



SCIENCE

Export Control Compliance

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WHAT ARE EXPORT CONTROLS?

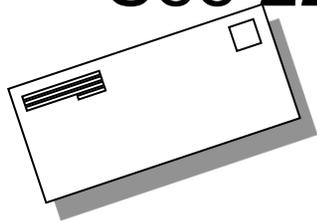
Restrictions applied by a government to the “*export*” of goods, services, software or technology.



AN EXPORT IS....

The transfer of anything to a **FOREIGN PERSON** or a foreign destination by any means, anywhere, anytime.

See 22 C.F.R. §120.17 and 15 C.F.R. §734.2(b)



Exposure is disclosure



Export Control Compliance: Important Part of the NASA Mission

- “It is NASA policy to ensure that exports and transfers of commodities, technical data, or software to foreign persons are carried out in accordance with United States export control laws and regulations, and Administration and NASA policy.”
 - » NPD 2190.1B, Section 1.a. (20 June 2012)
- “We want to maximize the benefits of our international efforts while ensuring that we comply with U.S. export control laws and regulations. This is the personal responsibility of each employee.”
 - » NPR 2190.1B, Section P.1 (27 December 2011)



Key Export Control & Nonproliferation Principles

- 31 C.F.R. 500-598 – Office of Foreign Assets Control (OFAC) Sanctions
- P.L. 109-112 – Iran, North Korea, & Syria Non-Proliferation Act
 - Restricts extraordinary payments to certain Russian entities in connection with human space flight activities, including the ISS
- U.S. Non-Proliferation and Export Control Policy, National Space Policy, & Space Transportation Policy
- P.L. 106-391 – NASA Authorization Act of 2000
- P.L. 112-10 – Department of Defense and Full-Year Continuing Appropriations Act, 2011
- **Compliance with Primary Export Control Laws and Regulations**
 - **Arms Export Control Act -- International Traffic in Arms Regulations (ITAR)**
 - **Export Administration Act -- Export Administration Regulations (EAR)**
- 10 CFR 810 Department of Energy regulations



PRIMARY EXPORT CONTROL REGULATIONS

The International Traffic in Arms Regulations (ITAR)

- 22 CFR 120-130
- Control the export of goods and technical data on the United States Munitions List (USML) and certain items on the Missile Technology Control Regime (MTCR) Annex.
- USML items are mainly “military” in nature, with a limited number of “dual-use” items.
- State Department is the authority



The Export Administration Regulation (EAR)

- 15 CFR 730-774
- Regulations which control the export of goods and technology on the Commerce Control List (CCL), including certain items on the Missile Technology Control Regime Annex.
- Items on the CCL are typically referred to as “dual-use” items.
- Commerce Department is the authority





Proscribed Countries §126.1

- If a country appears on the “proscribed country” list, it is (generally) U.S. policy to deny licenses, or other approvals, associated with exports and imports of defense articles and defense services, destined for or originating in that country
- **ITAR** License Exemptions are trumped if a “**foreign person**” from any of these countries is involved; i.e., a license must be applied for.
- **EAR** Mirrors the ITAR 126.1 List – **Country Group D:5**



ITAR Proscribed Countries § 126.1

(EAR Mirrors the ITAR List – Country Group D:5)

- AFGHANISTAN (Case-by-Case)
- BELARUS
- BURMA
- CENTRAL AFRICAN REPUBLIC (Case-by-Case)
- CHINA (PRC)
- CONGO (Case-by-Case)
- COTE D'IVOIRE (Case-by-Case)
- CUBA
- CYPRUS (Case-by-Case)
- ERITREA
- FIJI (Case-by-Case)
- HAITI (Case-by-Case)
- IRAN
- IRAQ (Case-by-Case)
- LEBANON (Case-by-Case)
- LIBERIA (Case-by-Case)
- LIBYA (Case-by-Case)
- NORTH KOREA
- SOMALIA (Case-by-Case)
- SRI LANKA (Case-by-Case)
- SUDAN (Case-by-Case)
- SYRIA
- VENEZUELA
- VIETNAM (Case-by-Case)
- ZIMBABWE (Case-by-Case)

**List is updated by Federal Register Notice
Current as of 30 September 2014**



THE UNITED STATES MUNITIONS LIST (USML) 22 CFR 121 (ITAR)

