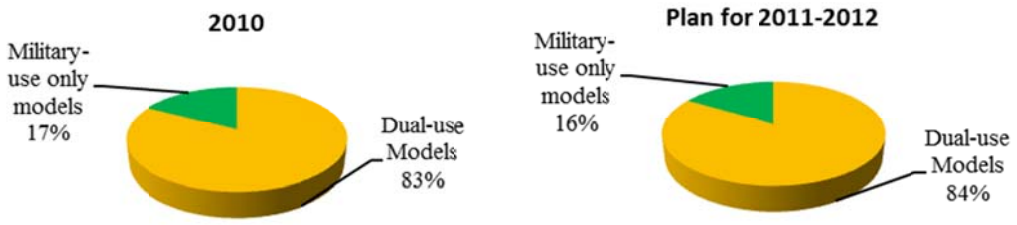
Figure IV-11: Dual-Use Uncooled Infrared Camera Models



	Number of models ≤111,000 pixels	Number of models >111,000 pixels and ≤310,000 pixels	Number of models >310,000 pixels
2010	232	36	3
Plan for 2011-2012	224	50	5

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

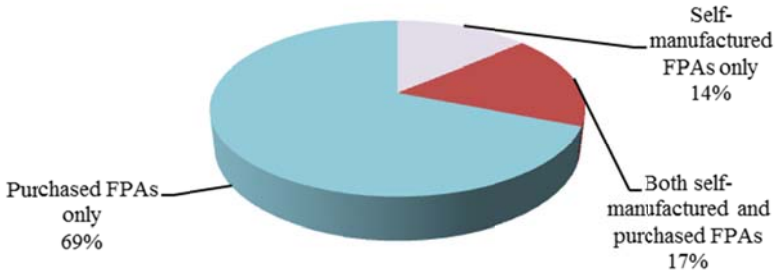
Figure IV-12: Comparison of Military-use-only and Dual-Use Uncooled Infrared Camera Models



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Survey respondents were also asked how they obtained the FPAs they used in the uncooled infrared cameras they manufactured. Of the 29 manufacturers, 86 percent purchased uncooled infrared FPAs (see Figure IV-13). The data show that the majority of uncooled infrared camera producers do not manufacture FPAs but rely on other companies for this component. It is important to note that the sizes of the camera companies are vastly different, and many of them produce a limited number of products.

Figure IV-13: Sources of Uncooled Infrared FPAs

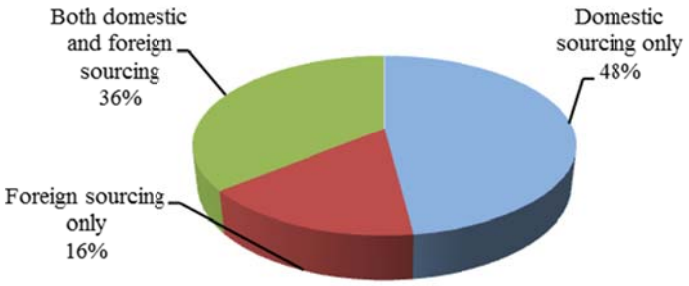


Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Of the survey respondent that purchased FPAs, 52 percent sourced at least some of them from non-U.S. sources (see Figure IV-14). Ten of these 13 companies sourcing FPAs from non-U.S. companies manufacture dual-use cameras, one manufactures military-use-only cameras, and two manufacture both military-use-only and dual-use cameras. The top non-U.S. sources of uncooled infrared FPAs are ULIS of France and SCD of Israel. [10]

[10] France controls FPAs on its munitions list. France's licensing policies are significantly less restrictive than those of the United States, including authorizing sales to China.

Figure IV-14: Geographic Sources of Uncooled Infrared FPAs

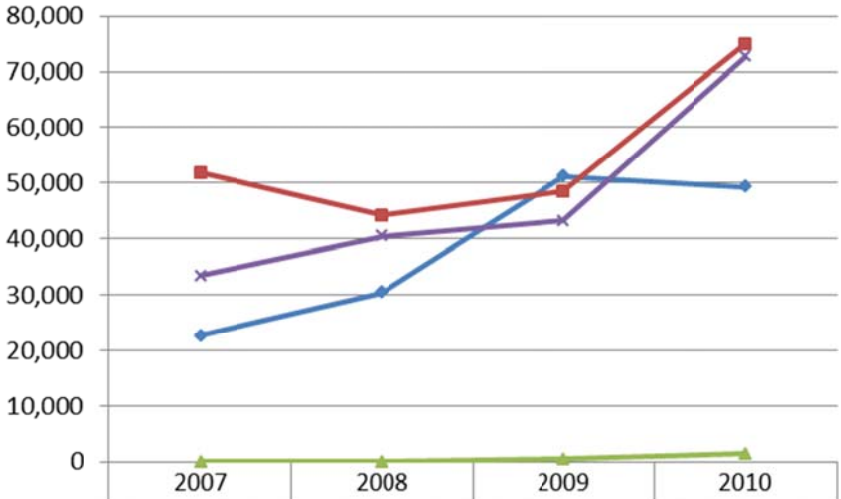


Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Based on survey respondent sales data, uncooled infrared cameras were more predominant in the domestic market; 124,290 units were sold in the United States in 2010, almost twice the 74,098 units that were exported. From 2007 to 2010, there was a higher quantity of dual-use uncooled infrared cameras sold domestically than military-use-only cameras (see Figure IV-15). However, the value of military-use-only uncooled infrared cameras sold in the United States was greater than that of dual-use cameras – more than twice the value from 2008 to 2010.

There have been more domestic sales than export sales between 2007 and 2010, though dual-use exports have been increasing steadily. In 2010, the quantity of exported dual-use uncooled infrared cameras increased by 68 percent and almost reached the number of cameras sold in the United States.

Figure IV-15: Uncooled Infrared Camera Sales (Quantity)



	2007	2008	2009	2010
U.S. Military-Use Only	22,762	30,502	51,203	49,299
U.S. Dual-Use	51,848	44,165	48,485	74,991
Military-Use Only Exports	0	0	483	1,440
Dual-Use Exports	33,477	40,464	43,284	72,658

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The majority of non-U.S. uncooled infrared camera competitors are in Germany, the United Kingdom, China, and Israel. The companies mentioned most by survey respondents were NEC of Japan, Thermoteknix in the United Kingdom, and Elbit Systems in Israel.

C. Cooled Infrared FPAs and Cameras

Summary

- There were almost no dual-use exports of cooled infrared FPAs and limited military-use-only exports.
- There are more than twice as many product lines available for military-use-only cooled infrared cameras than for dual-use ones. However, the number of dual-use cooled infrared FPA product lines increased by 85 percent compared to the 11 percent increase in the number of military-use cooled infrared FPAs.
- There is significant non-U.S. competition, with 64 percent of U.S. cooled infrared camera manufacturers sourcing cooled FPAs from non-U.S. sources. SCD of Israel, Sofradir of France, Xenics of Belgium, and AIM of Germany are the main non-U.S. competitors.

Cooled Infrared FPAs

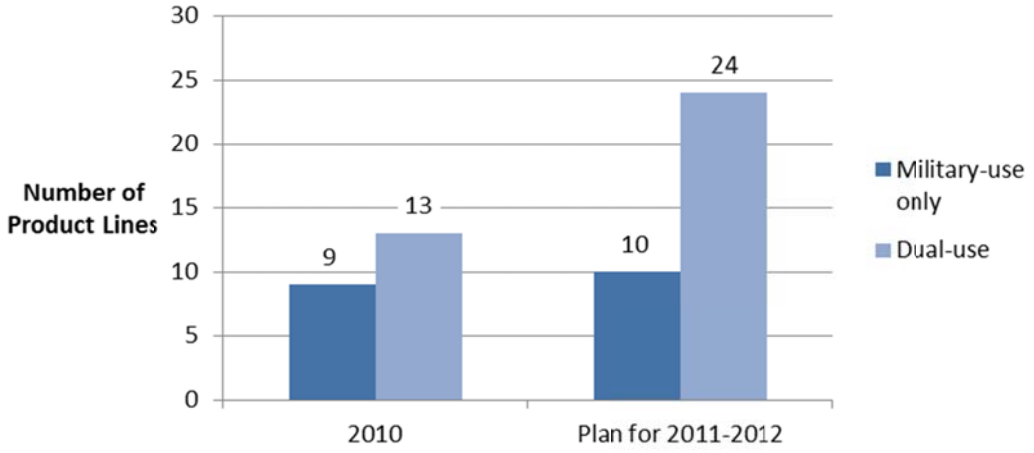
There were nine survey respondents that manufactured cooled infrared FPAs, with an additional company planning to manufacture in 2011-12. Nine respondents reported manufacturing cooled infrared FPAs in the United States and one company manufacturing outside of the United States. [11]

There were three companies that strictly sold military-use-only cooled infrared FPAs in 2010 and projected to do so in 2011-12, while two companies sold both military-use-only and dual-use cooled infrared FPAs in 2010 and projected to do so in 2011-12. Additionally, four companies strictly sold dual-use cooled infrared FPAs in 2010 and projected to do so in 2011-12.

This increase in the number of companies is reflected in the number of product lines available from survey respondents. The number of available military-use-only product lines was projected to increase from 9 to 10, while the number of available dual-use product lines was projected to increase 85 percent from 13 to 24 (see Figure IV-16).

[11] One of the manufacturers does not sell cooled infrared FPAs as stand-alone products, and thus is not reflected in the sales data.

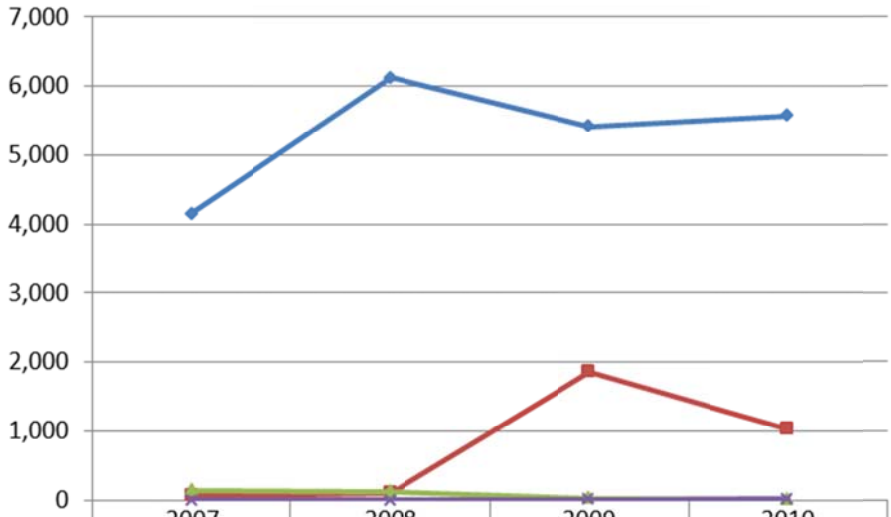
Figure IV-16: Cooled Infrared FPA Product Lines



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Based on survey respondent sales data, cooled infrared FPAs are predominately military-use-only and sold in the United States. There were almost no dual-use cooled infrared FPAs exported from 2007-2010, while exports of military-use-only cooled infrared FPAs steadily decreased (see Figure IV-17). Over the time period, there were more military-use-only cooled infrared FPAs sold domestically than dual-use FPAs, although the number of dual-use FPAs did increase. Cooled infrared camera manufacturers that produce their own FPAs did not report on their FPA production, as they do not sell their FPAs as stand-alone products, and therefore the presented FPA sales figures do not represent FPA manufacturing totals.

Figure IV-17: Cooled Infrared FPA Sales (Quantity)



	2007	2008	2009	2010
U.S. Military-Use Only	4,156	6,119	5,420	5,574
U.S. Dual-Use	68	103	1,861	1,025
Military-Use Only Exports	140	119	23	6
Dual-Use Exports	0	0	5	14

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The majority of non-U.S. cooled infrared FPA competitors are in France, Israel, Germany, and the United Kingdom. The companies mentioned most by survey respondents were Sofradir of France, Selex of the United Kingdom, AIM of Germany, and SCD of Israel.

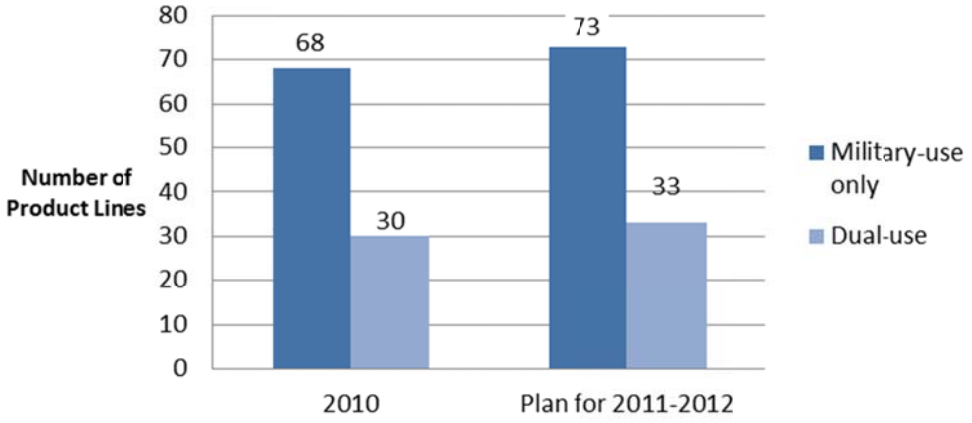
Cooled Infrared Cameras

There were 19 survey respondents that manufactured cooled infrared cameras, with an additional company planning to manufacture in 2011-12. Of these, 15 respondents reported manufacturing cooled infrared cameras in the United States and five companies reported manufacturing such cameras both inside and outside of the United States.

There was only one change in the number of companies making military-use-only and dual-use cooled infrared cameras from 2010 to 2011-12: five sold military-use-only cameras, nine sold both military-use-only and dual-use cameras, and five sold dual-use cameras in 2010 while six are projected to sell dual-use cameras in 2011-12.

However, the number of product lines was projected to change. The number of available military-use-only product lines was projected to increase seven percent from 68 to 73, while the number of available dual-use product lines was projected to increase 10 percent from 30 to 33 (see Figure IV-18). This means there was twice the number of military-use-only product lines than dual-use product lines.

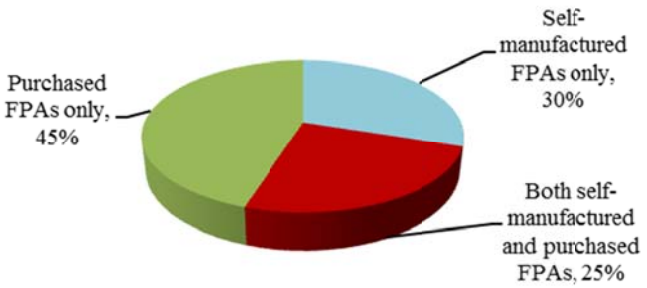
Figure IV-18: Cooled Infrared Camera Product Lines



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Survey respondents were also asked how they obtained the FPAs they used in the cooled infrared cameras they manufactured. Of the 20 manufacturers, 70 percent purchased cooled infrared FPAs (see Figure IV-19).

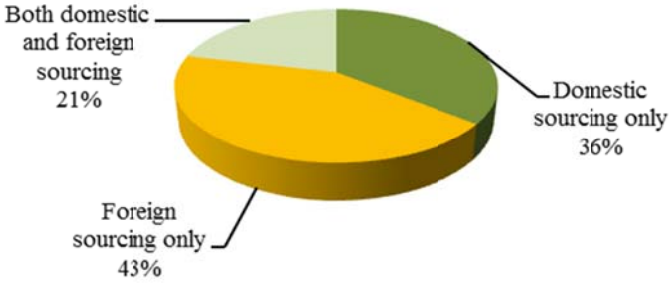
Figure IV-19: Sources of Cooled Infrared FPAs



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Only five of the 14 respondents that purchased FPAs sourced them only from domestic companies (see Figure IV-20). Two of the nine companies sourcing cooled infrared FPAs from non-U.S. companies sell military-use-only cameras, four sell dual-use cameras, and three sell both military-use-only and dual-use cameras. The top non-U.S. sources of cooled infrared FPAs are SCD in Israel, Xenics in Belgium, and Sofradir in France.

Figure IV-20: Geographic Sources of Cooled Infrared FPAs

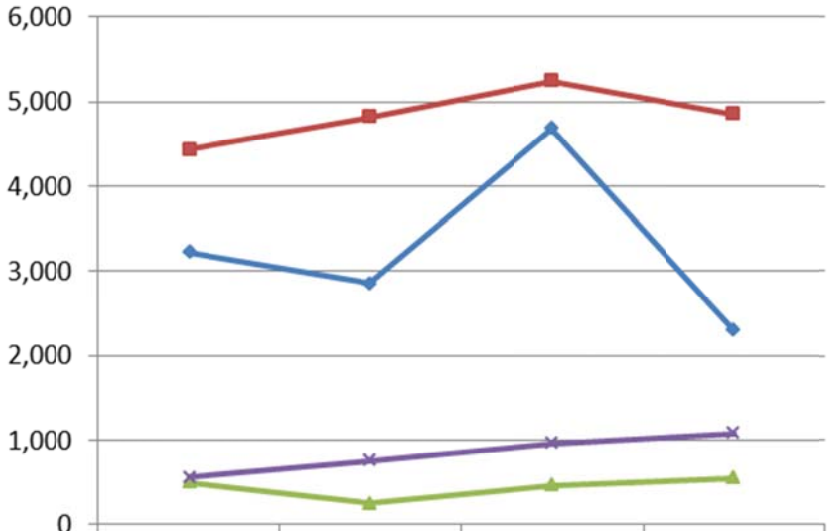


Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Based on survey respondent sales data, cooled infrared cameras are predominately sold in the United States. From 2007-2010, there were more dual-use cooled infrared cameras sold domestically than military-use-only cameras (see Figure IV-21). This is opposite from cooled infrared FPA sales, which were mainly military-use-only sales.

Exports of military-use-only and dual-use cooled infrared cameras combined were less than 2,000 units in 2010. The number of dual-use cooled infrared camera exports has steadily grown from 2007 to almost double the number of exported military-use-only cameras.

Figure IV-21: Cooled Infrared Camera Sales (Quantity)



	2007	2008	2009	2010
U.S. Military-Use Only	3,225	2,853	4,683	2,299
U.S. Dual-Use	4,432	4,818	5,252	4,854
Military-Use Only Exports	496	252	467	553
Dual-Use Exports	561	758	962	1,082

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The majority of non-U.S. cooled infrared camera competitors are in France, Israel, Germany, and the United Kingdom. The companies mentioned most by survey respondents were Sofradir and Thales of France, Selex of the United Kingdom, AIM of Germany, and Opgal and SCD of Israel.

D. Image Intensifier Tubes (IITs) and Cameras and Imaging Equipment

Summary

- IIT manufacturing appears to be concentrated, with only three survey respondents manufacturing IITs and nine respondents manufacturing IIT imagers.
- There are no military-use-only Gen II IIT and IIT imager models, but there are numerous dual-use Gen II IIT and IIT imager models.
- There were no exports of military-use-only Gen III or higher IITs, and limited exports of military-use-only Gen III or higher IIT imagers. Gen II and Gen III IITs are controlled almost exclusively on the ITAR, as are many of the military-use-only and dual-use products containing them.

IITs

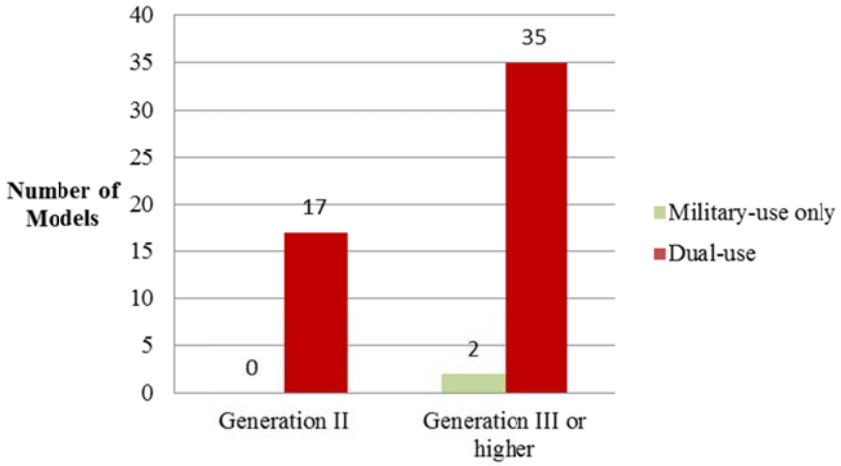
There were three survey respondents that manufactured IITs and one that was a reseller in 2010 and projected to remain in the market in 2011-12. Three respondents reported manufacturing or operating in the United States and one company reported manufacturing both inside and outside of the United States.

There was no change in the number of companies selling military-use-only and dual-use IITs from 2010 to 2011-12: no companies sold solely military-use-only IITs, three companies sold dual-use IITs, and one company sells both military-use-only and dual-use IITs.

In addition, the number of product lines was not projected to change from 2010 to 2011-12. The number of available military-use-only product lines, of which there were no Gen II models, was expected to remain at two, while the available Gen II and Gen III dual-use product lines were expected to remain at 24, a significantly larger amount than military-use-only products.

