



U.S. Export Controls on GPS/GNSS Equipment

Presented to National Space-Based PNT Advisory Board
Toughen Working Group

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Outline

1. ITAR vs EAR
2. Sensitive Technology Controls
 - USML
 - CCL with MT
3. Mass Market Exports
4. Export Control Reviews

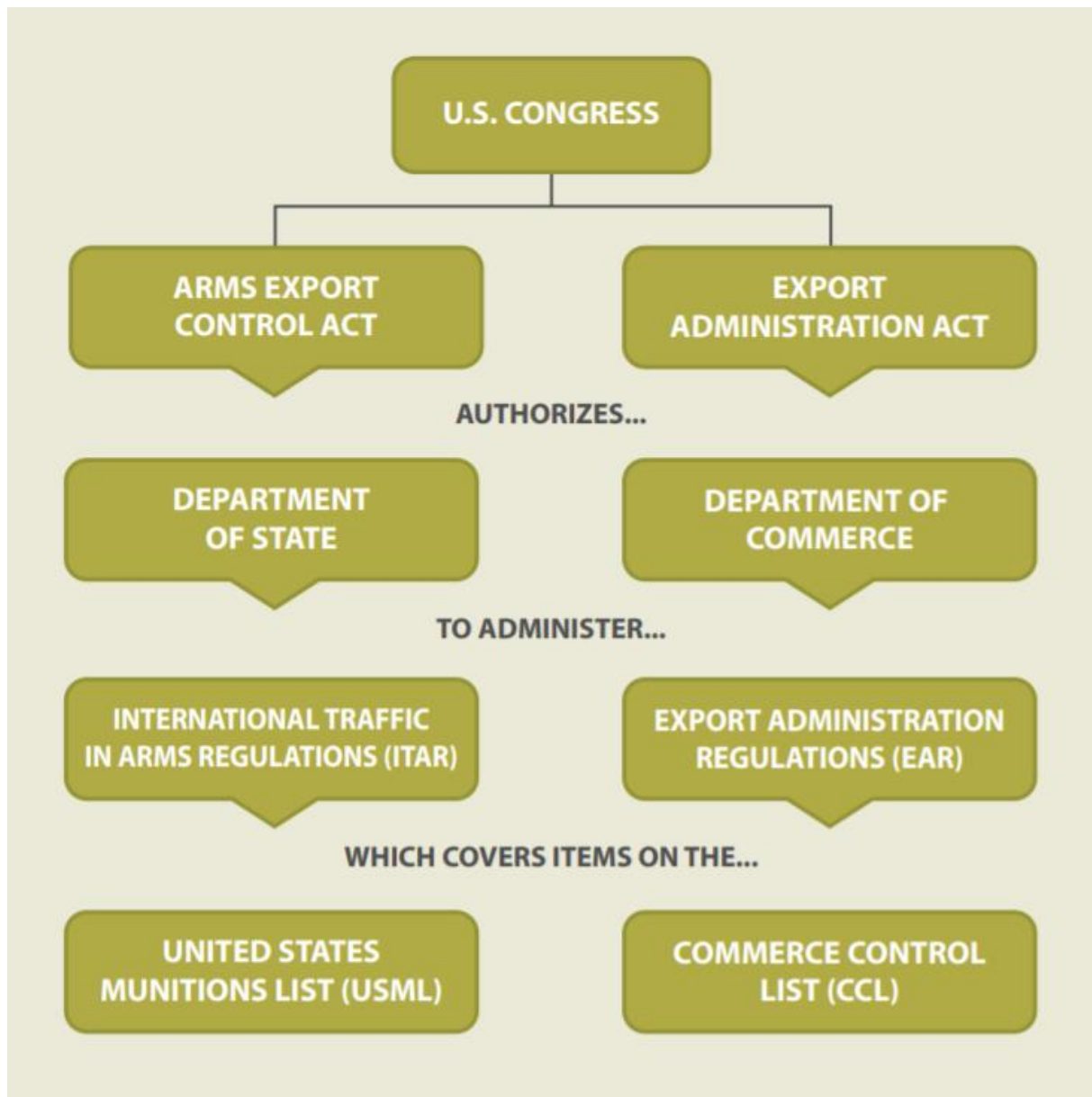
Space Policy Directive-7

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Exports of any United States PNT capabilities included on the **United States Munitions List** or the **Commerce Control List** will continue to be licensed pursuant to the **International Traffic in Arms Regulations** or the **Export Administration Regulations**, as appropriate, and in accordance with all existing laws and regulations.