- I – Firearms
- II – Guns and Armament
- III – Ammunition/Ordnance
- **IV – Launch Vehicles, etc...**
- **V – Explosives, Propellants, Incendiary Agents and Their Constituents**
- VI - Vessels of War and Special Naval Equipment
- VII – Ground Vehicles
- **VIII – Aircraft and Related Articles**
- IX - Military Training Equipment
- X – Personnel Protective Equipment
- XI - Military Electronics
- **XII – Fire Control, Range Finder, Optical and Guidance and Control Equipment**
- **XIII – Materials and Miscellaneous Articles**
- XIV - Toxicological Agents and Associated Equipment
- **XV – Spacecraft Systems and Associated Equipment**
- XVI - Nuclear Weapons Related Articles
- XVII - Classified Articles, Technical Data and Defense Services Not Otherwise Enumerated
- XVIII - Directed Energy Weapons
- **XIX – Gas Turbine Engines and Associated Equipment**
- XX - Submersible Vessels and Related Articles
- XXI - Articles, Technical Data and Defense Services Not Otherwise Enumerated



THE COMMERCE CONTROL LIST (CCL) 15 CFR 774 (EAR)

- Category 0 - Nuclear Materials Facilities & Equipment [and Miscellaneous Items]
- Category 1 - Materials, Chemicals, Microorganisms and Toxins
- Category 2 - Materials Processing
- **Category 3 – Electronics Design Development and Production**
- **Category 4 - Computers**
- **Category 5 Part 1 - Telecommunications**
- Category 5 Part 2 - Information Security
- **Category 6 – Sensors and Laser**
- **Category 7 - Navigation and Avionics**
- Category 8 - Marine
- **Category 9 - Propulsion Systems, Space Vehicles and Related Equipment**



TECHNICAL DATA AND TECHNOLOGY

The International Traffic in Arms Regulations (ITAR)

– Technical Data

Information which is **required** for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance, or modification of defense articles; classified information related to defense articles and defense services on the USML; information covered by an invention secrecy order; some software directly related to defense articles.

The Export Administration Regulation (EAR)

- Technology

Specific information **necessary** for the “development”, “production”, or “use” of a product. The information takes the form of “technical data” or “technical assistance”.

Does not include information concerning general scientific, mathematical or engineering principles commonly taught in schools, colleges and universities or information in the “public domain”.

Does not include basic marketing information on function or purpose or general system descriptions of items.



EXPORT CONTROL REFORM

- **Objective: Protecting U.S. National Security**
- **“Higher fence around a smaller yard”**
- **Must be multilateral to be effective**
 - **Unilateral controls must address legal or foreign policy objective**
- **Dynamic control lists that are easily updated**
 - **Reflect changing technology/availability**
- **Transparent, predictable and timely processes**
- **Strengthen ability to comply, enforce**

www.export.gov/ecr



SUMMARY OF REVISED CONTROLS

Category XV (Satellites and Spacecraft) Today

International Traffic in Arms Regulations

Export Administration Regulations

Cat XV

Other

New ECCN 9x515

Existing ECCNs

Military Satellites

Military Ground equip

Parts critical for military functions

Services for ITAR and EAR satellites

GPS Rcvrs

Worldwide license, except Canada.

25% *de minimis*, except 0% for China and other ITAR 126.1 countries.

STA-36 eligible, except for certain software and technology

Controls for satellite items transferred from ITAR to be the same as for 9x515

Sats and Ground equip not on ITAR

Rad Hard ICs

Parts not on ITAR or other EAR

New sat related item or tech

Spec electronics

Spec optical sensors

Spec radar systems



ITEMS TRANSFERRING TO COMMERCE ON 10 Nov 2014

- **Satellites**

- Commercial Communication Satellites
- Lower-Performance Remote Sensing Satellites
- Planetary Rovers
- Planetary and Interplanetary Probes

- **Related systems for the above**

- Ground control systems
- Training simulators
- Test, inspection, and production equipment
- Non-critical software for production, operation or maintenance
- Non-critical technology for development, production, installation, operation or maintenance
- Radiation hardened microelectronics (transferred on 27 June 2014)