Military-use-only IIT models are very limited, with two Gen III or higher models sold in both 2010 and 2011-12 (see Figure IV-22). Conversely, there are a large number of both dual-use IIT models, with no projected increase: 17 Gen II and 35 Gen III or higher models. According to this data, dual-use IIT models dominate the market, and are projected to remain that way.

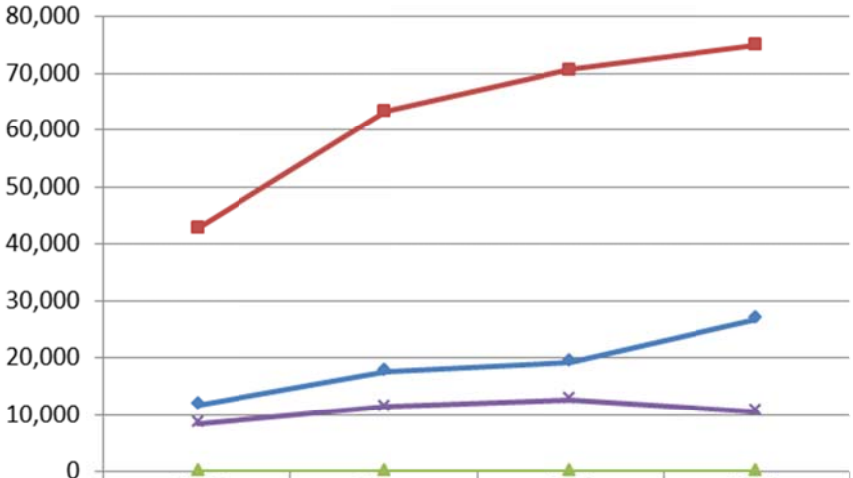
Figure IV-22: Image Intensifier Tube Models for 2010 and 2011-12



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Based on survey respondent sales data, IITs are predominately dual-use and sold in the United States. No military-use-only IIT exports were exported from 2007-2010, while exports of dual-use IITs were below domestic sales. The sales quantity for military-use-only IITs in the United States increased steadily, but was below that of dual-use IITs, which also increased over the time period (see Figure IV-23). It is important to note that IIT camera manufacturers that produce their own IITs did not report on their IIT production as they do not sell their IITs as stand-alone products, and therefore the presented IIT sales figures do not represent IIT manufacturing totals.

Figure IV-23: Image Intensifier Tube Sales (Quantity)



	2007	2008	2009	2010
U.S. Military-Use Only	11,684	17,556	19,300	26,754
U.S. Dual-Use	42,773	63,272	70,679	75,052
Military-Use Only Exports	0	0	0	0
Dual-Use Exports	8,408	11,350	12,670	10,597

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The majority of non-U.S. IIT competitors are in France, Russia, and Germany. The companies mentioned most by survey respondents were Photonis of France and Harder Digital of Germany.

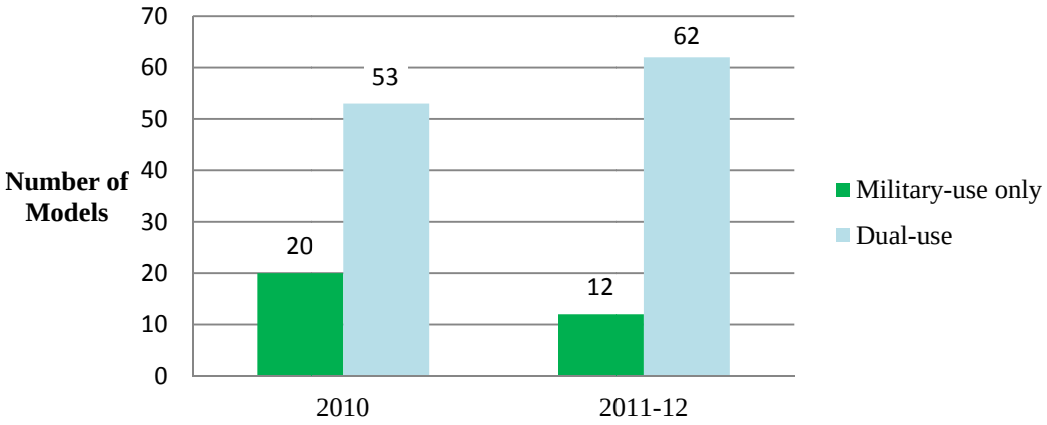
IIT Cameras and Imaging Equipment

There were nine survey respondents that manufactured IIT imagers (cameras and/or direct-view equipment) in 2010 and projected to remain in the market in 2011-12. Eight respondents reported manufacturing in the United States and one company reported manufacturing both inside and outside of the United States.

There was no change in the number of companies selling military-use-only and dual-use IIT imagers from 2010 to 2011-12: three companies sell military-use-only models, four sell dual-use models, and two sell both military-use-only and dual-use models. In addition, the number of dual-use product lines was not projected to change from 28, while the available military-use-only product lines were expected to increase by one from 21 product lines in 2010 to 22 product lines in 2011-12.

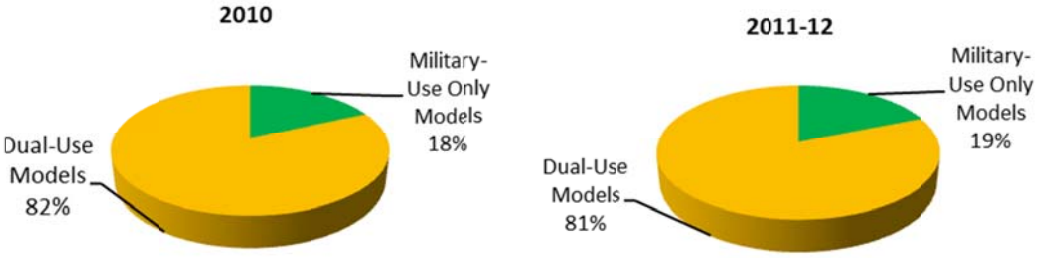
Military-use-only IIT imager models are limited, with no Gen II and 20 Gen III or higher models in 2010 and 12 Gen III or higher models in 2011-12. Conversely, there are a larger number of dual-use IIT models for both Gen II and Gen III or higher models. There were 37 Gen II dual-use IIT models in 2010 and 2011-12, and a 17 percent increase in Gen III or higher models from 53 in 2010 to 62 in 2011-12 (see Figure IV-24). According to this data, dual-use IIT imager models are predominate in the market, and are projected to remain that way (see Figure IV-25).

Figure IV-2: Gen III or Higher IIT Imager Models for 2010 and 2011-12



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

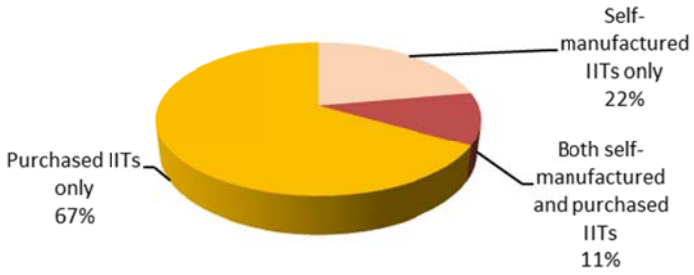
Figure IV-25: Comparison of Military-use-only and Dual-Use IIT Imager Models



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Survey respondents were also asked how they obtained the IITs they used in the IIT imager they manufactured. Of the nine manufacturers, seven purchased IITs (see Figure IV-26).

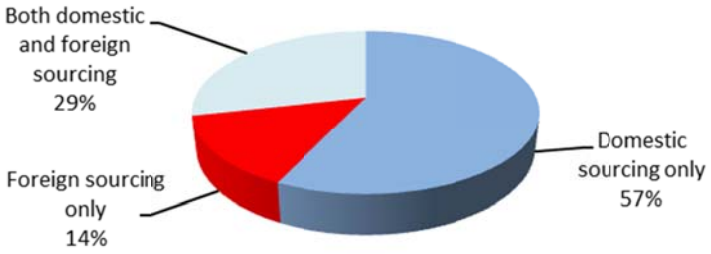
Figure IV-26: Sources of Image Intensifier Tubes



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The majority of the seven respondents that purchased IITs sourced them domestically (see Figure IV-27). All three of the companies sourcing IITs from non-U.S. companies sell dual-use IIT imagers. The top non-U.S. sources of IITs are Photonis in France and Ekran Optical Systems in Russia.

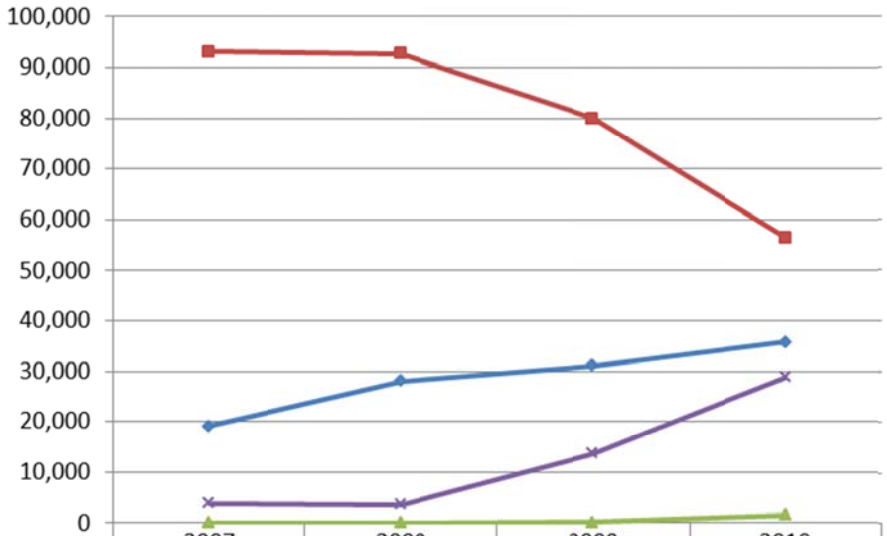
Figure IV-27: Geographic Sources of Image Intensifier Tubes



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Based on survey respondent sales data, IIT imagers were more predominant in the domestic market; 92,223 units were sold in the United States in 2010, almost three times the 30,432 units that were exported. From 2007 to 2010, there were more dual-use IIT imagers sold than military-use-only units (see Figure IV-28). However, the number of military-use-only IIT units has steadily increased while the number of dual-use units has decreased over the time period.

Figure IV-28: IIT Imager Sales (Quantity)



	2007	2008	2009	2010
U.S. Military-Use Only	19,138	28,096	31,030	35,722
U.S. Dual-Use	93,155	92,778	80,014	56,501
Military-Use Only Exports	0	0	161	1,579
Dual-Use Exports	3,855	3,600	13,691	28,853

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

There have been more domestic than export sales of IIT imagers between 2007 and 2010 - 436,434 images were sold domestically over the four-year period, compared to 51,739 imagers that were exported. However, dual-use exports have been increasing, with respondents exporting seven times the number of IIT units in 2010 than they did in 2007. Military-use-only exports of IIT imagers have increased, but they are a fraction of sales.

Survey respondents mentioned 19 competitors in 10 countries as their non-U.S. IIT imager competitors, with the majority of competitors in Israel, France, and Canada. Thales of France,

Simrad of Norway, Harmamatsu of Japan, General Starlight Company of Canada, and ITL of Israel were mentioned by two respondents each, and the rest of non-U.S. competitors were mentioned once.

E. Low Light Level (LLL) Sensor Components and Imaging Equipment

Summary

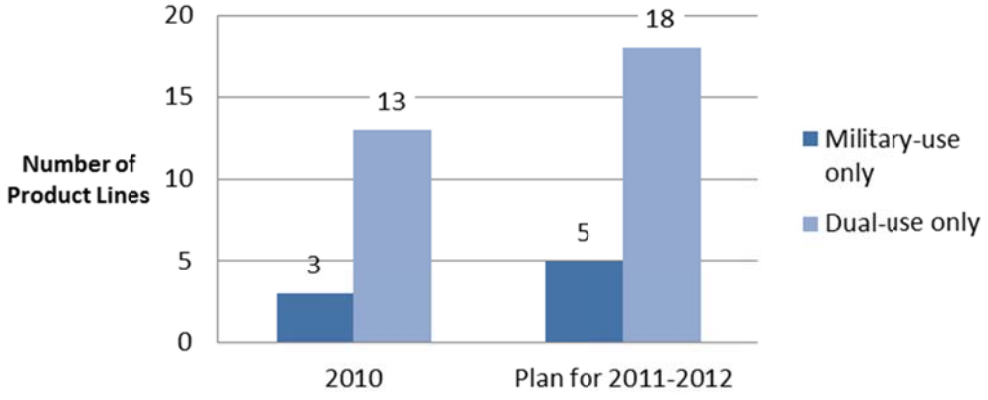
- LLL FPA/sensor and LLL imager manufacturing appears to be concentrated, with only four survey respondents manufacturing LLL sensor components and 12 respondents manufacturing cameras using LLL sensor components.
- LLL sensor components and imagers are a small part of the U.S. night vision market, with sales quantities a fraction of those for cooled and uncooled infrared FPAs and cameras.

LLL Sensor Components

There were four survey respondents that were LLL sensor component manufacturers in 2010 and projected to remain in the market in 2011-12. Three respondents reported manufacturing in the United States and one company reported manufacturing outside of the United States.

There was no change in the number of companies selling military-use-only and dual-use LLL sensor components from 2010 to 2011-12: no companies sold solely military-use-only LLL sensor components, two sold dual-use LLL sensor components, and two sold both military-use-only and dual-use LLL sensor components. However, the number of product lines was projected to increase. Companies sold only three military-use-only product lines in 2010 and expected to sell five in 2011-12, while they sold 13 dual-use product lines in 2010 and projected to sell 18 in 2011-12 (see Figure IV-29).

Figure IV-29: LLL Sensor Component Product Lines

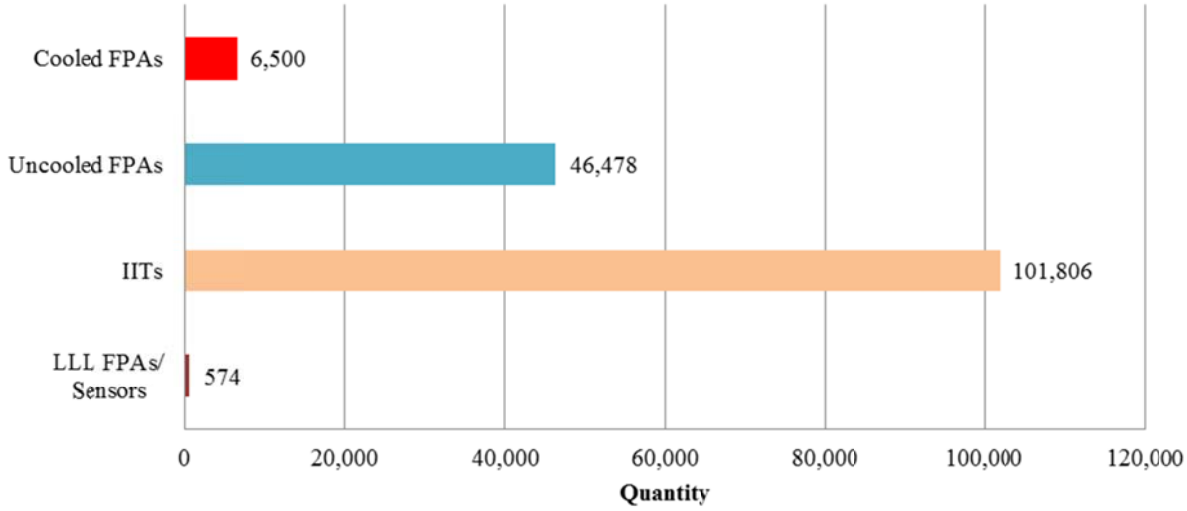


Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Based on survey respondent sales data, LLL sensor components are only a fraction of the U.S. night vision market. In 2010, U.S. LLL sensor components sales were half a percent of IITs, the comparable light amplification sensor components (see Figure IV-30). LLL sensor components sales in the United States were also less than 10 percent of both cooled infrared and uncooled

infrared FPA sales. As with other component sales data, these figures do not necessarily represent manufacturing totals, as some companies producing imagers source their components internally.

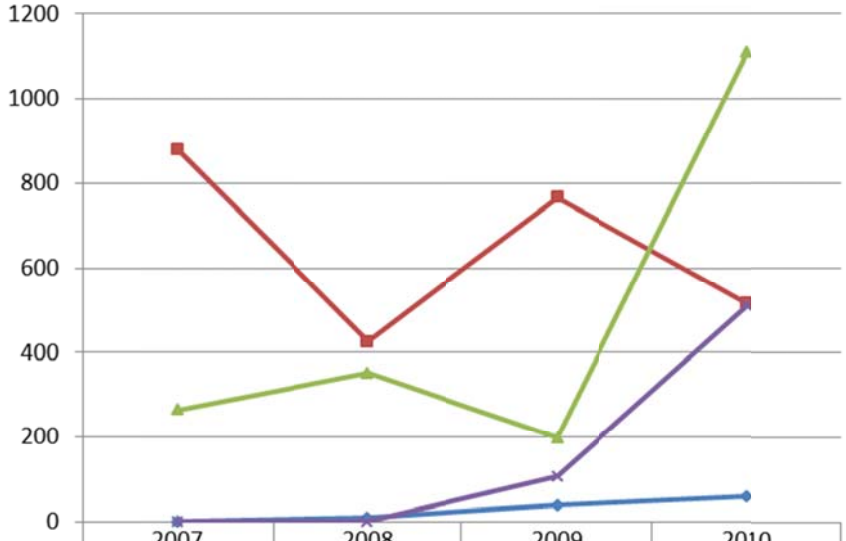
Figure IV-30: FPA and IIT Sales Comparison in the United States in 2010



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

For 2007-2010, there were more dual-use LLL sensor components sold domestically than military-use-only sensor components (see Figure IV-31). LLL sensor component sales were more predominant in the international market; 1,621 units were exported in 2010, almost three times the 574 units sold in the United States.

Figure IV-31: Low Light Level Sensor Components Sales (Quantity)



	2007	2008	2009	2010
U.S. Military-Use Only	0	10	39	59
U.S. Dual-Use	880	426	766	515
Military-Use Only Exports	265	352	198	1,110
Dual-Use Exports	0	0	107	511

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

There were more military-use-only LLL sensor component non-U.S. sales than dual-use non-U.S. sales, although military-use-only non-U.S. sales did fluctuate between 2007 and 2010. Dual-use non-U.S. exports of LLL sensor components have increased, but only from 2009 to 2010. These non-U.S. sales are attributable to one company selling military-use-only LLL sensor components and one company selling dual-use LLL sensor components.

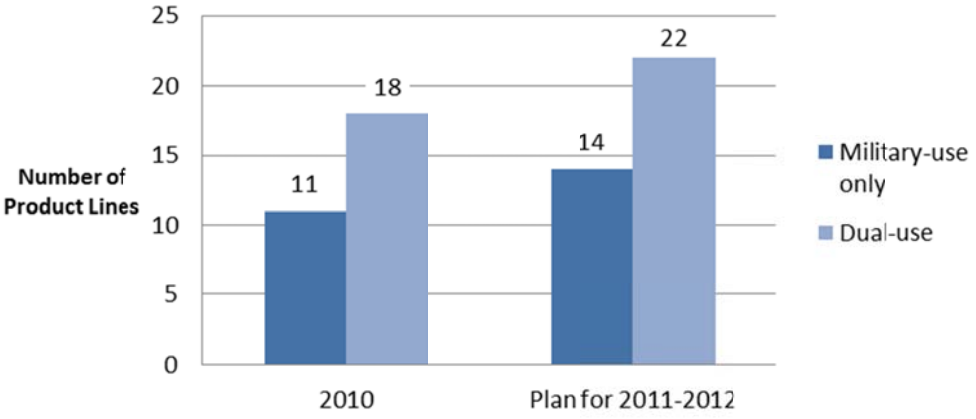
The majority of non-U.S. LLL sensor components competitors are in the United Kingdom, Japan and Germany. The companies mentioned most by survey respondents were Texas Instruments and Hamamatsu in Japan.

LLL Imagers

There were 12 survey respondents that manufactured LLL imagers in 2010 and projected to remain in the market in 2011-12. Of these respondents, seven reported manufacturing LLL imagers in the United States, four manufacture outside of the United States, and one manufactures both inside and outside of the United States.

There was no change in the number of companies selling military-use-only and dual-use LLL imagers from 2010 to 2011-12: four companies sell military-use-only imagers, six sell dual-use imagers, and three companies sell both military-use-only and dual-use imagers. However, the number of product lines was projected to increase. The number of military-use-only LLL imager product lines sold increased 27 percent from 2010 to 2011-12, while the number of dual-use product lines sold increased 22 percent (see Figure IV-32).