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U.S. Authorization Hierarchy



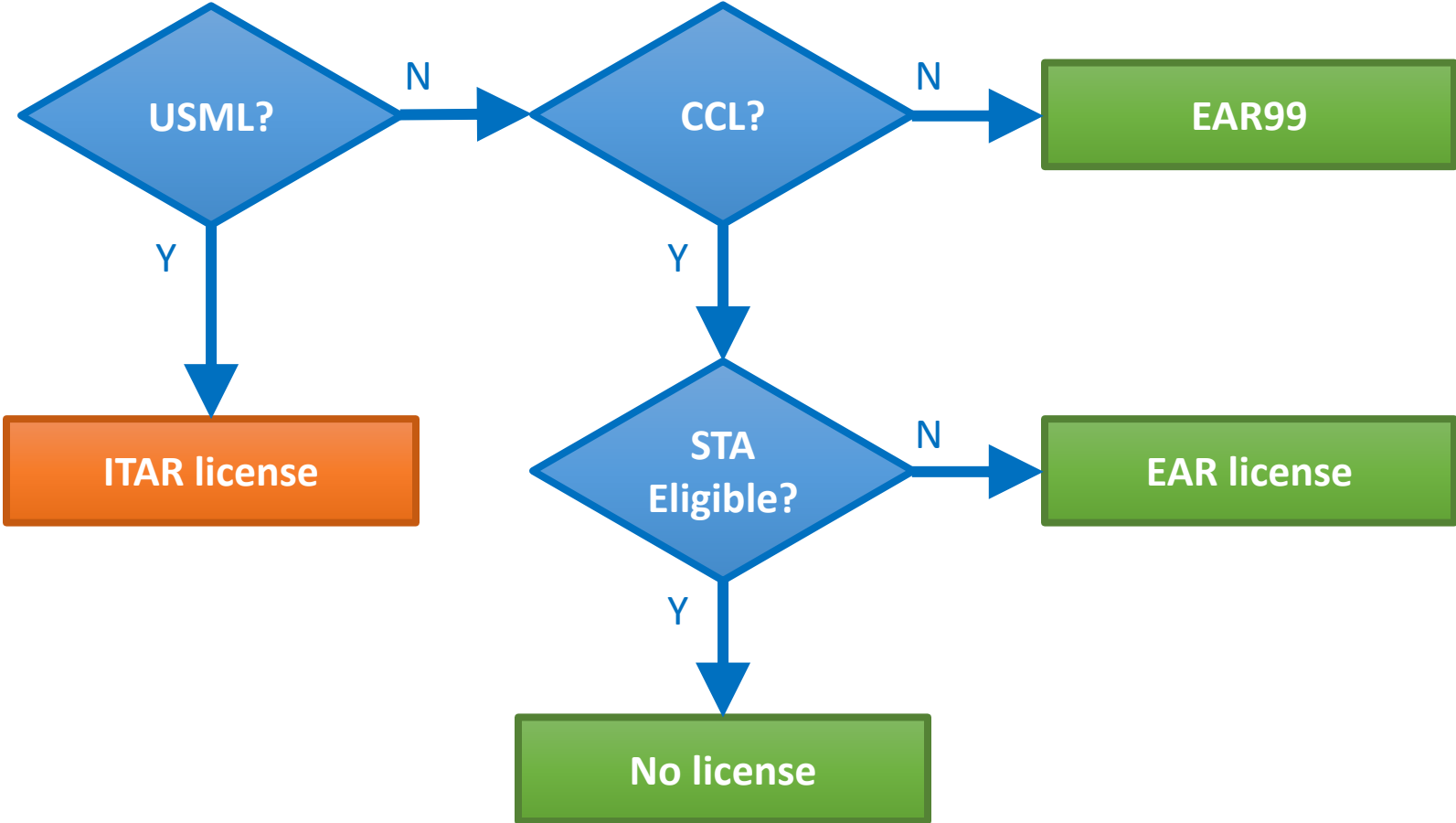
Space Policy Directive-7

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Exports of **sensitive** dual-use or **advanced** PNT information, systems, technologies, and components will be considered on a **case-by-case** basis in accordance with existing laws and regulations, as well as relevant national security and foreign policy goals and considerations.