- **Certain Spacecraft (Human-rated or robotic) without integrated propulsion**

- Orion MPCV – Crew Module
- Cygnus
- Others

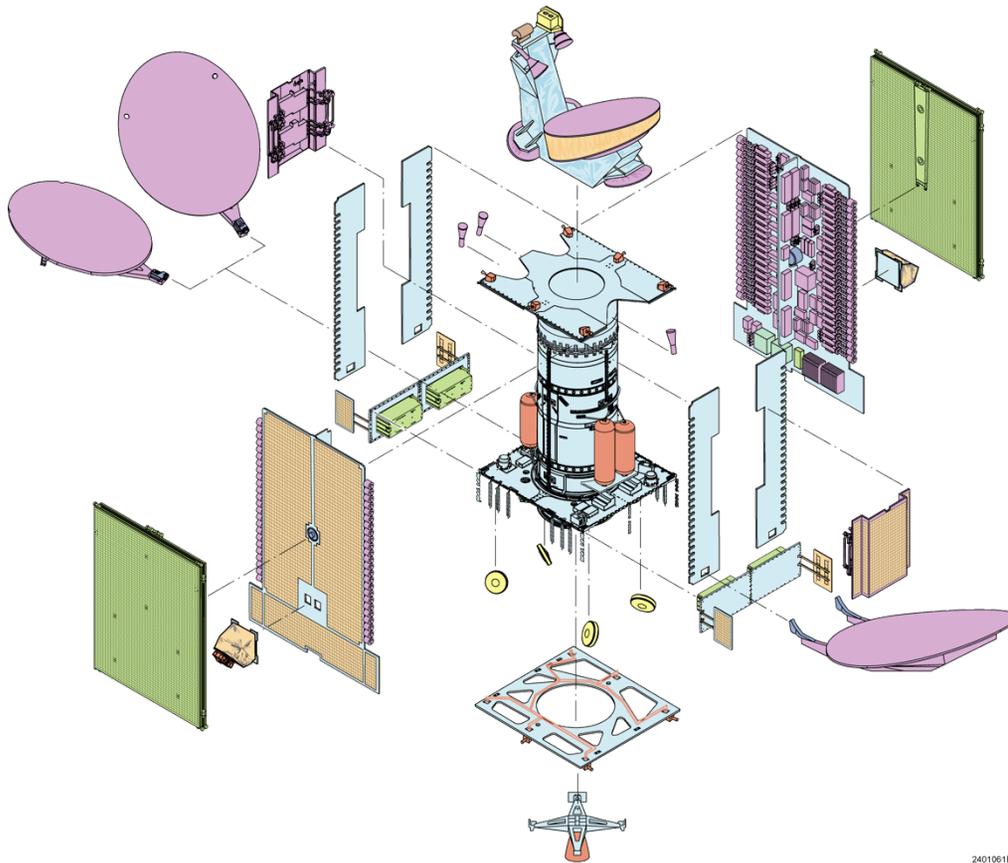
- **Parts and components of satellite bus and payloads not listed on USML**

- Thousands of *types* of parts and subsystems
- Hundreds of thousands of specific parts



COMMERCE SATELLITE-RELATED PARTS AND COMPONENTS

SATELLITE BUS SYSTEM INCLUDES:



2401061E

- Solar Array
- Propulsion Tank
- Optical Solar Reflector
- Tower Structure
- Stationary Plasma Thruster
- Antenna Reflector
- Antenna Subreflector
- Comm Panel
- Electronics
- Spacecraft Control
- Electronics
- Thruster
- Antenna Feed
- Earth Sensor
- Thermal Blanket
- TWTA
- Batteries
- TT&C Antenna



ITEMS REMAINING ON USML

- **Satellites and spacecraft**
 - Unique military and intelligence functions, including nuclear detection, intelligence collection, missile tracking, anti-satellite or space-based weapons, classified operation or equipment, and navigation
 - Meeting specific remote sensing parameters
 - Certain human-rated habitats with integrated propulsion
- **Ground control equipment**
 - Performs a uniquely military function for one of satellites above
- **Parts & components**
 - Sixteen specific technologies critical to military functions
 - Any payload that performs one of military functions listed above
 - DoD funded payloads



SPACECRAFT REMAINING ON USML

- (1) Are specially designed to mitigate effects (*e.g.*, scintillation) of or for detection of a nuclear detonation;
- (2) Autonomously track ground, airborne, missile, or space objects in real-time using imaging, infrared, radar, or laser systems;
- (3) Conduct signals intelligence (SIGINT) or measurement and signatures intelligence (MASINT);
- (4) Are specially designed to be used in a constellation or formation that when operated together, in essence or effect, form a virtual satellite;
- (5) Are anti-satellite or anti-spacecraft (*e.g.*, kinetic, RF, laser, charged particle);
- (6) Have space-to-ground weapons systems (*e.g.*, kinetic or directed energy);
- (7) Have certain electro-optical remote sensing capabilities or characteristics;
- (8) Have certain radar remote sensing capabilities or characteristics such as certain synthetic, inverse synthetic or ultra-wideband SAR;