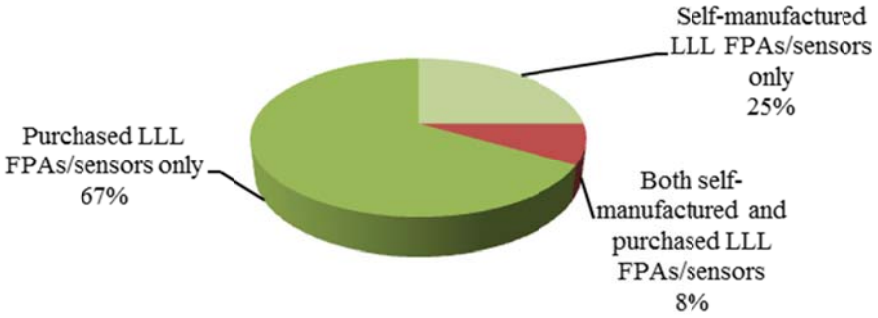
Figure IV-32: LLL Imager Product Lines



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Survey respondents were also asked how they obtained the LLL sensor components they used in the imagers they manufactured. Of the 12 manufacturers, 77 percent purchased LLL sensor components (see Figure IV-33). The data show that the majority of camera producers do not manufacture LLL sensor components but rely on other companies for this component.

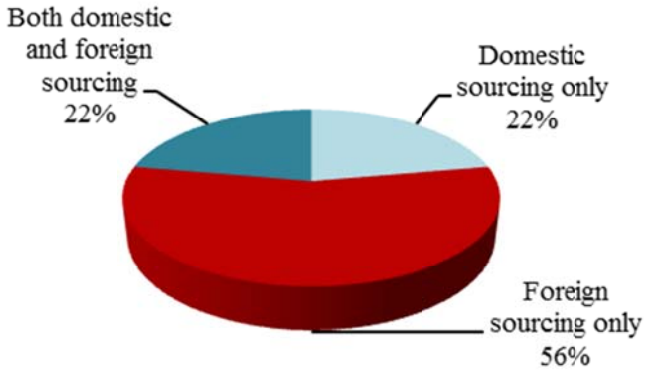
Figure IV-33: Sources of LLL Sensor Components



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The majority of the nine respondents that purchased LLL sensor components sourced them from non-U.S. suppliers (see Figure IV-34). Four of the seven companies sourcing LLL sensor components from non-U.S. companies sell dual-use imagers, two sell military-use-only imagers, and one sells both military-use-only and dual-use imagers. The top non-U.S. sources of LLL sensor components are e2v Technologies in the United Kingdom and Texas Instruments in Japan.

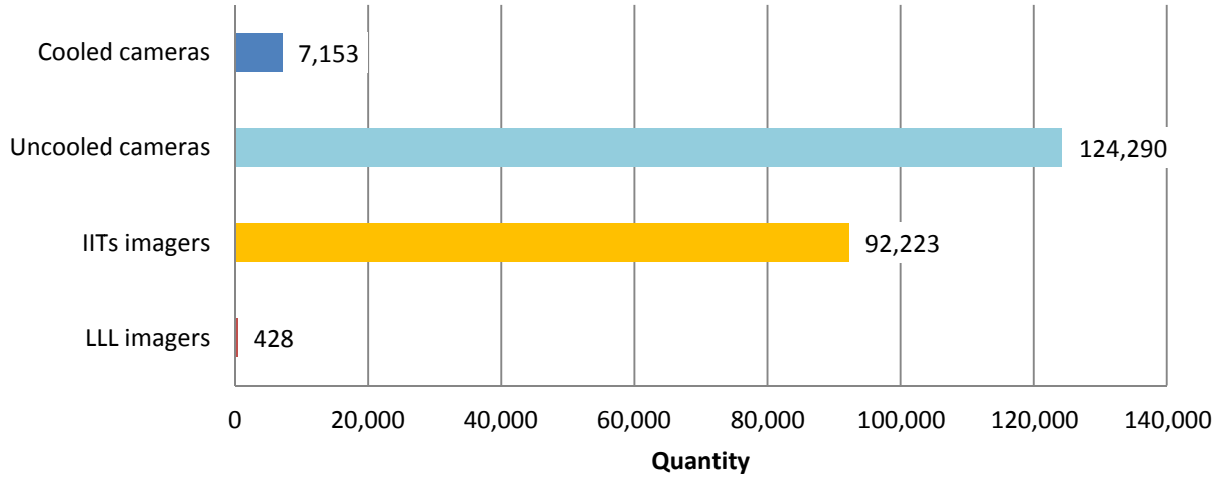
Figure IV-34: Geographic Sources of LLL Sensor Components



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Based on survey respondent sales data, LLL imagers are only a fraction of the U.S. night vision market. In 2010, domestic sales for LLL imagers were half a percent of IIT imagers, which is comparable light amplification equipment (see Figure IV-35). Sales for LLL imagers in the United States were also less than six percent of both cooled infrared cameras and less than 0.3 percent uncooled infrared camera sales. There were more domestic and international sales of LLL sensor components than of LLL imagers.

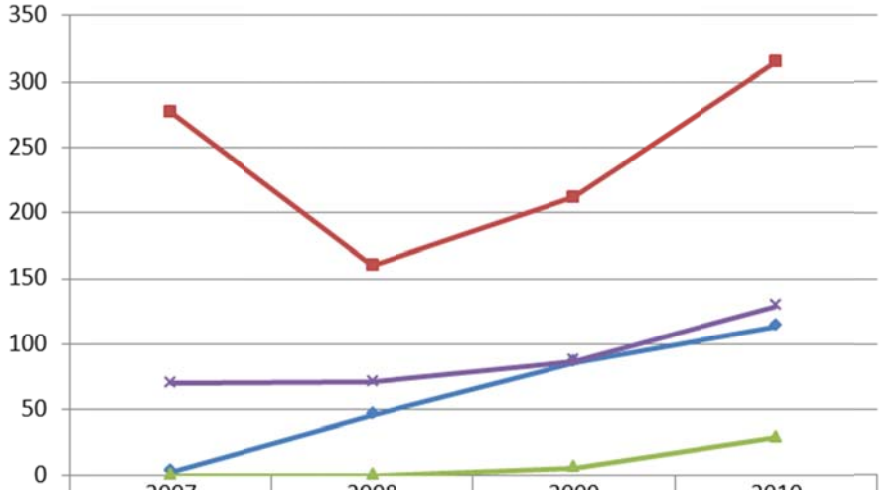
Figure IV-35: Imager Sales Comparison in the United States in 2010



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

LLL imagers were more predominant in the domestic market; 158 units were sold in the United States in 2010, almost three times the number that was exported. From 2007 to 2010, there were more dual-use LLL imagers sold domestically than military-use-only imagers (see Figure IV-36). However, the number of military-use-only LLL imagers steadily increased while the number of dual-use imagers using these sensors fluctuated somewhat over the time period.

Figure IV-36: Sales of LLL Imagers (Quantity)



	2007	2008	2009	2010
U.S. Military-Use Only	3	46	86	113
U.S. Dual-Use	277	160	212	315
Military-Use Only Exports	0	0	6	29
Dual-Use Exports	70	71	87	129

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Survey respondents listed 26 countries as destinations of their exports of LLL imagers from 2009 and 2010. Canada received the largest number and highest value of LLL imagers, followed by

China and Germany (see Figure IV-37). Of these 26 countries, 18 (69 percent) are Wassenaar Arrangement Regime Partners.

Figure IV-37: Destinations of Exports of LLL Imagers

Country	2009		2010	
	value	quantity	value	quantity
Canada	$467,277	17	$1,990,454	53
China	$412,543	14	$535,732	17
Germany	$501,758	18	$508,687	19
Singapore	$59,964	2	$287,144	13
South Korea	$70,588	3	$219,102	7
United Kingdom	$84,387	3	$187,381	6
France	$206,450	5	$161,858	5
Taiwan	$181,307	7	$160,372	8
Hong Kong	$0	0	$148,043	6
Japan	$195,475	6	$124,145	4
Australia	$47,511	2	$106,532	4
Italy	$71,925	4	$62,815	2
Netherlands	$0	0	$56,175	2
Norway	$50,000	1	$54,413	2
India	$118,500	2	$40,800	2
Czech Republic	$0	0	$32,000	
Switzerland	$26,075	1	$28,875	1
Hungary	$0	0	$25,725	5
Israel	$43,146	2	$24,150	1
Malaysia	$0	0	$21,388	1
Chile	$31,000	1	$0	0
Turkey	$30,600	1	$0	0
New Zealand	$29,768	1	$0	0
Russia	$26,705	1	$0	0
Sweden	$20,000	1	$0	0
Ireland	$11,813	1	$0	0

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The majority of non-U.S. competitors of LLL imagers are in Japan, the United Kingdom, and Germany. The companies mentioned most by survey respondents were Hamamatsu of Japan, Andor Technology and Raptor Photonics of the United Kingdom, and PCO of Germany.

Figure IV-38: Summary of Night Vision Component and Equipment Survey Respondents

Type of Night Vision Component/Equipment	# of Companies	# of 2010 Product Lines	# of 2011-12 Product Lines	Quantity from 2007 - 2010				# of Companies Selling to DOD
				Military-use-only Sales	Dual-Use Sales	U.S. Sales	Export Sales	
Uncooled Infrared FPAs	11	25	33	Increase	Decrease	Increase	Overall Increase	1
Uncooled Infrared Cameras	31	136	147	Increase	Increase	Increase	Increase	12
Cooled Infrared FPAs	10	22	34	Overall Increase	Overall Increase	Overall Increase	Decrease	4
Cooled Infrared Cameras	20	98	106	Overall Decrease	Overall Increase	Overall Decrease	Increase	13
Image Intensifier Tubes	4	26	26	Increase	Increase	Increase	Overall Increase	2
Image Intensifier Tube Imagers	9	49	50	Increase	Decrease	Overall Decrease	Increase	7
Low Light Level Sensors	4	16	23	Overall Increase	Overall Increase	Decrease	Increase	2
Low Light Level Imagers	12	29	36	Increase	Overall Increase	Overall Increase	Increase	5

Source: U.S. Department of Commerce, Bureau of Industry and Security, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Figure IV-39: Summary of Sensor Component Sourcing Survey Responses

Type of Night Vision Equipment	Manufacture Sensor Components	Purchase Sensor Components	Manufacture and Purchase Sensor Components	U.S. Source	Non-U.S. Source	U.S. and Non-U.S. Source
Uncooled Infrared Cameras	14%	69%	17%	48%	16%	36%
Cooled Infrared Cameras	30%	45%	25%	36%	43%	21%
Image Intensifier Tube Imagers	22%	67%	11%	57%	14%	29%
Low Light Level Imagers	25%	67%	8%	22%	56%	22%

Source: U.S. Department of Commerce, Bureau of Industry and Security, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

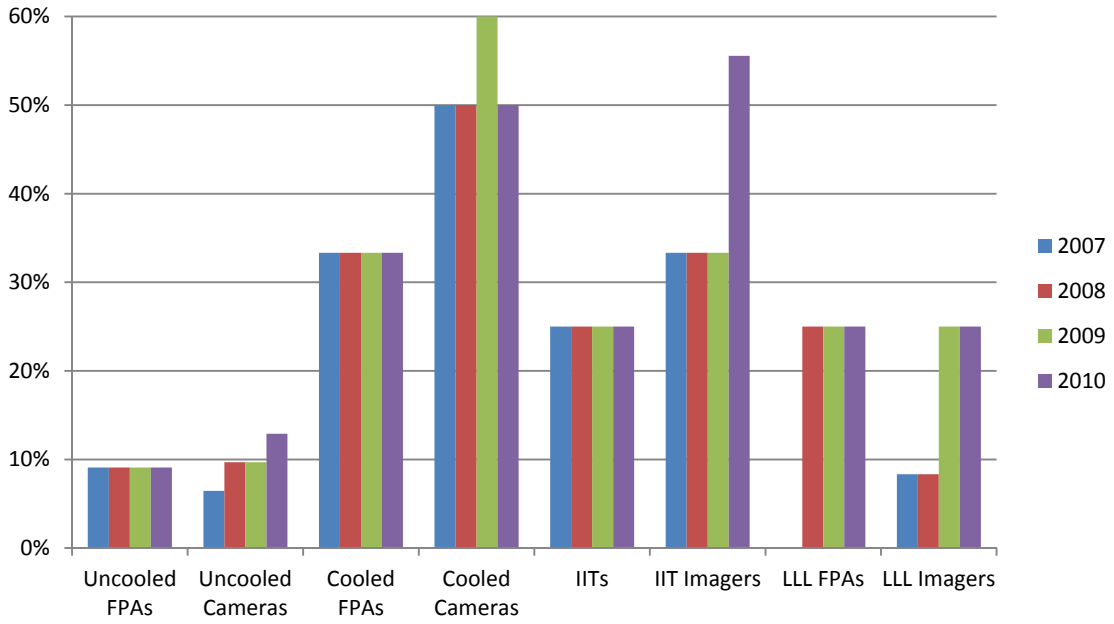
V. Department of Defense (DOD) Sales and R&D Funding

Summary

- Approximately 38 percent of survey respondents sold military-use-only night vision products to DOD. The largest number of companies sold military-use-only cooled infrared cameras to DOD.
- Approximately 36 percent of survey respondents sold dual-use night vision products to DOD. The largest number of companies sold dual-use IIT imagers to DOD.
- Approximately 27 percent of survey respondents received some level of R&D funding from DOD for their recent night vision component or equipment products.
- The number of companies selling night vision components and equipment to DOD, along with the low levels of military-use-only exports, indicates that the majority of end-users are not predominately or exclusively military.

Survey respondents were asked to identify if they had any sales to DOD from 2007 to 2010 for the different types of military-use-only and dual-use night vision components and equipment. As can be seen in Figure V-1, the military-use-only products with the least number of companies selling to DOD are uncooled infrared FPAs and cameras. The largest number of companies sold cooled infrared cameras to DOD, while a large percent of IIT imager sellers sold military-use-only items to DOD in 2010. Overall, 17 companies sold military-use-only night vision components and equipment to DOD, 37.8 percent of survey respondents.

Figure V-1: Percent of Companies Selling Military-Use-Only Night Vision Products to DOD[12]

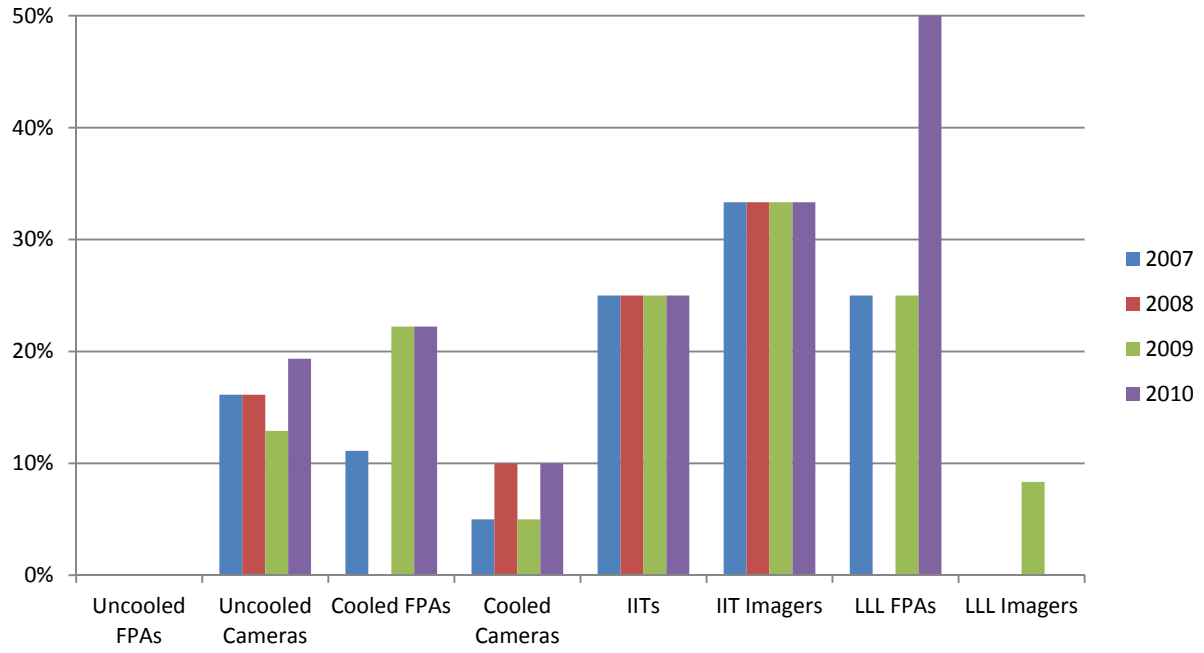


Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

[12] Percentages calculated by dividing number of companies selling a specific night vision product to DOD by the number of companies that manufacture or sell the specific night vision product.

With regard to dual-use night vision components and equipment, no companies sold uncooled infrared FPAs to DOD, and only one company sold cameras using LLL sensor components to DOD in 2009 (see Figure V-2). The largest consistent percentage of companies sold dual-use image IIT imagers to DOD, although there was a spike in the percentage of companies selling LLL sensor components to DOD in 2010. Overall, 16 companies sold dual-use night vision components and equipment to DOD, or 35.6 percent of survey respondents.

Figure V-2: Percent of Companies Selling Dual-Use Night Vision Products to DOD[13]



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

The number of companies selling night vision components and equipment to DOD, along with the low levels of military-use-only exports examined in Section IV, indicates that the majority of end-users are not predominately or exclusively military.

Respondents were also asked to provide information on the R&D funding they received from DOD for their current products. A total of 11 companies received some level of R&D funding from DOD for their recent night vision components and equipment products, or 26.8 percent of surveyed manufacturers (see Figure V-3).

[13] Percentages calculated by dividing number of companies selling a specific night vision product to DOD by the number of companies that manufacture or sell the specific night vision product.

Figure V-3: Companies Receiving R&D Funding from DOD

Types of Night Vision Component/Equipment	# of Companies Receiving DOD R&D Funding	Total Manufacturers	% of Companies Receiving DOD R&D Funding
Uncooled Infrared FPAs	1	8	12.5%
Uncooled Infrared Cameras	5	29	17.2%
Cooled Infrared FPAs	2	8	25.0%
Cooled Infrared Cameras	5	19	26.3%
Image Intensifier Tubes	1	3	33.3%
Image Intensifier Tube Imagers	1	9	11.1%
Low Light Level Sensors	1	4	25.0%
Low Light Level Imagers	2	12	16.7%
TOTAL	**11**	**41**	**26.8%**

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

VI. Control List Jurisdiction

A. Summary

- Military-use-only night vision components and equipment have different physical and technical characteristics than dual-use night vision components and equipment (e.g., weapons mounting, stability software, special packaging), which could be used as a discriminator in controlling items on the USML and CCL.
- Uncooled infrared FPA size is not an indication of military application.
- IIT Generation is not an indication of military application.
- There are numerous applications that are specific to military-use-only components and equipment that are not shared by dual-use components and equipment, and vice-versa.

B. Characteristics of Military-Use Night Vision Items

Survey respondents were asked to identify any differences, such as physical and technical characteristics, between military-use-only and dual-use night vision components and equipment they manufacture or use.[14] Sensor components and cameras that are military-use-only share some characteristics: they have higher performance and more stringent specifications than dual-use night vision items; they are entirely built to MIL specifications and standards; and they have packaging that is rugged and able to handle environmental and temperature stress.

According to the survey results, there are some characteristics specific to military-use sensor components. Military-use sensor components have higher frame rates, different read-out modes, and more stable software than dual-use sensor components. Additionally, military-use-only imaging equipment differs from dual-use equipment because of weapon mount capability and the type of sensor component incorporated into the cameras.

Survey respondents were asked to identify the number of military-use-only and dual-use uncooled infrared FPAs, IITs, and related cameras and imagers that they manufactured in 2010 and projected to manufacture in 2011-12, in order to determine if the FPA size and tube generation characteristics are an indication of military application.

As shown in Figure VI-1, the number of military-use uncooled infrared FPAs and cameras are projected to decrease at sizes at and below 310,000 pixels, and increase at sizes above 310,000 pixels. Conversely, dual-use infrared uncooled FPAs and cameras are projected to increase at all sizes, except for a slight decrease in uncooled infrared cameras at sizes at and below 111,000 pixels. In particular, there is a projected 31.6 percent increase in uncooled infrared cameras at sizes greater than 111,000 and at or below 310,000 pixels. This data suggests that uncooled infrared FPA size is not an indication of military application.

[14] Only 12 of the 45 survey respondents (26.6 percent) reported manufacturing both military-use only and dual-use night vision components and equipment.

Figure VI-1: Uncooled Infrared FPAs and Cameras Models

Military-Use	≤111,000 Pixels		>111,000 and ≤310,000 Pixels		>310,000 Pixels	
	2010	2011-12	2010	2011-12	2010	2011-12
Uncooled FPAs	0	0	4	3	0	1
Uncooled Cameras	27	21	28	25	2	9
Dual-Use	**≤111,000 Pixels**		**>111,000 and ≤310,000 Pixels**		**>310,000 Pixels**	
	2010	2011-12	2010	2011-12	2010	2011-12
Uncooled FPAs	18	20	5	10	1	3
Uncooled Cameras	232	224	36	50	3	5

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

As far as IITs and related imagers, there are no current or projected military-use-only Gen II IIT and imager models (see Figure VI-2). The number of military-use-only Gen III or greater IIT models is projected to remain steady, while the number of related imagers is projected to decrease 40 percent. For dual-use IITs and imagers, the number of Gen II models is projected to remain static. Notwithstanding that Gen III or greater dual-use IIT models outnumber military-use models by almost 18-to-1, there is a projected 17 percent increase in the number of dual-use Gen III or greater IIT imagers, which would exceed the number of military-use imagers by more than 500 percent. This data suggests that IIT Generation is not an indication of military application.