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Order of Review



USML Categories

- I. Firearms and Related Articles
- II. Guns and Armament
- III. Ammunition and Ordnance
- IV. Launch Vehicles, Guided Missiles, Ballistic Missiles, Rockets, Torpedoes, Bombs, and Mines
- V. Explosives and Energetic Materials, Propellants, Incendiary Agents, and Their Constituents
- VI. Surface Vessels of War and Special Naval Equipment
- VII. Ground Vehicles
- VIII. Aircraft and Related Articles
- IX. Military Training Equipment and Training
- X. Personal Protective Equipment
- XI. Military Electronics**
- XII. Fire Control, Laser, Imaging, and Guidance Equipment**
- XIII. Materials and Miscellaneous Articles
- XIV. Toxicological Agents, Including Chemical Agents, Biological Agents, and Associated Equipment
- XV. Spacecraft and Related Articles**
- 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

USML Category XV

(a) **Spacecraft**, including satellites and space vehicles, whether designated developmental, experimental, research, or scientific, or having a commercial, civil, or military end-use, that:

...

(9) **Provide Positioning, Navigation, and Timing (PNT) signals;**

Note to paragraph (a)(9): This paragraph does not control a satellite or spacecraft that provides only a differential correction broadcast for the purposes of positioning, navigation, or timing.

USML Category XV

- (e) Spacecraft parts, components, accessories, attachments, equipment, or systems
 - Does not specify any GPS/GNSS equipment
- Military GPS/GNSS receivers previously appeared in Category XV(c) but **moved to Category XII** in 2016

USML Category XII

(d) Guidance and navigation systems or end items, as follows:

...

(2) Global Navigation Satellite System (GNSS) receiving equipment, as follows:

(i) GNSS receiving equipment **specially designed for military applications** (MT if designed or modified for airborne applications and capable of providing navigation information at speeds in excess of 600 m/s);

(ii) Global Positioning System (GPS) receiving equipment specially designed for **encryption or decryption** (e.g., Y-Code, M-Code) **of GPS precise positioning service (PPS) signals** (MT if designed or modified for airborne applications);

USML Category XII

(iii) GNSS receiving equipment **specifically designed for use with an antenna described in Category XI(c)(10)** (MT if designed or modified for airborne applications); Or

(iv) GNSS receiving equipment **specifically designed for use with rockets, missiles, SLVs, drones, or unmanned air vehicle systems capable of delivering at least a 500 kg payload to a range of at least 300 km** (MT);

(3) GNSS anti-jam systems **specifically designed for use with an antenna described in Category XI(c)(10)**;

USML Category XI

(c) Parts, components, accessories, attachments, and associated equipment, as follows:

...

(10) Antenna, and specially designed parts and components therefor, that:

(i) Employ **four or more elements**, electronically steer angular beams, independently steer angular nulls, create angular nulls with a null depth greater than 20 dB, **and** achieve a beam switching speed faster than 50 milliseconds;

USML Category XI

- (ii) Form adaptive null attenuation greater than 35 dB with convergence time less than one second;
- (iii) Detect signals across multiple RF bands with matched left hand and right hand spiral antenna elements for determination of signal polarization; or
- (iv) Determine signal angle of arrival less than two degrees (e.g., interferometer antenna);

Note to paragraph (c)(10): This category does not control Traffic Collision Avoidance Systems (TCAS) equipment conforming to FAA TSO C-119c.

Missile Technology (MT) Controls

- Missile Technology Control Regime (MTCR) establishes multilateral controls to prevent missile proliferation
- USG implements MTCR commitments via both USML and CCL
- Example: MTCR control on airborne GNSS receivers capable of exceeding speeds of 600 m/s
 - USML Cat XII(d)(2)(i) covers military receivers
 - CCL ECCN 7A105.b.1 covers non-military receivers
- USML uses “(MT)” markings to indicate alignment with MTCR
- CCL limits export of MT items by applying licensing policies (e.g., disallowing License Exceptions)

CCL ECCN 7A005

Export Control Classification Number (ECCN) 7A005: “Satellite navigation system” receiving equipment having any of the following and “specially designed” “components” therefor.

- a. Employing a **decryption** algorithm “specially designed” or modified **for government use** to access the ranging code for position and time; or
- b. Employing ‘**adaptive antenna systems**’.

Note: 7A005.b does not apply to “satellite navigation system” receiving equipment that only uses “components” designed to filter, switch, or combine signals from multiple omnidirectional antennas that do not implement adaptive antenna techniques.

Technical Note: For the purposes of 7A005.b ‘adaptive antenna systems’ dynamically generate one or more spatial nulls in an antenna array pattern by signal processing in the time domain or frequency domain.

CCL ECCN 7A105

ECCN 7A105: Receiving equipment for 'navigation satellite systems', having any of the following characteristics, and "specially designed" "parts" and "components" therefor.