SPACECRAFT REMAINING ON USML (CONTINUED)

- (9) Provide certain Positioning, Navigation, and Timing (PNT) signals;
- (10) Provide space-based logistics, assembly, or servicing of any spacecraft (e.g., refueling) **and** have integrated propulsion other than that required for attitude control;
- (11) Reserved
- (12) Provide for sub-orbital, Earth orbital, cis-lunar, lunar, deep space (*i.e.*, space beyond lunar orbit), and planetary spaceflight, or in-space human habitation, **which have** integrated propulsion other than that required for attitude control; or
- (13) Are classified, contain classified software or hardware, are manufactured using classified production data, or are being developed using classified information.



USML ELECTRO-OPTICAL REMOTE SENSING PARAMETERS

USML Category XV(a)(7) - Have any of the following electro-optical remote sensing capabilities or characteristics:

- (i) Electro-optical visible and near infrared (VNIR) (*i.e.*, 400nm to 1,000nm) or infrared (*i.e.*, greater than 1,000nm to 30,000nm) with less than 40 spectral bands and having a clear aperture greater than 0.35 meters;
- (ii) Electro-optical hyperspectral with 40 spectral bands or more in the VNIR, short-wavelength infrared (SWIR) (*i.e.*, greater than 1,000nm to 2,500nm) or any combination of the aforementioned and having a Ground Sample Distance (GSD) less than 30 meters;
- (iii) Electro-optical hyperspectral with 40 spectral bands or more in the mid-wavelength infrared (MWIR) (*i.e.*, greater than 2,500nm to 5,500nm) having a narrow spectral bandwidth of $\Delta\lambda$ less than or equal to 20nm full width at half maximum (FWHM) or having a wide spectral bandwidth with $\Delta\lambda$ greater than 20nm FWHM and a GSD less than 200 meters; or
- (iv) Electro-optical hyperspectral with 40 spectral bands or more in the long-wavelength infrared (LWIR) (*i.e.*, greater than 5,500nm to 30,000nm) having a narrow spectral bandwidth of $\Delta\lambda$ less than or equal to 50nm FWHM or having a wide spectral bandwidth with $\Delta\lambda$ greater than 50nm FWHM and a GSD less than 500 meters;

Note 1: Ground Sample Distance (GSD) is measured from a spacecraft's nadir (*i.e.*, local vertical) position.

Note 2: Optical remote sensing spacecraft or satellite spectral bandwidth is the smallest difference in wavelength (*i.e.*, $\Delta\lambda$) that can be distinguished at full width at half maximum (FWHM) of wavelength λ .

Note 3: An optical satellite or spacecraft is not Significant Military Equipment (see §120.7 of this subchapter) if non-earth pointing.



16 CRITICAL TECHNOLOGIES REMAINING ON USML

- 1) Certain specified antennas having particular capabilities
- 2) Certain space-qualified optics with particular properties
- 3) Space-qualified FPAs having particular peak response wavelength
- 4) Space-qualified mechanical cryocooler
- 5) Space-qualified active vibration suppression
- 6) Certain optical bench assemblies
- 7) Certain non-communication space-qualified directed energy systems
- 8) Space-based kinetic or charged particle energy systems
- 9) Certain space-qualified atomics clocks
- 10) High performance attitude determination and control systems
- 11) Certain space-based thermoionic converters or generators
- 12) Certain thrusters for orbit adjustment
- 13) Control moment gyroscopes
- 14) Certain space-qualified MMICs
- 15) Certain space-qualified oscillators
- 16) Certain high performing star trackers

MMIC – Monolithic Microwave Integrated Circuit



SERVICES REMAINING ON USML

- Satellite integration and launch services
 - Provided by a U.S. person
 - To a foreign launch integrator or launch vehicle provider
- Launch support considered a defense service, includes furnishing assistance or information for:
 - Integration of satellite to vehicle
 - Launch failure analysis



Closing

- The Department of State is the regulatory authority for defense articles and defense services. <http://www.pmddtc.state.gov/>
- The Department of Commerce is the regulatory authority for dual-use items. <http://www.bis.doc.gov/>
- The NASA Export Control Program is at <http://oiihq.nasa.gov/nasaecp/index.html>