Figure VI-2: Image Intensifier Tubes and Imagers Models

Military-Use	Gen II Models		Gen III or Greater Models	
	2010	2011-12	2010	2011-12
Image Intensifier Tubes	0	0	2	2
Image Intensifier Tube Imagers	0	0	20	12
Dual-Use	**Gen II Models**		**Gen III or Greater Models**	
	2010	2011-12	2010	2011-12
Image Intensifier Tubes	17	17	35	35
Image Intensifier Tube Imagers	37	37	53	62

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

C. Applications for Night Vision Items

Survey respondents were asked to provide the specific applications for the night vision components and equipment they manufacture and sell. Companies reported classifying specific applications for *all* types of both military-use-only and dual-use night vision components and equipment into three categories: security, surveillance, tracking, and border/perimeter protection; firearm scopes, mounts, and sites; and vehicle situational awareness/collision avoidance/enhanced vision systems.

Survey respondents provided two application categories for military-use-only night vision components and equipment: targeting systems/pods and threat warning, and counter improvised

explosive device. In addition, force protection and missile tracking, guidance, and seeker/countermeasure were listed as specific application categories for thermal imaging military-use-only products.

Survey respondents provided many specific applications for dual-use night vision component and equipment, four of which apply to both thermal imaging and light amplification products: scientific research, astronomy and space science, law enforcement/search and rescue, and solar panel inspection. One additional application category was provided for dual-use light amplification components and equipment: wildlife detection/hunting. Dual-use thermal imaging products had eight specific application categories provided by survey respondents: building inspections; firefighting; semiconductor debug and failure analysis; medical imaging/research; thermography/maintenance; underwater imaging; HazMat; and gas detection/imaging and utility inspection.

This information suggests that, there are a few applications shared by both military-use-only and dual-use night vision components and equipment. However, there are numerous applications that are specific to military-use-only components and equipment that are not shared by dual-use components and equipment, and vice versa.

Figure VI-3: Applications for Night Vision Items

Infrared Imaging	Light Amplification
Military-use-only and Dual-Use Applications	
Security, surveillance, tracking, and border/perimeter protection	
Firearm sighting scopes, mounts, and sites	
Vehicle situational awareness/collision avoidance/enhanced vision systems	
Military-use-only Applications	
Targeting systems/pods and threat warning	
Counter improvised explosive device	
Force protection	
Missile tracking, guidance, and seeker/countermeasure	
Dual-Use Applications	
Scientific research	
Astronomy and space science	
Law enforcement/search and rescue	
Solar panel inspection	
Building inspections	Wildlife detection/hunting
Fire fighting	
Semiconductor debug and failure analysis	
Medical imaging/research	
Thermography/maintenance	
Underwater imaging	
HazMat	
Gas detection/imaging and utility inspection	

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

VII. Non-U.S. Competitors

Survey respondents were asked to provide the names and countries of their non-U.S. competitors. Uncooled infrared camera manufacturers have the largest number of non-U.S. competitors, followed by cooled infrared camera manufacturers (see Figure VII-1). The majority of non-U.S. competitors compete with U.S. night vision component and equipment manufacturers both inside and outside of the United States.

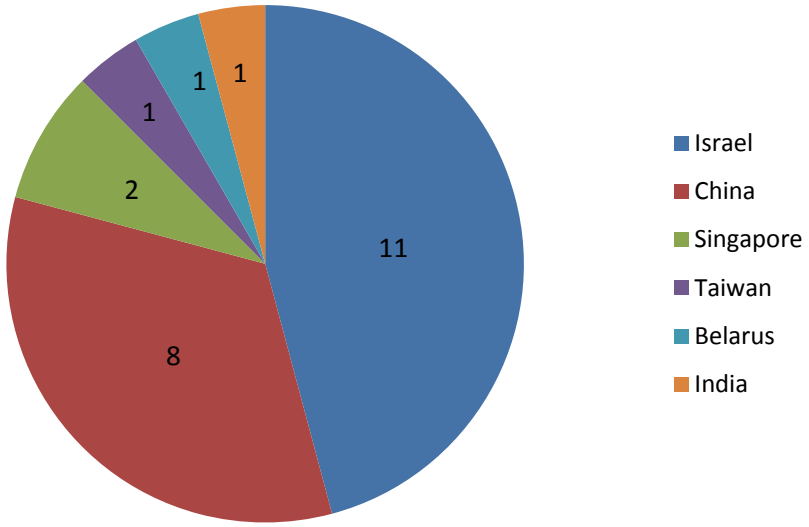
Figure VII-1: Non-U.S. Night Vision Component and Equipment Competitors

Types of Night Vision Component/Equipment	# of Competitors	# of Regime Partner Countries	# of Other Countries
Uncooled Infrared FPAs	25	11	2
Uncooled Infrared Cameras	60	14	4
Cooled Infrared FPAs	10	5	1
Cooled Infrared Cameras	36	12	2
Image Intensifier Tubes	6	4	2
Image Intensifier Tube Cameras	19	8	2
Low Light Level Sensors	12	6	3
Low Light Level Imagers	24	9	3

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

Overall, 106 distinct non-U.S. competitors in 23 countries were mentioned. The non-U.S. competitors mentioned most frequently were Sofradir in France, Selex in the United Kingdom, and Thales in France. Hamamatsu in Japan was the only non-U.S. competitor listed for all eight types of night vision components and equipment. Eighty-two of the competitors (74.5 percent) are located in countries that are Wassenaar Arrangement adherents; 59 of these competitors were located in the European Union. The remaining 24 competitors are located in Belarus, China, India, Israel, Singapore, and Taiwan (see Figure VII-2).

Figure VII-2: Non-U.S. Competitors in Non-Regime Partner Countries



Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

In addition, survey respondents were asked to identify non-U.S. competitors that produce uncooled FPAs and cameras in three different size ranges and IITs and imagers at two different generation classifications. As can be seen in Figure VII-3, there is significant non-U.S. capability at all FPA sizes and IIT Generation classifications.

*Figure VII-3: Uncooled Infrared and IIT Non-U.S. Competitors**

	≤111,000 Pixels	>111,000 and ≤310,000 Pixels	>310,000 Pixels
Uncooled FPAs	17/2	11/4	15/3
Uncooled Cameras	40/13	25/14	20/9

	Gen II Models	Gen III or Greater Models
Image Intensifier Tubes	4/1	4/0
Image Intensifier Tube Imagers	13/4	13/4

*Presented as number of competitors in Regime Partner countries/number of competitors in other countries

Source: U.S. DOC, BIS, *Night Vision Focal Plane Arrays, Sensors, and Cameras* survey, August 2011

VIII. Report Findings

State of Controlled Night Vision Market:

12. **The number of current and projected dual-use product lines for night vision sensor components and imaging equipment is greater than the number of military-use-only product lines.** The exception to this is cooled infrared cameras.
13. **The sales data provided by survey respondents show volatility in the market.** The survey data does not identify a cause for this, but the volatility is likely due to the global recession, increased competition, export controls, and unsteady/unpredictable military sales.
14. **From 2007-2010, dual-use exports of all night vision components and equipment have increased**, from 310,389 to 498,406 components and equipment**.**
15. **Non-U.S. companies have a strong presence in the U.S. market, with 44 percent of survey respondents purchasing some sensor components from non-U.S. suppliers:** 52 percent of uncooled infrared camera companies, 64 percent of cooled infrared camera companies, 33 percent of image intensification tubes (IIT) imager companies and 78 percent of low light level (LLL) imager companies source some sensor components from non-U.S. sellers.
16. **Dual-use uncooled infrared FPAs are moving toward larger formats, but the majority of available models are in the lower format range.** Uncooled infrared FPAs were predominately sold in the United States; there were no exports of military-use-only uncooled infrared FPAs, and very few exports of dual-use uncooled infrared FPAs.
17. **There has been a spike in both U.S. and non-U.S. dual-use uncooled infrared camera sales from 2009-2010.** This spike in sales coincides with the implementation with the 2009 rule that reduced licensing requirements to some regime partners for dual-use uncooled infrared cameras controlled under ECCN 6A003.
18. **The number of cooled infrared FPA product lines increased, with dual-use product lines experiencing the largest increase.** However, cooled infrared FPA sales were dominated by U.S. military-use-only sales. There were almost no exports of dual-use cooled infrared FPAs and limited military-use-only exports.
19. **The number of military-use-only cooled infrared camera product lines has increased, and there are more than twice as many military-use-only as dual-use product lines.** However, dual-use cooled infrared camera exports have grown at a higher rate than military-use-only exports. In the United States, a larger number of dual-use than military-use-only cooled infrared cameras were sold, although the sales value for the dual-use cameras was much smaller than the sales value for the military-use only exports.
20. **IIT manufacturing appears to be very concentrated, with few respondents reporting manufacturing capability.** Sales quantities for both military-use-only and dual-use IITs in the U.S. increased steadily during the survey period; there were no exports of military-

use-only IITs. In addition, there are no military-use-only Gen II IIT models available, and the vast majority of Gen III and higher IIT models are dual-use.[15]

21. **There are a larger number of dual-use IIT imager models than military-use-only, and there are projected to be more dual-use models in 2011-12.** Similar to IITs, there are no military-use-only Gen II IIT imager models available, and the vast majority of Gen III and higher IIT imager models are dual-use. There have been more domestic than export sales of IIT imagers, but dual-use exports have been increasing dramatically.
22. **LLL sensor components and LLL imagers are currently a fraction of the night vision market.** There are more dual-use LLL sensor and imaging equipment product lines than military-use-only. In the United States, there are more dual-use than military-use-only LLL sensor components and LLL imagers sold.

Department of Defense (DOD) Sales and R&D Funding:

5. Approximately 38 percent of survey respondents sold some military-use-only night vision components and equipment to DOD. The largest number of companies sold military-use-only cooled infrared cameras to DOD.
6. Approximately 36 percent of survey respondents sold some dual-use night vision components and equipment to DOD. The largest number of companies sold dual-use IIT imagers to DOD.
7. Approximately 27 percent of survey respondents received some level of research and development (R&D) funding from DOD for their recent night vision component or equipment products.
8. The number of companies selling night vision components and equipment to DOD, along with the low levels military-use-only exports, indicates that the majority of end-users are not predominately or exclusively military.

Control List Jurisdiction:

5. Military-use-only night vision components and equipment have different physical and technical characteristics than dual-use night vision components and equipment (e.g., weapons mounting, stability software, special packaging), which could be used as a discriminator in controlling items on the USML and CCL.
6. Uncooled infrared FPA size is not an indication of military application.
7. IIT Generation is not an indication of military application.
8. There are numerous applications that are specific to military-use-only components and equipment that are not shared by dual-use components and equipment, and vice-versa.

[15] Generation (Gen) classification is an aspect of IITs and associated imagers used to characterize the devices. In general, an image is brighter and sharper at higher generations. For the purpose of this assessment, IIT size is divided into two categories: Gen II, and Gen III or higher.

Non-U.S. Competitors:

4. There is widespread availability of night vision components and equipment among Wassenaar Arrangement regime members.
5. There is evidence that certain items across all types of night vision components and equipment are available from outside of regime members. These countries include Belarus, China, India, Israel, Singapore, and Taiwan.
6. There is clear evidence that foreign availability exists outside of regime members at all size ranges for uncooled FPAs, uncooled cameras, and IIT imagers.

Appendix A. United States Munitions List Category XI

designed or modified for use with the equipment in paragraphs (a) and (b) of this category, except for such items as are in normal commercial use.

(d) Technical data (as defined in §120.10) and defense services (as defined in §120.9) directly related to the defense articles enumerated in paragraphs (a) through (c) of this category. (See §125.4 for exemptions.) Technical data directly related to the manufacture or production of any defense articles enumerated elsewhere in this category that are designated as Significant Military Equipment (SME) shall itself be designated as SME.

CATEGORY XII—FIRE CONTROL, RANGE FINDER, OPTICAL AND GUIDANCE AND CONTROL EQUIPMENT

*(a) Fire control systems; gun and missile tracking and guidance systems; gun range, position, height finders, spotting instruments and laying equipment; aiming devices (electronic, optic, and acoustic); bomb sights, bombing computers, military television sighting and viewing units, and periscopes for the articles of this section.

*(b) Lasers specifically designed, modified or configured for military application including those used in military communication devices, target designators and range finders, target detection systems, and directed energy weapons.

*(c) Infrared focal plane array detectors specifically designed, modified, or configured for military use; image intensification and other night sighting equipment or systems specifically designed, modified or configured for military use; second generation and above military image intensification tubes (defined below) specifically designed, developed, modified, or configured for military use, and infrared, visible and ultraviolet devices specifically designed, developed, modified, or configured for military application. Military second and third generation image intensification tubes and military infrared focal plane arrays identified in this subparagraph are licensed by the Department of Commerce (ECCN 6A002A and 6A003A)) when part of a commercial system (*i.e.*, those systems originally designed for commercial use). This does not include any military system comprised of non-military specification components. Replacement tubes or focal plane arrays identified in this paragraph being exported for commercial systems are subject to the controls of the ITAR.

NOTE: *Special definition.* For purposes of this subparagraph, *second and third generation image intensification tubes* are defined as having: A peak response within the 0.4 to 1.05 micron wavelength range and incorporating a microchannel plate for electron image amplification having a hole pitch (center-to-center spacing) of less than 25 microns and having either:

(a) An S–20, S–25 or multialkali photocathode; or

(b) A GaAs, GaInAs, or other compound semiconductor photocathode.

*(d) Inertial platforms and sensors for weapons or weapon systems; guidance, control and stabilization systems except for those systems covered in Category VIII; astro-compasses and star trackers and military accelerometers and gyros. For aircraft inertial reference systems and related components refer to Category VIII.

(e) Components, parts, accessories, attachments and associated equipment specifically designed or modified for the articles in paragraphs (a) through (d) of this category, except for such items as are in normal commercial use.

(f) Technical data (as defined in §120.10) and defense services (as defined in §120.9) directly related to the defense articles enumerated in paragraphs (a) through (e) of this category. (See §125.4 for exemptions.) Technical data directly related to manufacture and production of any defense articles enumerated elsewhere in this category that are designated as Significant Military Equipment (SME) shall itself be designated as SME.

CATEGORY XIII—AUXILIARY MILITARY EQUIPMENT

(a) Cameras and specialized processing equipment therefor, photointerpretation, stereoscopic plotting, and photogrammetry equipment which are specifically designed, developed, modified, adapted, or configured for military purposes, and components specifically designed or modified therefor;

(b) Military Information Security Assurance Systems and equipment, cryptographic devices, software, and components specifically designed, developed, modified, adapted, or configured for military applications (including command, control and intelligence applications). This includes: (1) 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, including equipment and software for tracking, telemetry and control (TT&C) encryption and decryption;

(2) Military cryptographic (including key management) systems, equipment, assemblies, modules, integrated circuits, components of software which have the capability of generating spreading or hopping codes for spread spectrum systems or equipment;

(3) Military cryptanalytic systems, equipment, assemblies, modules, integrated circuits, components or software;

Appendix B. Commerce Control List ECCNs 6A002 and 6A003

sounders limited to any of the following:

a. Measuring the depth of water;

b. Measuring the distance of submerged or buried objects; or

c. Fish finding.

Note 2: *6A001.b does not apply to equipment specially designed for installation on surface vessels.*

c. [RESERVED]

N.B.: *For diver deterrent acoustic systems, see 8A002.r.*

6A002 Optical sensors.

License Requirements

Reason for Control: NS, MT, CC, RS, AT, UN

Control(s)	*Country Chart*
NS applies to entire entry	NS Column 2
MT applies to optical detectors in 6A002.a.1, a.3, or .e that are specially designed or modified to protect "missiles" against nuclear effects (e.g., Electromagnetic Pulse (EMP), X-rays, combined blast and thermal effects), and usable for "missiles".	MT Column 1
RS applies to 6A002.a.1, a.2, a.3 (except a.3.d.2.a and a.3.e for lead selenide based focal plane arrays (FPAs)), .c, and .e	RS Column 1
CC applies to police-model infrared viewers in 6A002.c	CC Column 1
AT applies to entire entry	AT Column 1
UN applies to 6A002.a.1, a.2, a.3 and c.	Iraq, North Korea, and Rwanda.

License Requirement Notes: *See §743.1 of the EAR for reporting requirements for exports under License Exceptions.*

License Exceptions

LVS: $3000; *except* N/A for MT and for 6A002.a.1, a.2, a.3, .c, and .e
GBS: N/A
CIV: N/A
STA: License Exception STA may not be used to ship any commodity in: 6A002.a.1.a, b. or c; or 6A002.a.2.a in which the photocathode in described in 6A002.a.2.a 3.a is a Multialkali photocathode (e.g., S–20 and S–25) having a luminous sensitivity exceeding 700 μA/lm; or 6A002.a.3; or 6A002.b; or 6A002.c "Direct view" imaging equipment incorporating any of the following:
1. Image intensifier tubes having the characteristics listed in the description of 6A002.a.2.a earlier in this STA paragraph of License Exception section to this ECCN ; or
2. "Focal plane arrays" having the characteristics listed in the description of 6A002.a.3; or 6A002.e to any of the eight destinations listed in § 740.20(c)(2) of the EAR

List of Items Controlled

Unit: Number
Related Controls: The following commodities are subject to the export

licensing authority of U.S. Department of State, Directorate of Defense Trade Controls (22 CFR part 121): 1.) "Image intensifiers" defined in 6A002.a.2 and "focal plane arrays" defined in 6A002.a.3 specially designed, modified, or configured for military use and not part of civil equipment; 2.) "Space qualified" solid-state detectors defined in 6A002.a.1, "space qualified" imaging sensors (e.g., "monospectral imaging sensors" and "multispectral imaging sensors") defined in 6A002.b.2.b.1, and "space qualified" cryocoolers defined in 6A002.d.1, unless, on or after September 23, 2002, the Department of State issues a commodity jurisdiction determination assigning the export licensing authority to the Department of Commerce, Bureau of Industry and Security. See also 6A102, 6A202, and 6A992

***Note**: Exporters may apply for a commodity jurisdiction request with the Department of State, Directorate of Defense Trade Controls for "space qualified" solid-state detectors defined in 6A002.a.1 and imaging sensors (e.g., "monospectral imaging sensors" and "multispectral imaging sensors") defined in 6A002.b.2.b.1 that may have predominant civil application(s).*

Related Definitions: N/A
Items:

a. Optical detectors, as follows:

***Note:** 6A002.a does not control germanium or silicon photodevices.*

***N.B.:** Silicon and other material based 'microbolometer' non "space-qualified" "focal plane arrays" are only specified under 6A002.a.3.f.*

a.1. "Space-qualified" solid-state detectors, as follows:

a.1.a. "Space-qualified" solid-state detectors, having all of the following:

a.1.a.1. A peak response in the wavelength range exceeding 10 nm but not exceeding 300 nm; *and*

a.1.a.2. A response of less than 0.1% relative to the peak response at a wavelength exceeding 400 nm;

a.1.b. "Space-qualified" solid-state detectors, having all of the following:

a.1.b.1. A peak response in the wavelength range exceeding 900 nm but not exceeding 1,200 nm; *and*

a.1.b.2. A response "time constant" of 95 ns or less;

a.1.c. "Space-qualified" solid-state detectors having a peak response in the wavelength range exceeding 1,200 nm but not exceeding 30,000 nm;

a.2. Image intensifier tubes and specially designed components therefor, as follows:

a.2.a. Image intensifier tubes having all of the following:

a.2.a.1. A peak response in the wavelength range exceeding 400 nm but not exceeding 1,050 nm;

a.2.a.2. A microchannel plate for electron image amplification with a hole pitch (center-to-center spacing) of 12 μm or less; *and*

a.2.a.3. Any of the following photocathodes:

a.2.a.3.a. S-20, S-25 or multialkali photocathodes with a luminous sensitivity exceeding 350 μA/lm;

a.2.a.3.b. GaAs or GaInAs photocathodes; *or*

a.2.a.3.c. Other III-V compound semiconductor photocathodes;

Note: *6A002.a.2.a.3.c does not apply to compound semiconductor photocathodes with a maximum radiant sensitivity of 10 mA/W or less.*

a.2.b. Specially designed components, as follows:

a.2.b.1. Microchannel plates having a hole pitch (center-to-center spacing) of 12 μm or less;

a.2.b.2. GaAs or GaInAs photocathodes;

a.2.b.3. Other III-V compound semiconductor photocathodes;

Note: *6A002.a.2.b.3 does not control compound semiconductor photocathodes with a maximum radiant sensitivity of 10 mA/W or less.*

a.3. Non-"space-qualified" "focal plane arrays", as follows:

N.B.: *Silicon and other material based 'microbolometer' non"space-qualified" "focal plane arrays" are only specified in 6A002.a.3.f.*

Technical Notes:

1. Linear or two-dimensional multi-element detector arrays are referred to as "focal plane arrays".

2. For the purposes of 6A002.a.3. 'cross scan direction' is defined as the axis parallel to the linear array of detector elements and the 'scan direction' is defined as the axis perpendicular to the linear array of detector elements.