- a. Designed or modified for use in "missiles"; or
- b. Designed or modified for airborne applications and having any of the following:
 - b.1. Capable of providing navigation information at speeds in excess of 600 m/s;
 - b.2. Employing decryption, designed or modified for military or governmental services, to gain access to a 'navigation satellite system' secure signal/data; or
 - b.3. Being "specially designed" to employ anti-jam features (e.g., null steering antenna or electronically steerable antenna) to function in an environment of active or passive countermeasures.

Note: 7A105.b.2 and 7A105.b.3 do not control equipment designed for commercial, civil or Safety of Life (e.g., data integrity, flight safety) 'navigation satellite system' services.

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As a general guideline, most exports of **civil, mass-market** space-based PNT capabilities that are currently available or are planned to be available in the global marketplace will continue to be considered **favorably**.

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CCL ECCN 7A994

ECCN 7A994: Other navigation direction finding equipment, airborne communication equipment, all aircraft inertial navigation systems not controlled under 7A003 or 7A103, and other avionic equipment, including “parts” and “components,” not elsewhere specified.

- *License Requirement Notes: Typically commercially available GPS do not employ decryption or adaptive antenna and are classified as 7A994.*

CCL ECCN 9A515.x

ECCN 9A515.x: “Parts,” “components,” “accessories” and “attachments” that are “specially designed” for defense articles controlled by USML Category XV or items controlled by 9A515, and that are NOT:

- x.1. Enumerated or controlled in the USML or elsewhere within ECCNs 9A515 or 9A004;
 - x.2. through x.7. describe other things that don't include GNSS receivers
- Spaceborne GNSS receivers are controlled by 9A515.x
 - Eligible for License Exception STA

License Exception STA

- License Exception Strategic Trade Authorization (STA) allows the unlicensed export, re-export, and in-country transfer of products to 37 U.S. allies
 - Eight other countries eligible to receive certain items under STA, provided all terms of the license exceptions have been met
- Online tool to determine eligibility: www.bis.doc.gov/statool
- Exports under STA are filed via the Automated Export System (AES)
- Complete information about STA exceptions can be found in 15 CFR § 740.20

EAR99

- Most of the products, services, and technologies that fall within the scope of the EAR are not specifically controlled for export, and are given the classification of EAR99
- They are not listed on the CCL
- EAR99 items generally consist of low-technology consumer goods and do not require a license in most situations
- EAR99 items can generally be exported without a license but exporters of EAR99 items still need to perform careful due diligence to ensure the item is not going to an embargoed or sanctioned country, a prohibited end-user, or used in a prohibited end-use

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Export controls shall be updated to ensure that unnecessary controls that undermine or restrict the **resilience and global use of civil GPS** are reduced or eliminated without compromising United States navigation warfare, national security, or homeland security.

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USML Reviews

- State Department leads rolling review of all 21 USML Categories, several at a time
- Commerce, DOD, NASA, other agencies involved
- State and Commerce issue parallel rulemaking notices in the Federal Register when transferring items from ITAR to EAR

**Advance Notice of
Proposed Rulemaking
(ANPRM)**



**Notice of Proposed
Rulemaking
(NPRM)**



Final Rule

USML Category XII Review

- Final rule to revise Cat XII issued 2016
 - GNSS receivers were added at that time, as was the reference to Cat XI(c) for anti-jam antennas
- Cat XII unlikely to be reviewed again for several years

USML Category XI Review

- State issued final rule in August 2021, making temporary modification to Category XI
 - Limited to XI(b) controls on electronic systems, equipment or software specially designed for intelligence purposes
- Category XI(c)(1-3) is under active review, but this does not include the (c)(10) antenna controls

USML Category XV Review

- Kicked off in response to Space Policy Directive-2 (2018) on streamlining commercial space regulations
- ANPRM issued March 2019
- Interagency adjudication of comments/inputs ongoing
- **Issuance of NPRM forthcoming, considered “priority” by State Department**
- Cat XV(a)(9) control on PNT satellites may need revision to avoid over-control of commercial, LEO-based GNSS constellations

ANPRM on Emerging Technologies

- Issued November 2019 in response to Export Control Reform Act of 2018 (ECRA)
- Commerce seeks criteria for identifying emerging technologies that are essential to U.S. national security but not yet on CCL (or USML)
- **PNT** cited as 1 of 14 representative technology categories of interest to Commerce
- Process is anticipated to result in proposed rules for new Export Control Classification Numbers (ECCNs) on the CCL
 - Commerce does not seek to alter existing controls on technology already specifically described in the CCL
 - **ECCN 7A105 already describes navigation satellite system receivers**
- **Hence, the PNT technologies of interest are non-satellite**



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