Note 1: *6A002.a.3 includes photoconductive arrays and photovoltaic arrays.*

Note 2: *6A002.a.3 does not control:*

a. Multi-element (not to exceed 16 elements) encapsulated photoconductive cells using either lead sulphide or lead selenide;

b. Pyroelectric detectors using any of the following:

b.1. Triglycine sulphate and variants;

b.2. Lead-lanthanum-zirconium titanate and variants;

b.3. Lithium tantalate;

b.4. Polyvinylidene fluoride and variants; or

b.5. Strontium barium niobate and variants.

a.3.a. Non-"space-qualified" "focal plane arrays", having all of the following:

a.3.a.1. Individual elements with a peak response within the wavelength range exceeding 900 nm but not exceeding 1,050 nm; *and*

a.3.a.2. A response "time constant" of less than 0.5 ns;

a.3.b. Non-"space-qualified" "focal plane arrays", having all of the following:

a.3.b.1. Individual elements with a peak response in the wavelength range exceeding 1,050 nm but not exceeding 1,200 nm; *and*

a.3.b.2. A response "time constant" of 95 ns or less;

a.3.c. Non-"space-qualified"

non-linear (2-dimensional) "focal plane arrays", having individual elements with a peak response in the wavelength range exceeding 1,200 nm but not exceeding 30,000 nm;

N.B.: *Silicon and other material based 'microbolometer' non"space-qualified" "focal plane arrays" are only specified in 6A002.a.3.f.*

a.3.d. Non-"space-qualified" linear (1-dimensional) "focal plane arrays", having all of the following:

a.3.d.1. Individual elements with a peak response in the wavelength range exceeding 1,200 nm but not exceeding 3,000 nm; *and*

a.3.d.2. Any of the following :

a.3.d.2.a. A ratio of scan direction dimension of the detector element to the cross-scan direction dimension of the detector element of less than 3.8; *or*

a.3.d.2.b. Signal processing in the element (SPRITE);

a.3.e. Non-"space-qualified" linear (1-dimensional) "focal plane arrays", having individual elements with a peak response in the wavelength range exceeding 3,000 nm but not exceeding 30,000 nm.

a.3.f. Non-"space-qualified" non-linear (2-dimensional) infrared "focal plane arrays" based on 'microbolometer' material having individual elements with an unfiltered response in the wavelength range equal to or exceeding 8,000 nm but not exceeding 14,000 nm.

Technical Notes:

1. For the purposes of 6A002.a.3.f. 'microbolometer' is defined as a thermal imaging detector that, as a result of a temperature change in the detector caused by the absorption of infrared radiation, is used to generate any usable signal.

2. Non- imaging thermal detectors are not controlled by 6A002.a.3. Imaging thermal detectors are a multi-element array of thermal detectors with the capacity to form a visual, electronic or other representation of an object with sufficient fidelity to enable understanding of its shape or other spatial characteristics, such as height, width, or area. A multi-element array of thermal detectors without the capacity to form spatial representation of an object is non-imaging.

3. 6A002.a.3.f captures all non-"space-qualified" non-linear (2-dimensional) infrared "focal plane arrays" based on microbolometer material having individual elements with any unfiltered response between 8,000 nm and 14,000 nm.

b. "Monospectral imaging sensors" and "multispectral imaging sensors" designed for remote sensing applications, having any of the following:

b.1. An Instantaneous-Field-Of-View (IFOV) of less than 200 μrad (microradians); *or*

b.2. Being specified for operation in the wavelength range exceeding 400 nm but not exceeding 30,000 nm and having all the following:

b.2.a. Providing output imaging data in digital format; *and*

b.2.b. Being any of the following:

b.2.b.1. "Space-qualified"; *or*

b.2.b.2. Designed for airborne operation, using other than silicon detectors, and having an IFOV of less than 2.5 mrad (milliradians).

c. Direct view imaging equipment operating in

the visible or infrared spectrum, incorporating any of the following:

c.1. Image intensifier tubes having the characteristics listed in 6A002.a.2.a; *or*

c.2. "Focal plane arrays" having the characteristics listed in 6A002.a.3.

Technical Note: *"Direct view" refers to imaging equipment, operating in the visible or infrared spectrum, that presents a visual image to a human observer without converting the image into an electronic signal for television display, and that cannot record or store the image photographically, electronically or by any other means.*

Note: *6A002.c does not control the following equipment incorporating other than GaAs or GaInAs photocathodes:*

a. Industrial or civilian intrusion alarm, traffic or industrial movement control or counting systems;

b. Medical equipment;

c. Industrial equipment used for inspection, sorting or analysis of the properties of materials;

d. Flame detectors for industrial furnaces;

e. Equipment specially designed for laboratory use.

d. Special support components for optical sensors, as follows:

d.1. "Space-qualified" cryocoolers;

d.2. Non-"space-qualified" cryocoolers, having a cooling source temperature below 218 K (-55° C), as follows:

d.2.a. Closed cycle type with a specified Mean-Time-To-Failure (MTTF), or Mean-Time-Between-Failures (MTBF), exceeding 2,500 hours;

d.2.b. Joule-Thomson (JT) self-regulating minicoolers having bore (outside) diameters of less than 8 mm;

d.3. Optical sensing fibers specially fabricated either compositionally or structurally, or modified by coating, to be acoustically, thermally, inertially, electromagnetically or nuclear radiation sensitive.

Note: *6A002.d.3 does not apply to encapsulated optical sensing fibers specially designed for bore hole sensing applications.*

e. "Space qualified" "focal plane arrays" having more than 2,048 elements per array and having a peak response in the wavelength range exceeding 300 nm but not exceeding 900 nm.

6A003 Cameras.

License Requirements

Reason for Control: NS, NP, RS, AT, UN

Control(s)	*Country Chart*
NS applies to entire entry	NS Column 2
NP applies to items controlled in paragraphs 6A003.a.2, a.3 and a.4.	NP Column 1
RS applies to items controlled in 6A003.b.3, to items controlled in 6A003.b.4.a, and to items controlled in 6A003.b.4.b that have a frame rate greater than 60 Hz or that incorporate a focal plane array with more than 111,000 elements,	RS Column 1

or to items in 6A003.b.4.b when being exported or reexported to be embedded in a civil product. (But see § 742.6(a)(2)(iii) and (v) for certain exemptions)	
RS applies to items controlled in 6A003.b.4.b that have a frame rate of 60 Hz or less and that incorporate a focal plane array with not more than 111,000 elements if not being exported or reexported to be embedded in a civil product.	RS Column 2
RS applies to items controlled in 6A003.b.4.b	A license is required to export or reexport these items to Hong Kong. This license requirement does not appear in the Commerce Country Chart.
AT applies to entire entry	AT Column 1
UN applies to items controlled in 6A003.b.3 and b.4.	Iraq and Rwanda.

License Exceptions

LVS: $1500, except N/A for 6A003.a.2 through a.6, b.1, b.3 and b.4

GBS: Yes for 6A003.a.1

CIV: Yes for 6A003.a.1

STA: License Exception STA may not be used to ship any commodity in 6A003.b.3 or b.4to any of the eight destinations listed in § 740.20(c)(2) of the EAR.

List of Items Controlled

Unit: Number

Related Controls: Related Controls: (1) See ECCNs 6E001 ("development"), 6E002 ("production"), and 6E201 ("use") for technology for items controlled under this entry. (2) Also see ECCN 6A203. (3) See ECCN 8A002.d and .e for cameras specially designed or modified for underwater use. (4) See ECCN 0A919 for foreign made military commodities that incorporate cameras described in 6A003.b.4.b. (5) Section 744.9 imposes license requirements on cameras described in 6A003.b.4.b if being exported for incorporation into an item controlled by ECCN 0A919 or for a military end-user.

Related Definitions: N/A

Items:

a. Instrumentation cameras and specially designed components therefor, as follows:

Note: *Instrumentation cameras, controlled by 6A003.a.3 to 6A003.a.5, with modular structures should be evaluated by their maximum capability, using plug-ins available according to the camera manufacturer's specifications.*

a.1. High-speed cinema recording cameras using any film format from 8 mm to 16 mm inclusive, in which the film is continuously advanced throughout the recording period, and that are capable of recording at framing rates exceeding 13,150 frames/s;

Note: *6A003.a.1 does not control cinema recording cameras designed for civil purposes.*

a.2. Mechanical high speed cameras, in which the film does not move, capable of recording at rates exceeding 1,000,000 frames/s for the full framing height of 35 mm film, or at proportionately higher rates for lesser frame heights, or at proportionately lower rates for

greater frame heights;

a.3. Mechanical or electronic streak cameras having writing speeds exceeding 10 mm/μs;

a.4. Electronic framing cameras having a speed exceeding 1,000,000 frames/s;

a.5. Electronic cameras, having all of the following:

a.5.a. An electronic shutter speed (gating capability) of less than 1μs per full frame; *and*

a.5.b. A read out time allowing a framing rate of more than 125 full frames per second.

a.6. Plug-ins, having all of the following characteristics:

a.6.a. Specially designed for instrumentation cameras which have modular structures and that are controlled by 6A003.a; *and*

a.6.b. Enabling these cameras to meet the characteristics specified in 6A003.a.3, 6A003.a.4 or 6A003.a.5, according to the manufacturer's specifications.

b. Imaging cameras, as follows:

Note: *6A003.b does not control television or video cameras specially designed for television broadcasting.*

b.1. Video cameras incorporating solid state sensors, having a peak response in the wavelength range exceeding 10 nm, but not exceeding 30,000 nm and having all of the following:

b.1.a. Having any of the following:

b.1.a.1. More than 4 x 10^6 "active pixels" per solid state array for monochrome (black and white) cameras;

b.1.a.2. More than 4 x 10^6 "active pixels" per solid state array for color cameras incorporating three solid state arrays; *or*

b.1.a.3. More than 12 x 10^6 "active pixels" for solid state array color cameras incorporating one solid state array; *and*

b.1.b. Having any of the following:

b.1.b.1. Optical mirrors controlled by 6A004.a.;

b.1.b.2. Optical control equipment controlled by 6A004.d.; *or*

b.1.b.3. The capability for annotating internally generated camera tracking data.

Technical Notes:

1. For the purposes of this entry, digital video cameras should be evaluated by the maximum number of "active pixels" used for capturing moving images.

2. For the purpose of this entry, camera tracking data is the information necessary to define camera line of sight orientation with respect to the earth. This includes: 1) the horizontal angle the camera line of sight makes with respect to the earth's magnetic field direction and; 2) the vertical angle between the camera line of sight and the earth's horizon.

b.2. Scanning cameras and scanning camera systems, having all of the following:

b.2.a. A peak response in the wavelength range exceeding 10 nm, but not exceeding 30,000 nm;

Appendix C. 2009 Rule on Uncooled Infrared Cameras Controlled Under ECCN 6A003

Models	Compliance time without Gussets installed	Compliance time with Gussets installed
(3) AT–602, AT–802, and AT–802A	(ii) *With 5,000 hours TIS or more on the airplane:* Initially upon accumulating 5,000 hours TIS on the airplane or within the next 10 hours TIS after June 1, 2009 (the effective date of this AD), or within the next 100 hours TIS from the last inspection performed, whichever occurs later. Repetitively thereafter at intervals not to exceed every 100 hours TIS.	(ii) *With 5,000 hours TIS or more on the airplane:* Initially upon accumulating 5,000 hours TIS on the airplane or within the next 10 hours TIS after June 1, 2009 (the effective date of this AD), or within the next 100 hours TIS from the last inspection performed, whichever occurs later. Repetitively thereafter at intervals not to exceed every 100 hours TIS.
	(i) *With less than 5,000 hours TIS on the airplane:* Initially upon accumulating 1,300 hours TIS on the airplane or within the next 100 hours TIS after August 10, 2007 (the effective date of AD 2007–13–17), whichever occurs later. Repetitively thereafter at intervals not to exceed every 300 hours TIS.	(i) *With less than 5,000 hours TIS on the airplane:* Initially upon accumulating 1,300 hours TIS on the airplane or within the next 100 hours TIS after June 1, 2009 (the effective date of this AD), whichever occurs later. Repetitively thereafter at intervals not to exceed every 300 hours TIS.
	(ii) *With 5,000 hours TIS or more on the airplane:* Initially upon accumulating 5,000 hours TIS on the airplane or within the next 10 hours TIS after June 1, 2009 (the effective date of this AD), or within the next 100 hours TIS from the last inspection performed, whichever occurs later. Repetitively thereafter at intervals not to exceed every 100 hours TIS.	(ii) *With 5,000 hours TIS or more on the airplane:* Initially upon accumulating 5,000 hours TIS on the airplane or within the next 10 hours TIS after June 1, 2009 (the effective date of this AD), or within the next 100 hours TIS from the last inspection performed, whichever occurs later. Repetitively thereafter at intervals not to exceed every 100 hours TIS.

(f) *For all airplanes:* Before further flight after any inspection required by paragraph (e)(1), (e)(2), and (e)(3) of this AD where crack damage is found, replace with a new engine mount or repair the engine mount.

(1) If choosing repair, return cracked mounts to Air Tractor, Inc. for repair or obtain FAA-approved written repair instructions coordinated with Air Tractor, Inc. before starting the repair.

(2) Contact Air Tractor, Inc., P.O. Box 485, Olney, Texas 76374; telephone: (940) 564–5616; fax: (940) 564–5612; Internet: *http://www.airtractor.com*, for specific FAA-approved repair/replacement instructions.

Alternative Methods of Compliance (AMOCs)

(g) The Manager, Fort Worth Airplane Certification Office, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. Send information to ATTN: Andy McAnaul, Aerospace Engineer, ASW–150, FAA San Antonio MIDO–43, 10100 Reunion Place, Suite 650, San Antonio, Texas 78216; phone: (210) 308–3365; fax: (210) 308–3370. Before using any approved AMOC on any airplane to which the AMOC applies, notify your appropriate principal inspector (PI) in the FAA Flight Standards District Office (FSDO), or lacking a PI, your local FSDO.

(h) AMOCs approved for AD 2008–10–12 are not approved for this AD.

Material Incorporated by Reference

(i) You must use Snow Engineering Co. Service Letter #253, Rev. C, dated April 17, 2008, to do the actions required by this AD, unless the AD specifies otherwise.

(1) As of June 12, 2008 (73 FR 25967), the Director of the Federal Register approved the incorporation by reference of Snow Engineering Co. Service Letter #253, Rev. C, dated April 17, 2008, under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) For service information identified in this AD, contact Air Tractor Inc., P.O. Box 485, Olney, Texas 76374; telephone: (940) 564–5616; fax: (940) 564–5612.

(3) You may review copies at the FAA, Central Region, Office of the Regional Counsel, 901 Locust, Kansas City, Missouri 64106; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

Issued in Kansas City, Missouri, on May 15, 2009.

Scott A. Horn,

Acting Manager, Small Airplane Directorate, Aircraft Certification Service.

[FR Doc. E9–11902 Filed 5–21–09; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF COMMERCE

Bureau of Industry and Security

15 CFR Parts 730, 734, 738, 740, 742, 743, 744, 746, 772 and 774

[Docket No. 0612242573–7104–01]

RIN 0694–AD71

Revisions to License Requirements and License Exception Eligibility for Certain Thermal Imaging Cameras and Foreign Made Military Commodities Incorporating Such Cameras

AGENCY: Bureau of Industry and Security, Commerce.

ACTION: Final rule.

SUMMARY: This rule imposes a license requirement for certain exports and reexports of military commodities manufactured outside the United States that are not subject to the International Traffic in Arms Regulations, regardless of the level of U.S. origin content, if those military commodities incorporate certain thermal imaging cameras that are subject to the Export Administration Regulations. This rule also removes Commerce Control List (CCL) based export and reexport license requirements with respect to 36 destinations for certain thermal imaging cameras when they are not incorporated into military commodities and if they are not being exported or reexported to be embedded in a civil product. It imposes a semi-annual reporting requirement on the transactions from which it removes the CCL based license requirements. This rule limits use of License Exception APR for reexports of certain cameras controlled by Export Control Classification Number 6A003.b.4.b and certain foreign made military commodities incorporating such cameras. This rule imposes a license requirement for software used to increase the frame rate of certain cameras. BIS is making these changes in recognition of the emerging availability of these cameras around the world, the export licensing practices of other governments and the potential use of these cameras in military applications.

DATES: *Effective Date:* This rule is effective May 22, 2009.

Compliance Date: All reexports made ineligible for License Exception APR by this rule and exports or reexports for which this rule imposes a new license requirement must be in compliance with this rule no later than June 22, 2009.

FOR FURTHER INFORMATION CONTACT: John Varesi, Sensors and Aviation Division, Office of National Security and Technology Transfer Controls (202) 482–1114 or *jvaresi@bis.doc.gov.*

SUPPLEMENTARY INFORMATION:

Background

The Export Administration Regulations (EAR) impose license requirements on, among other things, imaging cameras incorporating non-space-qualified, non-linear (2-dimensional) infrared focal plane arrays, based on microbolometer material having individual elements with an unfiltered response in the wavelength range equal to or exceeding 8,000 nm but not exceeding 14,000 nm. Prior to publication of this rule, these cameras were listed on the Commerce Control List (CCL) with national security (NS column 2), regional stability (RS column 1), antiterrorism (AT column 1) and United Nations embargo (UN) reasons for control. The RS column 1 reason for control is the most restrictive of these controls, imposing a license requirement on exports and reexports to all destinations other than Canada. Prior to publication of this rule, all of these cameras were also eligible under License Exception APR for reexport from Country Group A:1 and cooperating countries to Country Group D:1, and for reexport to Country Group A:1 and cooperating countries as identified in Supplement No. 1 to part 740 of the EAR.

In light of the potential for these cameras to be used in military applications as well as the growing number of foreign suppliers and the export license policies of other governments with respect to the destinations that form major markets for thermal imaging cameras, a revision of CCL based license requirements on certain cameras is warranted.

These cameras have the potential for military application, including incorporation into military commodities in ways that significantly enhance the capabilities of the military commodity. Therefore, in this rule, BIS is asserting licensing jurisdiction over military commodities manufactured outside the United States that incorporate certain cameras that are listed on the CCL. This rule adopts a definition of military commodity that is based on the Munitions List that is published by the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies (WAML) and the United States Munitions List (22 CFR Part 121). However, to prevent redundant coverage, this military commodity provision does not apply to items that are controlled by Export Control Classification Numbers (ECCNs) that end in the numerals ''018'' because such ECCNs apply to items on the WAML and are already subject to the EAR. This rule also revises controls based on camera performance level as measured by the number of elements in the camera's focal plane array, its frame rate and whether the camera is being exported or reexported to be embedded in a civil product. A camera that incorporates a focal plane array with more elements generally can record more detail about an image than can an otherwise identical camera that incorporates an array with fewer elements. A camera with a higher frame rate generally can capture more detail about the path of a moving object and depict the motion of objects more smoothly than can an otherwise identical camera with a lower frame rate. Cameras that will be embedded in a civil product pose concerns that are difficult to resolve without knowing the type of civil product into which the camera will be embedded.

Changes Being Made by This Rule

Application of EAR to Military Commodities Not Otherwise Subject to the EAR or to the ITAR That Incorporate Certain Infrared Cameras

This rule makes the *de minimis* provisions of the EAR inapplicable to military commodities made outside the United States that are not subject to the International Traffic in Arms Regulations (ITAR) (22 CFR Parts 120—130) and that incorporate cameras that are described in ECCN 6A003.b.4.b.

The rule also imposes a regional stability (RS column 1) license requirement on such military commodities for reexport, thereby requiring a license to any destination other than Canada. However, this license requirement does not apply if the export or reexport is part of a military deployment by any unit of the government of Australia, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom or the United States. Applications to reexport such military commodities will be reviewed in a manner that is consistent with the policies for similar military commodities that are subject to the ITAR.

The rule accomplishes these changes by revising § 734.4 to make foreign made military commodities containing ECCN 6A003.b.4.b cameras ineligible for *de minimis* treatment, by revising § 742.6(a)(2) to apply the RS column 1 license requirement and United States Munitions List licensing policy to military commodities controlled by ECCN 0A919, by revising § 772.1 adding a definition of ''military commodity,'' and by revising Supplement No. 1 to part 774 to create a new ECCN 0A919 to apply to military commodities made outside the United States that are not subject to the ITAR. This rule also imposes anti-terrorism (AT Column 1) and United Nations (arms embargo, Rwanda) license requirements and licensing policy to military commodities controlled by ECCN 0A919.

This rule also revises the treatment of thermal imaging cameras that incorporate focal plane arrays as described below.

Retention of Current License Requirements and License Application Review Policy for the Higher Frame Rates and Number of Elements in the Cameras' Focal Plane Arrays and for Cameras Being Exported or Reexported To Be Embedded in a Civil Product

Thermal imaging cameras described in ECCN 6A003.b.4.b that have a frame rate greater than 60 Hz or that incorporate a focal plane array with more than 111,000 elements or that are being exported or reexported to be embedded in a civil product continue to be subject to NS column 2, RS column 1, AT column 1 and UN reasons for control. These cameras generally will continue to require a license based on CCL license requirements for all destinations other than Canada. This rule retains this license requirement through revised language to the RS column 1 license requirement paragraph in ECCN 6A003, applying that requirement to cameras in ECCN 6A003.b.4.b that have a frame rate greater than 60 Hz or a focal plane array with more than 111,000 elements or that are being exported or reexported to be embedded in a civil product. However, pursuant to this rule, BIS may issue licenses that remove the RS column 1 license requirement for cameras that are fully-packaged for use as consumer-

ready civil products for exports or reexports to Australia, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.

Removal of Commerce Control List Based License Requirements for 36 Countries and Revision of License Application Review Policy for Certain Other Countries for Cameras With Lower Frame Rates and Number of Elements in the Cameras' Focal Plane Arrays That Are Not Being Exported or Reexported To Be Embedded in a Civil Product

This rule removes all CCL based license requirements for cameras described in ECCN 6A003.b.4.b that incorporate focal plane arrays with not more than 111,000 elements and that have a frame rate of 60 Hz or less and that are not being exported or reexported to be embedded in a civil product when being exported or reexported to Australia, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, and the United Kingdom. Exports and reexports of the cameras to Canada will continue to have no Commerce Control List based license requirements.

In addition, pursuant to this rule, BIS may issue licenses that remove the RS column 1 license requirement for exports and reexports to authorized companies as named in the license for the purpose of embedding such camera into a completed product that will be distributed only in Australia, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.

This rule also revises license application review policy for cameras described in ECCN 6A003.b.4.b that incorporate focal plane arrays with not more than 111,000 elements and that have a frame rate of 60 Hz or less and that are not being exported or reexported to be embedded in a civil product when such cameras are being exported or reexported to most destinations for which a license is required for regional stability reasons. Applications to export or reexport cameras incorporating a focal plane array with not more than 111,000 elements and a frame rate of 60 Hz or less and that are not being exported or reexported to be embedded in a civil product will be evaluated under the regional stability policy (RS column 2) set forth in § 742.6(b)(2) of the EAR, *i.e.*, ''will generally be considered favorably on a case-by-case basis unless there is evidence that the export or reexport would contribute significantly to the destabilization of the region to which the equipment is destined.''

Imposition of Reporting Requirement

This rule imposes a new reporting requirement with respect to exports for which this rule's revision or removal of regional stability as a reason for control results in the removal of all CCL based license requirements. Exporters of cameras described in ECCN 6A003.b.4.b will have to report semiannually to BIS by e-mail the name, address and telephone number of the exporter; the date of each export; the name, address and telephone number of the consignee or end user; the model number(s); the serial number of each exported camera that has a serial number; and the quantity of each model number of camera exported without a license to Australia, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, and the United Kingdom. BIS will use the information in these reports to verify that the cameras subject to this regulation are continuing to be sold to appropriate end-users and that the changes in controls are not jeopardizing U.S. national security or foreign policy interests. The rule imposes this reporting requirement by adding a new § 743.3—Thermal Imaging Camera Reporting.

Limitation on Use of License Exception APR for Cameras in ECCN 6A003.b.4.b

This rule limits use of License Exception APR for cameras described in ECCN 6A003.b.4.b by making such cameras ineligible for reexport under paragraph (a) of License Exception APR, and limits their reexport under paragraph (b) to destinations and for purposes for which they would not have a CCL based license requirement if exported from the United States. BIS is making this change to enable BIS to inform, via license conditions, the recipients of the reexports of the need to obtain a license for further reexports.

Revised Treatment of Cambodia and Laos With Respect to Paragraph (a) of License Exception APR

This rule revises the treatment of Cambodia and Laos as eligible destinations under License Exception APR. Although both countries are in Country Group D:1 and not in Country Group B, prior to publication of this rule, for purposes of License Exception APR, paragraph (a) they were treated as if the were in Country Group B (the items eligible for reexport under paragraph (a) of License Exception APR vary based on the country group in which the destination is located). Upon publication of this rule, they will be treated in the a same manner as other members of Country Group D:1 BIS is making this change because current national security interests of the United States do not support such disparate treatment of countries in Country Group D:1.

New End-User and End-Use License Requirements

In recognition of the fact that these cameras could be used in military activities, this rule imposes a license requirement on exports and reexports to all destinations other than Canada, when the exporter or reexporter knows, at the time of export or reexport, that the item will be used by a military end-user or will be incorporated into a military commodity described in ECCN 0A919 as created by this rule. The rule defines military end-user as national armed services (army, navy, marine, air force, or coast guard), as well as the national guard and national police, government intelligence or reconnaissance organizations, or any person or entity whose actions or functions are intended to support ''military end-uses'' as defined in § 744.17(d).

This rule also imposes a license requirement if BIS informs an exporter or reexporter, either individually by specific notice or through amendment to the EAR, that a license is required for export or reexport of items described in ECCN 6A003.b.4.b to specified end-users, because BIS has determined that there is an unacceptable risk of diversion to military end-users. Amendments to the EAR informing parties of such risk are in the form of amendments to the Entity List

(Supplement No. 4 to part 744 of the EAR).

Addition of Certain Cameras to the List of Items That Require a License for Export, Reexport or Transfer to Certain Military End Uses in China

Supplement No. 2 to part 744 of the EAR lists items for which § 744.21 of the EAR requires a license for the export, reexport or transfer to certain military end-uses in the People's Republic of China. This rules adds cameras controlled by ECCN 6A993 to Supplement No. 2 to part 744. BIS is taking this action consistent with United States Government policy of not supporting China's military modernization efforts.

Imposition of License Requirement for Software To Raise the Frame Rate of Cameras Above 9 Hz

This rule adds a new ECCN 6D994 to apply RS column 1 licensing requirement to software that is capable of increasing to more than 9 Hz, the frame rate of cameras that incorporate focal plane arrays controlled by 6A002.a.3.f. This new ECCN will allow BIS to impose a license requirement on software that could be used to raise the frame rate of previously exported cameras to a level equivalent to that of cameras that require a license for export.

Rulemaking Requirements

1. This rule is not a significant rule for purposes of Executive Order 12866.

2. Notwithstanding any other provision of law, no person is required to respond to nor be subject to a penalty for failure to comply with a collection of information, subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*) (PRA), unless that collection of information displays a currently valid Office of Management and Budget (OMB) Control Number. This regulation contains a collection previously approved by the OMB under control numbers 0694–0088, (Multi-Purpose Application,'' which carries a burden hour estimate of 58 minutes to prepare and submit form BIS–748. Miscellaneous and recordkeeping activities account for 12 minutes per submission. BIS estimates that this rule will reduce the total burden hours associated with this collection by 1,750 annually.

The reporting requirement for exports of cameras described in ECCN 6A3.b.4.b, imposed by this rule is a new collection of information. This new collection has been approved by OMB under control number 0694–0133. The estimated burden associated with this new collection is 60 hours annually.

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

4. The provisions of the Administrative Procedure Act (5 U.S.C. 553) requiring notice of proposed rulemaking, the opportunity for public participation, and a delay in effective date, are inapplicable because this regulation involves a military or foreign affairs function of the United States (see 5 U.S.C. 553(a)(1)). Further, no other law requires that a notice of proposed rulemaking and an opportunity for public comment be given for this rule. Because a notice of proposed rulemaking and an opportunity for public comment are not required to be given for this rule by 5 U.S.C. 553, or by any other law, the analytical requirements of the Regulatory Flexibility Act, 5 U.S.C. 601 *et seq.*, are not applicable.

List of Subjects

15 CFR Part 730

Administrative practice and procedure, Advisory committees, Exports, Reporting and recordkeeping requirements, Strategic and critical materials.

15 CFR Part 734

Administrative practice and procedure, Exports, Inventions and patents, Research, Science and technology.

15 CFR Part 740

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

15 CFR Parts 738 and 772

Exports.

15 CFR Part 742

Exports, Terrorism.

15 CFR Part 743

Administrative practice and procedure, Reporting and recordkeeping requirements.

15 CFR Part 744

Exports, Reporting and recordkeeping requirements, Terrorism.

15 CFR Parts 746 and 774

Exports, Reporting and recordkeeping requirements.

■ For the reasons set forth in the preamble, the Export Administration Regulations (15 CFR parts 730–774) are amended as follows:

PART 730—[AMENDED]

■ 1. The authority citation for part 730 continues to read as follows:

Authority: 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; 10 U.S.C. 7420; 10 U.S.C. 7430(e); 22 U.S.C. 287c; 22 U.S.C. 2151 note; 22 U.S.C. 3201 *et seq.*; 22 U.S.C. 6004; 30 U.S.C. 185(s), 185(u); 42 U.S.C. 2139a; 42 U.S.C. 6212; 43 U.S.C. 1354; 46 U.S.C. app. 466c; 50 U.S.C. app. 5; 22 U.S.C. 7201 *et seq.*; 22 U.S.C. 7210; E.O. 11912, 41 FR 15825, 3 CFR, 1976 Comp., p. 114; E.O. 12002, 42 FR 35623, 3 CFR, 1977 Comp., p. 133; E.O. 12058, 43 FR 20947, 3 CFR, 1978 Comp., p. 179; E.O. 12214, 45 FR 29783, 3 CFR, 1980 Comp., p. 256; E.O. 12851, 58 FR 33181, 3 CFR, 1993 Comp., p. 608; E.O. 12854, 58 FR 36587, 3 CFR, 1993 Comp., p. 179; E.O. 12918, 59 FR 28205, 3 CFR, 1994 Comp., p. 899; E.O. 12938, 59 FR 59099, 3 CFR, 1994 Comp., p. 950; E.O. 12947, 60 FR 5079, 3 CFR, 1995 Comp., p. 356; E.O. 12981, 60 FR 62981, 3 CFR, 1995 Comp., p. 419; E.O. 13020, 61 FR 54079, 3 CFR, 1996 Comp. p. 219; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13099, 63 FR 45167, 3 CFR, 1998 Comp., p.208; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; E.O. 13224, 66 FR 49079, 3 CFR, 2001 Comp., p. 786; E.O. 13338, 69 FR 26751, May 13, 2004; Notice of July 23, 2008, 73 FR 43603 (July 25, 2008); Notice of November 10, 2008, 73 FR 67097 (November 12, 2008).

■ 2. Supplement No. 1 to part 730 is amended by adding to the table immediately following the entry for collection number 0694–0132 and immediately preceding the entry for 0964–0134, the following new entry.

Supplement No. 1 to Part 730—Information Collection Requirements Under the Paperwork Reduction Act: OMB Control Numbers

* * * * *

Collection No.	Title	Reference in the EAR
*	* * * * * * *	
0694–0133	Thermal Imaging Camera Reporting	§ 743.3
*	* * * * * * *	

PART 734—[AMENDED]

■ 3. The authority citation for part 734 continues to read as follows:

Authority: 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; E.O. 12938, 59 FR 59099, 3 CFR, 1994 Comp., p. 950; E.O. 13020, 61 FR 54079, 3 CFR, 1996 Comp. p. 219; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of July 23, 2008, 73 FR 43603 (July 25, 2008); Notice of November 10, 2008, 73 FR 67097 (November 12, 2008).

■ 4. Section 734.4 is amended by redesignating paragraph (a)(5) as paragraph (a)(6) and adding a new paragraph (a)(5) to read as follows:

§ 734.4 De Minimis U.S. content.

(a) * * *

(5) There is no *de minimis* level for foreign made military commodities that incorporate cameras classified under ECCN 6A003.b.4.b if such cameras would be subject to the EAR as separate items and if the foreign made military commodity is not subject to the International Traffic in Arms Regulations (22 U.S.C. Parts 120–130).

* * * * *

PART 738—[AMENDED]

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

Authority: 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; 10 U.S.C. 7420; 10 U.S.C. 7430(e); 22 U.S.C. 287c; 22 U.S.C. 3201 *et seq.*; 22 U.S.C. 6004; 30 U.S.C. 185(s), 185(u); 42 U.S.C. 2139a; 42 U.S.C. 6212; 43 U.S.C. 1354; 46 U.S.C. app. 466c; 50 U.S.C. app. 5; 22 U.S.C. 7201 *et seq.*; 22 U.S.C. 7210; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of July 23, 2008, 73 FR 43603 (July 25, 2008).

■ 6. In Supplement No. 1 to part 738, The Commerce Country Chart, add:

■ a. References to footnote number 2 in the rows for Cyprus, Malta and South Africa,

■ b. References to footnote number 3 in the rows for Australia, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, South, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, and United Kingdom.

■ c. References to footnote number 4 in rows for the countries Austria, Cyprus, Finland, Ireland, Korea, South, Malta, South Africa, Sweden, and Switzerland; and

■ d. New footnotes 2 through 4 to the table to read as follows:

Supplement No. 1 to Part 738—Commerce Country Chart

* * * * *

[2] See § 742.4(a) for special provisions that apply to exports and reexports to these countries of certain thermal imaging cameras.

[3] See § 742.6(a)(3) for special provisions that apply to military commodities that are subject to ECCN 0A919.

[4] See § 742.6(a)(2) and (4)(ii) regarding special provisions for exports and reexports of certain thermal imaging cameras to these countries.

PART 740—[AMENDED]

■ 7. The authority citation for part 740 continues to read as follows:

Authority: 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; Sec. 901–911, Public Law 106–387; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of July 23, 2008, 73 FR 43603 (July 25, 2008).

■ 8. Section 740.2 is amended by adding paragraph (a)(11) to read as follows:

§ 740.2 Restrictions on all License Exceptions.

(a) * * *

(11) The item is a ''military commodity'' subject to ECCN 0A919, except that such military commodities may be reexported in accordance with § 740.11(b)(2)(ii) (official use by personnel and agencies of the U.S. Government).

* * * * *

■ 9. Section 740.16 is amended by revising paragraph (a)(2), paragraph (a)(3)(i), paragraph (a)(3)(ii) and paragraph (b) to read as follows:

§ 740.16 Additional permissive reexports (APR).

* * * * *

(a) * * *

(2) The commodities being reexported are not controlled for NP, CB, MT, SI or CC reasons and are not military commodities described in ECCN 0A919 or cameras described in ECCN 6A003.b.4.b; and

(3) * * *

(i) A country in Country Group B that is not also included in Country Group D:2, D:3, or D:4; and the commodity being reexported is both controlled for national security reasons and not controlled for export to Country Group A:1; or

(ii) A country in Country Group D:1 (National Security) (see Supplement No. 1 to part 740), other than North Korea and the commodity being reexported is controlled for national security reasons.

(b) *Reexports to and among specified countries.* (1) Commodities that are not controlled for nuclear nonproliferation or missile technology reasons and that are not listed in paragraph (b)(2) or (b)(3) of this section may be reexported to and among Country Group A:1 and cooperating countries, provided that eligible commodities are for use or consumption within a Country Group A:1 (see Supplement No. 1 to part 740) or cooperating country, or for reexport from such country in accordance with other provisions of the EAR.* * *

(2) Except as provided in paragraph (b)(3) of this section, cameras described in ECCN 6A003.b.4.b and ''military commodities'' described in ECCN 0A919 may not be exported under this paragraph (b).

(3) Cameras described in ECCN 6A003.b.4.b may be exported or reexported to and among: Australia, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, and the United Kingdom if:

(i) Such cameras are fully packaged for use as consumer ready civil products; or, (ii) Such cameras with not more than 111,000 elements are to be embedded in civil products.

* * * * *

PART 742—[AMENDED]

■ 10. The authority citation for 15 CFR part 742 continues to read as follows:

Authority: 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; 22 U.S.C. 3201 *et seq.*; 42 U.S.C. 2139a; 22 U.S.C. 7201 *et seq.*; 22 U.S.C. 7210; Sec 1503, Public Law 108–11, 117 Stat. 559; E.O. 12058, 43 FR 20947, 3 CFR, 1978 Comp., p. 179; E.O. 12851, 58 FR 33181, 3 CFR, 1993 Comp., p. 608; E.O. 12938, 59 FR 59099, 3 CFR, 1994 Comp., p. 950; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Presidential Determination 2003–23 of May 7, 2003, 68 FR 26459, May 16, 2003; Notice of July 23, 2008, 73 FR 43603 (July 25, 2008); Notice of November 10, 2008, 73 FR 67097 (November 12, 2008).

■ 11. Section 742.4 is amended by revising the third sentence of paragraph (a) and by adding a new sentence immediately following that third sentence to read as follows:

§ 742.4 National security.

(a) * * * A license is required to all destinations except Country Group A:1 and cooperating countries (see Supplement No. 1 to part 740), Bulgaria, Czech Republic, Estonia, Hungary, Iceland, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia for all items in ECCNs on the CCL that include NS column 2 in the Commerce Country Chart column of the ''License Requirements'' section except those cameras in ECCN 6A003.b.4.b that have a focal plane array with 111,000 or fewer elements and a frame rate of 60 Hz or less. A license is required to all destinations except Australia, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, and the United Kingdom for those cameras in ECCN 6A003.b.4.b that have a focal plane array with 111,000 or fewer elements and a frame rate of 60 Hz or less and for cameras being exported or reexported pursuant to an authorization described in § 742.6(a)(2)(iii) or (v) of the EAR.* * * * * * * * * *

■ 12. Section § 742.6 is amended by revising paragraph (a) and paragraph (b)(1) and paragraph (b)(2) to read as follows:

§ 742.6 Regional stability.

(a) *License requirements.* The following controls are maintained in support of U.S. foreign policy to maintain regional stability:

(1) *RS Column 1 License Requirements in General.* As indicated in the CCL and in RS column 1 of the Commerce Country Chart (see Supplement No. 1 to part 738 of the EAR), a license is required to all destinations, except Canada, for items described on the CCL under ECCNs 6A002.a.1, a.2, a.3, .c, or .e; 6A003.b.3, and b.4.a; 6A008.j.1; 6A998.b; 6D001 (only ''software'' for the ''development'' or ''production'' of items in 6A002.a.1, a.2, a.3, .c; 6A003.b.3 and .b.4; or 6A008.j.1); 6D002 (only ''software'' for the ''use'' of items in 6A002.a.1, a.2, a.3, .c; 6A003.b.3 and .b.4; or 6A008.j.1); 6D991 (only ''software'' for the ''development,'' ''production,'' or ''use'' of equipment controlled by 6A002.e or 6A998.b); 6E001 (only technology'' for ''development'' of items in 6A002.a.1, a.2, a.3 (except 6A002.a.3.d.2.a and 6A002.a.3.e for lead selenide focal plane arrays), and .c or .e, 6A003.b.3 and b.4, or 6A008.j.1); 6E002 (only ''technology'' for ''production'' of items in 6A002.a.1, a.2, a.3, .c, or .e, 6A003.b.3 or b.4, or 6A008.j.1); 6E991 (only ''technology'' for the ''development,'' ''production,'' or ''use'' of equipment controlled by 6A998.b); 6D994; 7A994 (only QRS11–00100–100/101 and QRS11–0050–443/569 Micromachined Angular Rate Sensors); 7D001 (only ''software'' for ''development'' or ''production'' of items in 7A001, 7A002, or 7A003); 7E001 (only ''technology'' for the ''development'' of inertial navigation systems, inertial equipment, and specially designed components therefor for civil aircraft); 7E002 (only ''technology'' for the ''production'' of inertial navigation systems, inertial equipment, and specially designed components therefor for civil aircraft); 7E101 (only ''technology'' for the ''use'' of inertial navigation systems, inertial equipment, and specially designed components for civil aircraft).

(2) *Special RS Column 1 license requirements applicable to certain thermal imaging cameras.*

(i) As indicated in the CCL and in RS Column 1 of the Commerce Country Chart, cameras described in 6A003 b.4.b require a license to all destinations other than Canada if such cameras have a frame rate greater than 60 Hz.

(ii) Except as noted in paragraph (a)(2)(iii) of this section, as indicated in the CCL and in RS Column 1 of the Commerce Country Chart, cameras described in 6A003 b.4.b require a license to all destinations other than Canada if such cameras incorporate a focal plane array with more than 111,000 elements and a frame rate of 60 Hz or less, or cameras described in 6A003 b.4.b that are being exported or reexported to be embedded in a civil product.

(iii) BIS may issue licenses for cameras subject to the license requirement of paragraph (a)(2)(ii) of this section that are fully-packaged for use as consumer-ready civil products that, in addition to the specific transactions authorized by such license, authorize exports and reexports of such cameras without a license to any civil end-user to whom such exports or reexport are not otherwise prohibited by U.S. law in Australia, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, and the United Kingdom. The license requirements of this paragraph (a)(2) shall not apply to exports or reexports so authorized. In this paragraph, the term ''civil end-user'' means any entity that is not a national armed service (army, navy, marine, air force, or coast guard), national guard, national police, government intelligence organization or government reconnaissance organization, or any person or entity whose actions or functions are intended to support ''military end-uses'' as defined in 744.17(d).

(iv) Except as noted in paragraph (a)(2)(v) of this section, as indicated in the CCL and in RS Column 1 of the Commerce Country Chart, cameras described in 6A003 b.4.b require a license to all destinations other than Canada if such cameras incorporate a focal plane array with 111,000 elements or less and a frame rate of 60 Hz or less and are being exported or reexported to be embedded in a civil product.

(v) BIS may also issue licenses for the cameras described in paragraph (a)(2)(iv) that, in addition to the specific transactions authorized by such license, authorize exports and reexports to authorized companies described in the license for the purpose of embedding such cameras into a completed product that will be distributed only in Australia, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, and the United Kingdom. The

license requirements of this paragraph (a)(2) shall not apply to exports or reexports so authorized. In this paragraph, the term ''authorized companies'' means companies that have been previously licensed for export, are not the subject of relevant negative intelligence or open source information, have not been the subject of a Department of Commerce or Department of State enforcement action within the past two years, have demonstrable production capacity, and do not pose an unacceptable risk of diversion.

(3) *Special RS Column 1 license requirement applicable to military commodities.* A license is required for reexports to all destinations except Canada for items classified under ECCN 0A919 except when such items are being reexported as part of a military deployment by a unit of the government of Australia, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom or the United States.

(4) *RS Column 2 license requirements.*

(i) *License Requirements Applicable to Most RS Column 2 Items.* As indicated in the CCL and in RS Column 2 of the Commerce Country Chart (see Supplement No. 1 to part 738 of the EAR), a license is required to any destination except Australia, Japan, New Zealand, and countries in the North Atlantic Treaty Organization (NATO) for items described on the CCL under ECCNs 0A918, 0E918, 2A983, 2D983, 2E983, 8A918, and for military vehicles and certain commodities (specially designed) used to manufacture military equipment, described on the CCL in ECCNs 0A018.c, 1B018.a, 2B018, 9A018.a and .b, 9D018 (only software for the ''use'' of commodities in ECCN 9A018.a and .b), and 9E018 (only technology for the ''development'', ''production'', or ''use'' of commodities in 9A018.a and .b).

(ii) *Special RS Column 2 license requirements applicable only to certain cameras.* As indicated by the CCL, and RS column 2 and footnote number 4 to the Commerce Country Chart, a license is required to any destination except Australia, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, and the United Kingdom for fully-packaged thermal imaging cameras for use as consumer-ready civil products controlled by 6A003.b.4.b when incorporating ''focal plane arrays'' that have not more than 111,000 elements and a frame rate of 60 Hz or less and that are not being exported or reexported to be embedded in a civil product.

(5) *RS requirements that apply to Iraq.* As indicated on the CCL, a license is required for the export or reexport to Iraq or transfer within Iraq of the following items controlled for RS reasons on the CCL: 0B999, 0D999, 1B999, 1C992, 1C995, 1C997, 1C999 and 6A992. The Commerce Country Chart is not designed to determine RS licensing requirements for these ECCNs.

(6) *RS requirement that applies to Hong Kong.* A license is required to export or reexport to Hong Kong any item controlled in ECCN 6A003.b.4.b

(b) * * *

(1) Applications for exports and reexports described in paragraph (a)(1), (a)(2) or (a)(6) of this section will be reviewed on a case-by-case basis to determine whether the export or reexport could contribute directly or indirectly to any country's military capabilities in a manner that would alter or destabilize a region's military balance contrary to the foreign policy interests of the United States. Applications for reexports of items described in paragraph (a)(3) of this section will be reviewed applying the policies for similar commodities that are subject to the International Traffic in Arms Regulations (22 CFR Parts 120–130).

(2) Applications to export and reexport commodities described in paragraph (a)(4) of this section will generally be considered favorably on a case-by-case basis unless there is evidence that the export or reexport would contribute significantly to the destabilization of the region to which the equipment is destined.

* * * * *

PART 743—[AMENDED]

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

Authority: 50 U.S.C. app. 2401 *et seq.*; Public Law 106–508; 50 U.S.C. 1701 *et seq.*; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of July 23, 2008, 73 FR 43603 (July 25, 2008).

■ 14. Add § 743.3 to read as follows:

§ 743.3 Thermal imaging camera reporting.

(a) *General requirement.* Exports of thermal imaging cameras must be reported to BIS as provided in this section.

(b) *Transactions to be reported.* Exports that are not authorized by an individually validated license of thermal imaging cameras controlled by ECCN 6A003.b.4.b to Australia, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, or the United Kingdom must be reported to BIS.

(c) *Party responsible for reporting.* The exporter as defined in § 772.1 of the EAR must ensure the reports required by this section are submitted to BIS.

(d) *Information to be included in the reports.* For each export described in paragraph (b) of this section, the report must identify: the name, address, and telephone number of the exporter; the date of each export; the name, address and telephone number of the consignee or end user; the model number(s) of each camera exported; the serial number of each exported camera that has a serial number; and the quantity of each model number of camera exported. (**Note**: Technical specifications may be requested on an as needed basis and must be provided to BIS after any such request.)

(e) *Where to submit reports.* Submit the reports via e-mail to *UTICreport@bis.doc.gov.*

(d) *Reporting periods and due dates.* This reporting requirement applies to exports made on or after May 22, 2009. Exports must be reported within one month of the reporting period in which the export takes place. The first reporting period begins on May 22, 2009 and runs through June 30, 2009. Subsequent reporting periods shall begin on January 1 and July 1 of each year, and shall run through June 30, and December 31 respectively. Exports in each reporting period must be reported to BIS no later than the last day of the month following the month in which the reporting period ends.

PART 744—[AMENDED]

■ 15. The authority citation for part 744 continues to read as follows:

Authority: 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; 22 U.S.C. 3201 *et seq.*; 42 U.S.C. 2139a; 22 U.S.C. 7201 *et seq.*; 22 U.S.C. 7210; E.O. 12058, 43 FR 20947, 3 CFR,

1978 Comp., p. 179; E.O. 12851, 58 FR 33181, 3 CFR, 1993 Comp., p. 608; E.O. 12938, 59 FR 59099, 3 CFR, 1994 Comp., p. 950; E.O. 12947, 60 FR 5079, 3 CFR, 1995 Comp., p. 356; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13099, 63 FR 45167, 3 CFR, 1998 Comp., p. 208; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; E.O. 13224, 66 FR 49079, 3 CFR, 2001 Comp., p. 786; Notice of July 23, 2008, 73 FR 43603 (July 25, 2008); Notice of November 10, 2008, 73 FR 67097 (November 12, 2008).

■ 16. Add § 744.9 to read as follows:

§ 744.9 Restrictions on certain exports and reexports of cameras controlled by ECCN 6A003.b.4.b.

(a) *General prohibitions.* In addition to the applicable license requirements for national security, regional stability, anti-terrorism and United Nations embargo reasons in §§ 742.4, 742.6, 742.8, 746.3 and 746.8 of the EAR, a license is required to export or reexport to any destination other than Canada cameras described in ECCN 6A003.b.4.b if at the time of export or reexport, the exporter or reexporter knows or is informed that the item will be or is intended to be:

(1) Used by a ''military end-user,'' as defined in paragraph (d) of this section; or

(2) Incorporated into a ''military commodity'' controlled by ECCN 0A919.

(b) *Additional prohibition on exporters or reexporters informed by BIS.* BIS may inform an exporter or reexporter, either individually by specific notice or through amendment to the EAR, that a license is required for the export or reexport of items described in ECCN 6A003.b.4.b to specified end-users, because BIS has determined that there is an unacceptable risk of diversion to the users or unauthorized incorporation into the ''military commodities'' described in paragraph (a) of this section. Specific notice is to be given only by, or at the direction of, the Deputy Assistant Secretary for Export Administration. When such notice is provided orally, it will be followed by a written notice within two working days signed by the Deputy Assistant Secretary for Export Administration.

(c) *License review standard.* Applications for licenses required by this section will be reviewed by applying the policies that would be applied under the International Traffic in Arms Regulations (22 CFR Parts 120–130).

(d) *Military end-user.* In this section, the term ''military end-user'' means the national armed services (army, navy, marine, air force, or coast guard), as well as the national guard and national police, government intelligence or reconnaissance organizations, or any person or entity whose actions or functions are intended to support ''military end-uses'' as defined in § 744.17(d).

(e) *Exception.* Shipments subject to the prohibitions in paragraphs (a) and (b) of this section that are consigned to and for the official use of the U.S. Government authorized pursuant to § 740.11(b)(2)(ii) of the EAR may be made under License Exception GOV. No other license exceptions apply to the prohibitions described in paragraphs (a) and (b) of this section.

■ 17. In Supplement No. 2 to part 744, add a paragraph (6)(iii) to read as follows:

Supplement No. 2 to Part 744—List of Items Subject to the Military End-Use License Requirement of § 744.21

* * * * *

(6) *Category 6—Sensors and Lasers* * * *

(iii) 6A993 Cameras, not controlled by 6A003 or 6A203 as follows (see List of Items Controlled). * * *

PART 746—[AMENDED]

■ 18. The authority citation for part 746 continues to read as follows:

Authority: 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; 22 U.S.C. 287c; Sec 1503, Public Law 108–11, 117 Stat. 559; 22 U.S.C. 6004; 22 U.S.C. 7201 *et seq.*; 22 U.S.C. 7210; E.O. 12854, 58 FR 36587, 3 CFR, 1993 Comp., p. 614; E.O. 12918, 59 FR 28205, 3 CFR, 1994 Comp., p. 899; E.O. 13222, 3 CFR, 2001 Comp., p. 783; Presidential Determination 2003–23 of May 7, 2003, 68 FR 26459, May 16, 2003; Presidential Determination 2007–7 of December 7, 2006, 72 FR 1899 (January 16, 2007); Notice of July 23, 2008, 73 FR 43603 (July 25, 2008).

■ 19. Section 746.8, paragraph (b)(1) is amended by adding a new sentence immediately following the existing third sentence to read as follows:

§ 746.8 Rwanda.

* * * * *

(b) * * *

(1) * * * Any U.S. person needs a license to reexport any item controlled by ECCN 0A919 to Rwanda. * * *

* * * * *

PART 772—[AMENDED]

■ 21. The authority citation for 15 CFR part 772 continues to read as follows:

Authority: 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of July 23, 2008, 73 FR 43603 (July 25, 2008).

■ 22. Section 772.1 is amended by adding, in alphabetical order, a definition for ''military commodity'' to read as follows:

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

* * * * *

Military commodity. As used in § 734.4(a)(5), Supplement No. 1 to part 738 (footnote No. 3), § 740.2(a)(11), § 740.16(a)(2), § 740.16(b)(2), § 742.6(a)(3), § 744.9(a)(2), § 744.9(b), ECCN 0A919 and ECCN 6A003 (*Related Controls*), ''military commodity'' or ''military commodities'' means an article, material or supply except software or technology that is described on the United States Munitions List (22 CFR Part 121) or on the Munitions List that is published by the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies, but does not include any item listed in any Export Control Classification Number for which the last three numerals are 018.

* * * * *

PART 774—[AMENDED]

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

Authority: 50 U.S.C. app. 2401 *et seq.*; 50 U.S.C. 1701 *et seq.*; 10 U.S.C. 7420; 10 U.S.C. 7430(e); 22 U.S.C. 287c, 22 U.S.C. 3201 *et seq.*, 22 U.S.C. 6004; 30 U.S.C. 185(s), 185(u); 42 U.S.C. 2139a; 42 U.S.C. 6212; 43 U.S.C. 1354; 46 U.S.C. app. 466c; 50 U.S.C. app. 5; 22 U.S.C. 7201 *et seq.*; 22 U.S.C. 7210; E.O. 13026, 61 FR 58767, 3 CFR, 1996 Comp., p. 228; E.O. 13222, 66 FR 44025, 3 CFR, 2001 Comp., p. 783; Notice of July 23, 2008, 73 FR 43603 (July 25, 2008).

■ 24. In Supplement No. 1 to part 774, Category 0, immediately following Export Control Classification Number 0A918 and immediately preceding Export Control Classification Number 0A978 add an Export Control Classification Number 0A919 to read as follows:

0A919 ''Military commodities'' as follows (see list of items controlled).

License Requirements

Reasons for Control: RS, AT, UN.

Control(s)	*Country chart*
RS applies to entire entry	RS Column 1.
AT applies to entire entry	AT Column 1.
UN applies to entire entry	Rwanda § 746.7 of the EAR.

License Exceptions

LVS: N/A.
GBS: N/A.
CIV: N/A.

List of Items Controlled

Unit: $ value.

Related Controls: (1) Military commodities are subject to the export licensing jurisdiction of the Department of State if they incorporate items that are subject to the International Traffic in Arms Regulations (ITAR) (22 CFR Parts 120–130). (2) Military commodities described in this paragraph are subject to the export licensing jurisdiction of the Department of State if such commodities are described on the United States Munitions List (22 CFR Part 121) and are in the United States. (3) The furnishing of assistance (including training) to foreign persons, whether in the United States or abroad in the design, development, engineering, manufacture, production, assembly, testing, repair, maintenance, modification, operation, demilitarization, destruction, processing, or use of defense articles that are subject to the ITAR; or the furnishing to foreign persons of any technical data controlled under 22 CFR 121.1 whether in the United States or abroad are under the licensing jurisdiction of the Department of State. (4) Brokering activities (as defined in 22 CFR 129.9) of military commodities that are subject to the ITAR are under the licensing jurisdiction of the Department of State.

Related Definitions: N/A.

Items: ''Military commodities'' with all of the following characteristics:

a. Described on either the United States Munitions List (22 CFR Part 121) or the Munitions List that is published by the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies (as set out on its Web site at *http://www.wassenaar.org*), but not any item listed in any Export Control Classification Number for which the last three characters are 018;

b. Produced outside the United States;

c. Not subject to the International Traffic in Arms Regulations (22 CFR Parts 120–130) for a reason other than presence in the United States; and

d. Incorporate one or more cameras controlled under ECCN 6A003.b.4.b.

■ 25. In Supplement No. 1 to part 774, Category 6, Export Control Classification Number 6A003, revise the ''Reason for Control'' and the ''Related Controls'' paragraphs to read as follows:

6A003 Cameras.

License Requirements

Reason for Control: NS, NP, RS, AT, UN.

Control(s)	*Country chart*
NS applies to entire entry	NS Column 2.
NP applies to items controlled in paragraphs 6A003.a.2, a.3 and a.4	NP Column 1.
RS applies to items controlled in 6A003.b.3, to items controlled in 6A003.b.4.a, and to items controlled in 6A003.b.4.b that have a frame rate greater than 60 Hz or that incorporate a focal plane array with more than 111,000 elements, or to items in 6A003.b.4.b when being exported or reexported to be embedded in a civil product. (But see § 742.6(a)(2)(iii) and (v) for certain exemptions).	RS Column 1.
RS applies to items controlled in 6A003.b.4.b that have a frame rate of 60 Hz or less and that incorporate a focal plane array with not more than 111,000 elements if not being exported or reexported to be embedded in a civil product.	RS Column 2.
RS applies to items controlled in 6A003.b.4.b	A license is required to export or reexport these items to Hong Kong. This license requirement does not appear in the Commerce Country Chart.
AT applies to entire entry	AT Column 1.
UN applies to items controlled in 6A003.b.3 and b.4	Iraq and Rwanda.

License Exceptions

* * * * *

List of Items Controlled

Unit: * * *

Related Controls: (1) See ECCNs 6E001 (''development''), 6E002 (''production''), and 6E201 (''use'') for technology for items controlled under this entry. (2) Also see ECCN 6A203. (3) See ECCN 8A002.d and .e for cameras specially designed or modified for underwater use. (4) See ECCN 0A919 for foreign made military commodities that incorporate cameras described in 6A003.b.4.b. (5) Section 744.9 imposes license requirements on cameras described in 6A003.b.4.b if being exported for incorporation into an item controlled by ECCN 0A919 or for a military end-user.

* * * * *

■ 26. In Supplement No. 1 to part 774, immediately following Export Control Classification Number 6D993, add a new Export Control Classification Number 6D994 to read as follows:

6D994 ''Software'' designed or modified for cameras incorporating ''focal plane arrays'' specified by 6A002.a.3.f and designed or modified to remove a frame rate restriction and allow the camera to exceed the frame rate specified in 6A003.b.4. Note 3.a.

License Requirements

Reason for Control: RS.

Control(s)	*Country chart*
RS applies to entire entry	RS Column 1.

License Exceptions

CIV: N/A.

TSR: N/A.

List of Items Controlled

Unit: $ value.

Items: The list of Items Controlled is in the ECCN heading.

Dated: May 18, 2009.

Matthew S. Borman,

Acting Assistant Secretary for Export Administration.

[FR Doc. E9–11951 Filed 5–21–09; 8:45 am]

BILLING CODE 3510–33–P

DEPARTMENT OF HOMELAND SECURITY

Customs and Border Protection Bureau

DEPARTMENT OF THE TREASURY

19 CFR Part 10

[Docket No. USCBP–2009–0015; CBP Dec. 09–17]

RIN 1505–AC13

Imported Directly Requirement Under the United States-Bahrain Free Trade Agreement

AGENCY: Customs and Border Protection, Department of Homeland Security; Department of the Treasury.

ACTION: Interim final rule; solicitation of comments.

SUMMARY: This document amends the U.S. Customs and Border Protection (CBP) regulations in title 19 of the Code of Federal Regulations (19 CFR) on an interim basis to change certain provisions relating to the requirement under the United States-Bahrain Free Trade Agreement (BFTA) that a good must be ''imported directly'' from one

Appendix D. Technology Assessment Survey Instrument

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OMB Control Number: 0694 - 0119
Expiration Date: 01/31/2013

TECHNOLOGY ASSESSMENT:
Night Vision Focal Plane Arrays (FPAs), Sensors, and Cameras

SCOPE OF ASSESSMENT

The U.S. Department of Commerce, Bureau of Industry and Security (BIS), Office of Technology Evaluation (OTE), is conducting a technology assessment regarding the U.S. night vision industry. The purpose of this assessment is to determine the nature of night vision focal plane arrays (FPAs), sensors, and cameras manufactured for military-use only and dual-use (for both commercial and military use). The data collected by this survey will help inform the current export control reform initiative.

RESPONSE TO THIS SURVEY IS REQUIRED BY LAW

A response to this survey is required by law (50 U.S.C. app. Sec. 2155). Failure to respond can result in a maximum fine of $10,000, imprisonment of up to one year, or both. Information furnished herewith is deemed confidential and will not be published or disclosed except in accordance with Section 705 of the Defense Production Act of 1950, as amended (50 U.S.C App. Sec. 2155). Section 705 prohibits the publication or disclosure of this information unless the President determines that its withholding is contrary to the national defense. Information will not be shared with any non-government entity, other than in aggregate form. The information will be protected pursuant to the appropriate exemptions from disclosure under the Freedom of Information Act (FOIA), should it be the subject of a FOIA request.

Not withstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB Control Number.

BURDEN ESTIMATE AND REQUEST FOR COMMENT

Public reporting burden for this collection of information is estimated to average 6 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information to BIS Information Collection Officer, Room 6883, Bureau of Industry and Security, U.S. Department of Commerce, Washington, D.C. 20230, and to the Office of Management and Budget, Paperwork Reduction Project (OMB Control No. 0694 - 0119), Washington, D.C. 20503.

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Section X — Who Must Respond

A. Identify the type of night vision equipment your company currently sells that are subject to control under 6A002 or 6A003 of the Commerce Control List (CCL) or Category XII of the U.S. Munitions List (USML). Also indicate where the equipment is manufactured.

	Yes/No	Location of Manufacture
Uncooled infrared focal plane arrays (FPAs)		
Uncooled infrared cameras (including camera cores)		
Cooled infrared FPAs		
Cooled infrared cameras (including camera cores)		
Image intensifier tubes		
Image intensifier tube cameras and direct-view equipment		
Low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc)		
Cameras using low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc)		

B. Provide a brief description of the function of your company in the space below.

Exemption From Survey

If you answered "No" to all products listed in Question A above, you may be exempt from completing this U.S. Government survey. Please call one of the BIS contacts listed in "General Instructions" to verify your status.

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section	General Instructions
A.	Your company is required to complete this survey using an Excel template, which can be downloaded from the BIS website. At your request, BIS staff will e-mail the Excel survey template directly to your company. For your convenience, a PDF version of the survey is available on the BIS website to aid internal data collection. **PLEASE DO NOT** submit the PDF version of your company's response to BIS.
	Do not copy and paste responses within this survey. Responses should be made manually. Copy and paste can disrupt the data collection process. If your survey response is corrupted as a result of copying and pasting responses, a new survey will be sent to you for completion.
B.	If information is not available from your records in the form requested, you may furnish estimates. Please indicate in the comment box on the page when you use an estimate.
C.	Questions related to this survey should be directed to: nightvisionsurvey@bis.doc.gov (preferred method of contact for survey questions) Teresa Telesco, Trade and Industry Analyst (202) 482-4959 Katharine Huang, Trade and Industry Analyst (202) 482-1271 Erika Maynard, Trade and Industry Analyst (202) 482-5572
D.	Upon completion, review and certification of the survey, transmit the survey via e-mail to _____.
E.	For overall questions to the Office of Technology Evaluation (OTE), please contact: Brad Botwin, Director, Industrial Studies Office of Technology Evaluation, Room 1093 U.S. Department of Commerce 1401 Constitution Avenue, NW Washington, DC 20230 bbotwin@bis.doc.gov 202-482-4060 Please do not submit completed surveys to this address; all surveys must be submitted electronically.

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Definitions	
6A002	Control for dual-use optical sensors within the Commerce Control List.
6A003	Control for dual-use cameras within the Commerce Control List.
Category XII	Control for fire control, range finder, optical and guidance and control equipment within the U.S. Munitions List.
Commerce Control List (CCL)	A list of dual-use items (commodities, software, and technology) subject to the authority of the Bureau of Industry and Security; part of the Export Administration Regulations.
Cooled Infrared	A method of infrared radiation that must be operated at cooled temperatures to obtain the desired infrared sensitivity.
Dual-use	Items that are for both commercial and military use or commercial use only.
Focal Plane Array (FPA)	Detectors used at the focus of imaging systems.
Image Intensifer Tube	Electro-optical device that convert low levels of light from various wavelengths into visible quantities of light.
Low Light Level	A technology for use in conditions of low light or poor visibility that converts low levels of light from various wavelengths into visible quantities of light.
Military-use	Items specifically designed or configured for military applications, with no equivalent civilian or commerical products.
Uncooled Infrared	A method of infrared radiation that can be operated at ambient temperatures, but have lower resolution and image quality than cooled infrared methods.
United States	The "United States" or "U.S." includes the 50 states, Puerto Rico, the District of Columbia, the island of Guam, the Trust Territories, and the U.S. Virgin Islands.
U.S. Munitions List (USML)	A list of artilces, services, and related technology designated as defense-related subject to the authority of the Department of State; part of the International Traffic in Arms Regulations.

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Section 1		Company Information - Headquarters			
A.	Company Name				
	Street Address				
	City				
	State				
	Zip Code				
	Phone Number				
	Fax Number				
	Website				
B.	Point of Contact(s) regarding this survey:				
	Name	Title	E-mail	Phone Number	
C.	My company is:				
	Comments:				

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 2.a **Uncooled Infrared FPAs**

A. Identify the number of uncooled infrared FPA product lines, the name of the products lines, and the number of uncooled infrared FPA models 1) less than or equal to 111,000 pixels, 2) greater than 111,000 pixels but less than or equal to 310,000 pixels, and 3) greater than 310,000 pixels your company **sold in 2010** that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines	number of models ≤111,000 pixels	number of models >111,000 and ≤310,000 pixels	number of models >310,000 pixels
Military-Use Only					
Dual-Use					

B. For 2011-2012, identify the number of uncooled infrared FPA product lines, the name of the products lines, and the number of uncooled infrared FPA models 1) less than or equal to 111,000 pixels, 2) greater than 111,000 pixels but less than or equal to 310,000 pixels, and 3) greater than 310,000 pixels that your company **projects** selling that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines	number of models ≤111,000 pixels	number of models >111,000 and ≤310,000 pixels	number of models >310,000 pixels
Military-Use Only					
Dual-Use					

C. Identify the specific applications for the uncooled infrared FPAs your company currently sells that are for military-use only or dual-use.

Military-Use Only	
Dual-Use	

D. Are there any differences (i.e., physical/technical characteristics) between the military-use only and dual-use uncooled infrared FPAs your company manufactures? Please explain your answer below.

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 2.b **Uncooled Infrared FPAs - cont.**

A. Identify the 10-digit Harmonized Tariff Schedule (HTS) codes your company uses to classify the military-use only and dual-use uncooled infrared FPAs it sells. If your products' HTS codes do not go to the 10-digit level, provide as many digits as possible.

Military-Use Only						
Dual-Use						

B. Identify your company's non-U.S. competitors for uncooled infrared FPAs, their country, if they compete with your company's military-use only or dual-use products, and if they produce uncooled infrared FPAs 1) less than or equal to 111,000 pixels, 2) greater than 111,000 pixels but less than or equal to 310,000 pixels, and 3) greater than 310,000 pixels.

Company Name	Country	Military-Only Products	Dual-Use Products	≤111,000 pixels	>111,000 and ≤310,000 pixels	>310,000 pixels

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 2.c **Uncooled Infrared FPAs - cont.**

A. Report the value and quantity of your company's U.S. and Non-U.S. sales figures for military-use only and dual-use uncooled infrared FPAs for 2007-2010, and indicate if you sold directly to the U.S. Department of Defense during those years.

	2007					2008				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

	2009					2010				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

B. Identify the types of dual-use uncooled infrared FPAs your company sold to the the U.S. Department of Defense. If your company had no such sales, move to the next section.

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 3.a **Uncooled Infrared Cameras (Including Camera Cores)**

A. Identify the number of uncooled infrared camera product lines, the name of the products lines, and the number of uncooled inrafred camera models 1) less than or equal to 111,000 pixels, 2) greater than 111,000 pixels but less than or equal to 310,000 pixels, and 3) greater than 310,000 pixels your company **sold in 2010** sells that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines	number of models ≤111,000 pixels	number of models >111,000 and ≤310,000 pixels	number of models >310,000 pixels
Military-Use Only					
Dual-Use					

B. For 2011-2012, identify the number of uncooled infrared camera product lines, the name of the products lines, and the number of uncooled infrared camera models 1) less than or equal to 111,000 pixels, 2) greater than 111,000 pixels but less than or equal to 310,000 pixels, and 3) greater than 310,000 pixels that your company **projects** selling that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines	number of models ≤111,000 pixels	number of models >111,000 and ≤310,000 pixels	number of models >310,000 pixels
Military-Use Only					
Dual-Use					

C. Identify the specific applications for the uncooled infrared cameras your company currently sells that are for military-use only or dual-use.

Military-Use Only	
Dual-Use	

D. How does your company obtain the FPAs it uses in its uncooled infrared cameras? If purchased from other companies, list the names and locations of the companies that provide you with uncooled infrared FPAs.

Company Name	Country	Company Name	Country

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 3.b	Uncooled Infrared Cameras (Including Camera Cores)- cont.	
A.	Are there any differences (i.e., physical/technical characteristics) between the military-use only and dual-use uncooled infrared cameras your company manufactures? Please explain your answer below.	
B.	Are there any differences (i.e., physical/technical characteristics) between the **FPAs** you use in the military-use only and dual-use uncooled infrared cameras your company manufactures? Please explain your answer below.	
C.	How many dual-use uncooled infrared camera models does your company license through the State Department? List the name of the camera's product line and explain why in the space below.	
Comments:		

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 3.c **Uncooled Infrared Cameras (Including Camera Cores) - cont.**

A. Identify the 10-digit Harmonized Tariff Schedule (HTS) codes your company uses to classify the military-use only and dual-use uncooled infrared cameras it sells. If your products' HTS codes do not go to the 10-digit level, provide as many digits as possible.

Military-Use Only						
Dual-Use						

B. Identify your company's non-U.S. competitors for uncooled infrared cameras, their country, if they compete with your company's military-use only or dual-use products, and if they produce uncooled infrared cameras 1) less than or equal to 111,000 pixels, 2) greater than 111,000 pixels but less than or equal to 310,000 pixels, and 3) greater than 310,000 pixels.

Company Name	Country	Military-Only Products	Dual-Use Products	≤111,000 pixels	>111,000 and ≤310,000 pixels	>310,000 pixels

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 3.d **Uncooled Infrared Cameras (Including Camera Cores)- cont.**

A. Report the value and quantity of your company's U.S. and Non-U.S. sales figures for military-use only and dual-use uncooled infrared cameras for 2007-2010, and indicate if you sold directly to the U.S. Department of Defense during those years.

	2007					2008				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

	2009					2010				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

B. Identify the types of dual-use uncooled infrared cameras your company sold to the the U.S. Department of Defense. If your company had no such sales, move to the next section.

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 4.a **Cooled Infrared FPAs**

A. Identify the number and name of the cooled infrared FPA product lines your company **sold in 2010** sells that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines
Military-Use Only		
Dual-Use		

B. For 2011-2012, identify the number and name of the cooled infrared FPA product lines your company **projects** selling that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines
Military-Use Only		
Dual-Use		

C. Identify the specific applications for the cooled infrared FPAs your company currently sells that are for military-use only or dual-use.

Military-Use Only	
Dual-Use	

D. Are there any differences (i.e., physical/technical characteristics) between the commercial-only and military-only cooled infrared FPAs your company manufactures? Please explain your answer below.

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 4.b **Cooled Infrared FPAs - cont.**

A. Identify the 10-digit Harmonized Tariff Schedule (HTS) codes your company uses to classify the military-use only and dual-use cooled infrared FPAs it sells. If your products' HTS codes do not go to the 10-digit level, provide as many digits as possible.

Military-Use Only						
Dual-Use						

B. Identify your company's non-U.S. competitors for cooled infrared FPAs, their country, and if they compete with your company's military-use only or dual-use cooled infrared FPAs.

Company Name	Country	Military-Only Products	Dual-Use Products

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 4.c **Cooled Infrared FPAs - cont.**

A. Report the value and quantity of your company's U.S. and Non-U.S. sales figures for military-use only and dual-use cooled infrared FPAs for 2007-2010, and indicate if you sold directly to the U.S. Department of Defense during those years.

	2007					2008				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

	2009					2010				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

B. Identify the types of dual-use cooled infrared FPAs your company sold to the the U.S. Department of Defense. If your company had no such sales, move to the next section.

Comments:	

Section 5.a **Cooled Infrared Cameras (Including Camera Cores)**

A. Identify the number and name of the cooled infrared camera product lines your company **sold in 2010** sells that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines
Military-Use Only		
Dual-Use		

B. For 2011-2012, identify the number and name of the cooled infrared camera product lines your company **projects** selling that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines
Military-Use Only		
Dual-Use		

C. Identify the specific applications for the cooled infrared cameras your company currently sells that are for military-use only or dual-use.

Military-Use Only	
Dual-Use	

D. How does your company obtain the FPAs it uses in its cooled infrared cameras? If purchased from other companies, list the names and locations of the companies that provide you with cooled infrared FPAs.

Company Name	Country	Company Name	Country

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 5.b	Cooled Infrared Cameras (Including Camera Cores) - cont.	
A.	Are there any differences (i.e., physical/technical characteristics) between the military-use only and dual-use cooled infrared cameras your company manufactures? Please explain your answer below.	
B.	Are there any differences (i.e., physical/technical characteristics) between the **FPAs** you use in the military-use only and dual-use cooled infrared cameras your company manufactures? Please explain your answer below.	
C.	How many dual-use cooled infrared camera models does your company license through the State Department? List the name of the camera's product line and explain why in the space below.	
Comments:		

Section 5.c **Cooled Infrared Cameras (Including Camera Cores) - cont.**

A. Identify the 10-digit Harmonized Tariff Schedule (HTS) codes your company uses to classify the military-use only and dual-use cooled infrared FPAs it sells. If your products' HTS codes do not go to the 10-digit level, provide as many digits as possible.

Military-Use Only						
Dual-Use						

B. Identify your company's non-U.S. competitors for cooled infrared FPAs, their country, and if they compete with your company's military-use only or dual-use cooled infrared FPAs.

Company Name	Country	Military-Only Products	Dual-Use Products

Comments:

Section 5.d **Cooled Infrared Cameras (Including Camera Cores) - cont.**

A. Report the value and quantity of your company's U.S. and Non-U.S. sales figures for military-use only and dual-use cooled infrared cameras for 2007-2010, and indicate if you sold directly to the U.S. Department of Defense during those years.

	2007					2008				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

	2009					2010				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

B. Identify the types of dual-use cooled infrared cameras your company sold to the the U.S. Department of Defense. If your company had no such sales, move to the next section.

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 6.a **Image Intensifier Tubes**

A. Identify the number of image intensifier tube product lines, the name of your products lines, and the number of Gen II and Gen III or higher models your company **sold in 2010** sells that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines	Gen II models	Gen III or higher models
Military-Use Only				
Dual-Use				

B. For 2011-2012, identify the number of image intensifier tube product lines, the name of your products lines, and the number of Gen II and Gen III or higher models your company **projects** selling that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines	Gen II models	Gen III or higher models
Military-Use Only				
Dual-Use				

C. Identify the specific applications for the image intensifer tubes your company currently sells that are for military-use only or dual-use (for both commercial and military use).

Military-Use Only	
Dual-Use	

D. Are there any differences (i.e., physical/technical characteristics) between the military-use only and dual-use image intensifier tubes your company manufactures? Please explain your answer below.

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 6.b **Image Intensifier Tubes - cont.**

A. Identify the 10-digit Harmonized Tariff Schedule (HTS) codes your company uses to classify the military-use only and dual-use image intensifer tubes it sells. If your products' HTS codes do not go to the 10-digit level, provide as many digits as possible.

Military-Use Only						
Dual-Use						

B. Identify your company's non-U.S. competitors for image intensifier tubes, their country, if they compete with your company's military-use only or dual-use products, and if they produce Gen II or Gen III or higher image intensifier tubes.

Company Name	Country	Military-Only Products	Dual-Use Products	Gen II	Gen III or higher

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 6.c **Image Intensifier Tubes - cont.**

A. Report the value and quantity of your company's U.S. and Non-U.S. sales figures for military-use only and dual-use image intensifier tubes for 2007-2010, and indicate if you sold directly to the U.S. Department of Defense during those years.

	2007					2008				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

	2009					2010				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

B. Identify the types of dual-use image intensifer tubes your company sold to the the U.S. Department of Defense. If your company had no such sales, move to the next section.

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 7.a **Image Intensifier Tube Cameras and Direct-View Equipment**

A. Identify the number of image intensifier tube camera and direct-view equipment product lines, the name of your products lines, and the number of Gen II and Gen III or higher models your company **sold in 2010** sells that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines	Gen II models	Gen III or higher models
Military-Use Only				
Dual-Use				

B. For 2011-2012, identify the number of image intensifier tube camera and direct-view equipment product lines, the name of your products lines, and the number of Gen II and Gen III or higher models your company **projects** selling that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines	Gen II models	Gen III or higher models
Military-Use Only				
Dual-Use				

C. Identify the specific applications for the image intensifier tube cameras and direct-view equipment your company currently sells that are for military-use only or dual-use (for both commercial and military use).

Military-Use Only	
Dual-Use	

D. How does your company obtain the image intensifier tubes it uses in its image intensifier tube cameras and direct-view equipment? If purchased from other companies, list the names and locations of the companies that provide you with image intensifier tubes.

Company Name	Country	Company Name	Country

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 7.b	Image Intensifier Tube Cameras and Direct-View Equipment- cont.	
A.	Are there any differences (i.e., physical/technical characteristics) between the military-use only and dual-use image intensifier tube cameras and direct-view equipment your company manufactures? Please explain your answer below.	
B.	Are there any differences (i.e., physical/technical characteristics) between the **tubes** you use in the military-use only and dual-use image intensifier tube cameras direct-view equipment your company manufactures? Please explain your answer below.	
C.	How many models of dual-use image intensifier tube cameras and direct-view equipment does your company license through the State Department? List the name of the camera's product line and explain why in the space below.	
Comments:		

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 7.c **Image Intensifier Tube Cameras and Direct-View Equipment- cont.**

A. Identify the 10-digit Harmonized Tariff Schedule (HTS) codes your company uses to classify the military-use only and dual-use image intensifier tube cameras and direct-view equipement it sells. If your products' HTS codes do not go to the 10-digit level, provide as many digits as possible.

Military-Use Only						
Dual-Use						

B. Identify your company's non-U.S. competitors for image intensifier tube cameras and direct-view equipement, their country, if they compete with your company's military-use only or dual-use products, and if they produce Gen II or Gen III or higher image intensifier tube cameras and direct-view equipement.

Company Name	Country	Military-Only Products	Dual-Use Products	Gen II	Gen III or higher

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 7.d **Image Intensifier Tube Cameras and Direct-View Equipment- cont.**

A. Report the value and quantity of your company's U.S. and Non-U.S. sales figures for military-use only and dual-use image intensifier tube cameras and direct-view equipment for 2007-2010, and indicate if you sold directly to the U.S. Department of Defense during those years.

	2007					2008				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

	2009					2010				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

B. Identify the types of dual-use image intensifier tube cameras and direct-view equipment your company sold to the the U.S. Department of Defense. If your company had no such sales, move to the next section.

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 8.a Low Light Level FPAs/Sensors (e.g., EMCCD, EBCMOS, APD, etc)

A. Identify the number and name of the low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) product lines your company **sold in 2010** sells that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines
Military-Use Only		
Dual-Use		

B. For 2011-2012, identify the number and name of the low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) product lines your company **projects** selling that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines
Military-Use Only		
Dual-Use		

C. Identify the specific applications for the low light level FPAs/sensors (e.g. EMCCD, EBCMOS, APD, etc) your company currently sells that are for military-use only or dual-use.

Military-Use Only	
Dual-Use	

D. Are there any differences (i.e., physical/technical characteristics) between the commercial-only and military-only low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) your company manufactures? Please explain your answer below.

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 8.b **Low Light Level FPAs/Sensors (e.g., EMCCD, EBCMOS, APD, etc) - cont.**

A. Identify the 10-digit Harmonized Tariff Schedule (HTS) codes your company uses to classify the military-use only and dual-use low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) it sells. If your products' HTS codes do not go to the 10-digit level, provide as many digits as possible.

Military-Use Only						
Dual-Use						

D. Identify your company's non-U.S. competitors for low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc), their country, and if they compete with your company's military-use only or dual-use low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc).

Company Name	Country	Military-Only Products	Dual-Use Products

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 8.c **Low Light Level FPAs/Sensors (e.g., EMCCD, EBCMOS, APD, etc) - cont.**

A. Report the value and quantity of your company's U.S. and Non-U.S. sales figures for military-use only and dual-use low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) for 2007-2010, and indicate if you sold directly to the U.S. Department of Defense during those years.

	2007					2008				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

	2009					2010				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

B. Identify the types of dual-use low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) your company sold to the the U.S. Department of Defense. If your company had no such sales, move to the next section.

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 9.a Cameras Using Low Light Level FPAs/Sensors (e.g., EMCCD, EBCMOS, APD, etc)

A. Identify the number and name of product lines of cameras using low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) your company **sold in 2010** sells that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines
Military-Use Only		
Dual-Use		

B. For 2011-2012, identify the number and name of the product lines of cameras using low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) your company **projects** selling that are for military-use only or dual-use (without regard to current jurisdiction).

	Number of Product Lines	Name of Product Lines
Military-Use Only		
Dual-Use		

C. Identify the specific applications for the cameras using low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) your company currently sells that are for military-use only or dual-use.

Military-Use Only	
Dual-Use	

D. How does your company obtain the low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) it uses in its cameras using low light level FPAs/sensors? If purchased from other companies, list the names and locations of the companies that provide you with low light level FPAs/sensors.

Company Name	Country	Company Name	Country

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 9.b	Cameras Using Low Light Level FPAs/Sensors (e.g., EMCCD, EBCMOS, APD, etc)	
A.	Are there any differences (i.e. physical/technical characteristics) between the military-use only and dual-use cameras using low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) your company manufactures? Please explain your answer below.	
B.	Are there any differences (i.e. physical/technical characteristics) between the **FPAs/sensors** (e.g., EMCCD, EBCMOS, APD, etc) you use in the military-use only and dual-use cameras using low light level FPAs/sensors your company manufactures? Please explain your answer below.	
C.	How many models of dual-use cameras using low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) does your company license through the State Department? List the name of the camera's product line and explain why in the space below.	
Comments:		

Section 9.c **Cameras Using Low Light Level FPAs/Sensors (e.g., EMCCD, EBCMOS, APD, etc) - cont.**

A. Identify the 10-digit Harmonized Tariff Schedule (HTS) codes your company uses to classify the military-use only and dual-use cameras using low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) it sells. If your products' HTS codes do not go to the 10-digit level, provide as many digits as possible.

Military-Use Only						
Dual-Use						

B. Identify your company's non-U.S. competitors for cameras using low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) their country and if they compete with your company's military-use only or dual-use cameras using low light level FPAs/sensors.

Company Name	Country	Military-Only Products	Dual-Use Products

C. Identify the types of dual-use cameras using low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) your company sold to the the U.S. Department of Defense. If your company had no such sales, move to the next section.

Comments:	

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Section 9.d **Cameras Using Low Light Level FPAs/Sensors (e.g., EMCCD, EBCMOS, APD, etc)**

A. Report the value and quantity of your company's U.S. and Non-U.S. sales figures for military-use only and dual-use cameras using low light level FPAs/sensors (e.g., EMCCD, EBCMOS, APD, etc) for 2007-2010, and indicate if you sold directly to the U.S. Department of Defense.

	2007					2008				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

	2009					2010				
	U.S.		DOD sales?	Non-U.S.		U.S.		DOD sales?	Non-U.S.	
	Value ($)	Quantity		Value ($)	Quantity	Value ($)	Quantity		Value ($)	Quantity
Military-Use Only										
Dual-Use										

B. For 2009 and 2010, identify the number of cameras using low light level FPAs/Sensors (e.g., EMCCD, EBCMOS, APD, etc) your company has exported, their value, and the destination countries.

2009			2010		
Country	Value ($)	Quantity	Country	Value ($)	Quantity

Comments:

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Section 10 Research and Development

A. List any of your company's current products that directly resulted from U.S. Department of Defense funding, identify the type of product, and what percent of the product's research and development funding came from the U.S. Department of Defense.

Product	Type of Product	DOD Funding Percentage

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 11	Impact Export Controls	
A.	Describe how the jurisdiction of your company's items under the USML or CCL has affected your sales, investments in R&D, competitiveness, and overall business strategy.	
	Uncooled infrared FPAs	
	Uncooled infrared cameras	
	Cooled infrared FPAs	
	Cooled infrared cameras	
	Image intensifier tubes	
	Image intensifier tube cameras	
	Low light level FPAs/sensors (e.g. EMCCDs, EBCMOS, etc)	
	Cameras using low light level FPAs/sensors	
	Comments:	

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Section 12	Certification
The undersigned certifies that the information herein supplied in response to this questionnaire is complete and correct to the best of his/her knowledge. It is a criminal offense to willfully make a false statement or representation to any department or agency of the United States Government as to any matter within its jurisdiction (18 U.S.C.A. 1001 (1984 & SUPP. 1197)).	
Company Name	
Name of Authorizing Official	
Title of Authorizing Official	
E-mail Address	
Phone Number and Extension	
Date Certified	
In the box below, please provide any additional comments or any other information you wish to include regarding this assessment.	
How many hours did it take to complete this survey?	

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