



Satellite Industry Association¹ Earth Observation Forum Working Group
White Paper

U.S. Leadership and Commercial Space-based Radio Frequency (RF) Sensing Export Controls:
A Pressing Need for Policy Guidance

Summary. American companies are building new classes of commercial, dual-use space capabilities--such as space-based radiofrequency (RF) remote sensing--with broad national security, civil, and commercial benefits. However, the U.S. Department of State has determined that the export of certain data and information products produced by U.S. radio frequency (RF) remote sensing satellite systems is a “defense service” subject to the International Trafficking in Arms Regulations (ITAR). The United States could better support its national and economic security, deepen its international partnerships, and assure competitiveness in the international marketplace by focusing ITAR controls on protecting higher-end information for sensitive military and intelligence end-uses, and leveraging Export Administration Regulations (EAR) controls for less sensitive information and end-uses. Such a policy would enable greater American private sector contributions of information and insights produced by such RF remote sensing satellites to address global maritime, environmental, resource, and border security challenges.

Background. The commercial space landscape has changed dramatically over the last 20 years. Once solely the domain of governments, commercial remote sensing satellite technology -- spurred by unprecedented private sector investment -- has proliferated globally and the information produced by these satellites is benefiting national security, stewardship of the environment, commerce, and science. The commercial space sector is driving economic growth and cultivating science and engineering talent.

One trailblazing area is space-based RF remote sensing. Increasingly, the lifeblood of the modern, digital world is the RF spectrum -- from communication devices to navigation aids to transportation systems at sea or on land that emit RF energy. U.S. commercial companies operate satellite systems that detect and process RF energy from emitters located on or near the surface of the Earth. These systems are designed and developed to be dual-use: broadening the applicability of RF data and information produced by these systems beyond national security to benefit civil, scientific, environmental, and commercial uses. These include detecting illegal fishing, smuggling operations, human trafficking, unauthorized natural resource extraction, poaching of endangered animals, sources of harmful RF interference (e.g., GPS interference), as well as monitoring carbon emissions and agricultural yields, and areas of commerce such as tracking the locations of oil tankers or food shipments at sea.

These RF satellite systems are composed entirely of commercially available parts and components, and utilize the same technology used in commercial communication satellite systems. The generic processing software employed in these systems uses internationally well-known processing algorithms that are not specially designed for military or intelligence purposes (such as the processing of signals intended to be low probability of interception (LPI) or low probability of detection (LPD) signals).

¹ SIA Executive Members include: Amazon; The Boeing Company; DIRECTV; EchoStar Corporation; HawkEye 360; Intelsat S.A.; Iridium Communications Inc.; Kratos Defense & Security Solutions; Ligado Networks; Lockheed Martin Corporation; OneWeb; Planet; SES Americom, Inc.; Space Exploration Technologies Corp.; Spire Global Inc.; and Viasat Inc. SIA Associate Members include: ABS US Corp.; The Aerospace Corporation; Artel, LLC; AST & Science; Astranis Space Technologies Corp.; Aurora Insight; Blue Origin; Comtech; Eutelsat America Corp.; ExoAnalytic Solutions; Hughes; Inmarsat, Inc.; Kymeta Corporation; Leonardo DRS; Lynk; Omnispace; OneWeb Technologies; Ovzon; Panasonic Avionics Corporation; Peraton; SpaceLink; Telesat Canada; ULA; UltiSat and XTAR, LLC.

Foreign governments and investors are also devoting resources to expand foreign commercial RF remote sensing satellite systems, recognizing their benefits and the global accessibility of technology (hardware and software) used to build and operate such systems. Pacing competitors to U.S. commercial RF space companies include three companies in Europe and at least one “commercial” entity in China, all of which are aggressively marketing their capabilities internationally.

Export Challenge. Despite the dual-use nature of these systems and national policy stating that the United States “will foster a policy and regulatory environment that enables a competitive and burgeoning U.S. commercial space sector,” the Department of State has determined that the delivery of certain RF remote sensing satellite data and information products to a foreign person, and the software used to produce those products, fall under ITAR. Specifically, that:

- The export of certain RF remote sensing satellite data and information products to a foreign person is a “defense service” pursuant to the definition of “defense service” in 22 CFR 120.9(a) and therefore subject to ITAR controls, even though the products themselves fall under the Export Administration Regulations (EAR) administered by the Department of Commerce.
- The generic processing software used in commercial RF remote sensing satellite systems is “technical data” as described in the U.S. Munitions List, Category XI(b) and XI(d) , and therefore subject to ITAR controls.

Such ITAR restrictions and broad treatment of the delivery of RF information as a “defense service” have a crippling effect on U.S. commercial space companies seeking to work with allies/partners, international organizations, and commercial entities in areas such as environmental stewardship, natural resource protection, and maritime and border security, and who seek to bring greater transparency to illicit and nefarious activities. In practice, U.S. companies have seen their international business grind to a halt, while they await lengthy ITAR-compliant reviews of export applications for every current and potential foreign customer and use case. For U.S. businesses, this has negative reputational and financial implications in an already competitive global marketplace, as well as risks lost U.S. business opportunities and the erosion of U.S. companies as preferred space providers for allies and partners.

Findings & Recommended Policy Actions

Finding 1: The strategic landscape and technological capabilities of U.S. industry and foreign competitors has changed dramatically over the last 20 years, including the commercialization of dual-use space technologies that were once solely the domain of governments. With national policy emphasizing both the national and economic security benefits of space, including its importance to American leadership, international partnerships, the environment, and responding to global crises, an interagency discussion on policy objectives and implementation is timely.

Recommendation 1: The U.S. Government should undertake an interagency review and issue policy guidance that considers the full range of issues and equities associated with the rapidly expanding commercial industry of signal capture and analysis. Such a review would seek to achieve forward-looking policy and policy implementation that enables a healthy U.S. commercial space-based RF remote sensing sector while also ensuring the appropriate protection of its capabilities.

Finding 2: American companies providing RF data and information are fully committed to protecting U.S. national security, and to maintaining compliance with U.S. export law and regulation. They recognize that dual-use information can have military and intelligence value and thus controls on the export of certain types of information to certain end-users and for certain end-uses is appropriate. However, applying ITAR to all RF remote sensing satellite products for all end-users and end-uses is overly broad. It produces an unintended effect of damaging commercial competitiveness and inhibiting

those companies from contributing to a wide range of international civil, commercial, environmental, and scientific challenges. Further, it is inconsistent with the intent of ITAR, which is to protect articles and services that provide a critical military or intelligence advantage.

Recommendation 2: Implement a more pragmatic policy and licensing approach, rather than determining that all RF remote sensing satellite products for all users and use cases fall under ITAR. As an alternative to imposing ITAR, the USG should consider whether a single one-stop regulation of space systems without ITAR controls, such as used for electro-optical satellite remote sensing, would be more appropriate for RF remote sensing because the system performance has too many variables to be regulated by a list of controlled equipment on the U.S. Munitions list.

Finding 3. Congress clearly expressed its intent to ensure the competitiveness of U.S. space companies when it legislated the removal of commercial space technologies from the ITAR nearly a decade ago in the National Defense Authorization Act for Fiscal Year 2013. Further, the Executive Branch has several existing authorities that enable it to apply regulatory and licensing restrictions more flexibly to commercial RF remote sensing satellite capabilities, as appropriate. 22 CFR 120.3(b), “Policy on designating or determining defense articles and services on the U.S. Munitions List,” provides the U.S. Government with the authority to determine that an item is a defense article or service if it “provides a critical military or intelligence advantage” such that it warrants control under the ITAR. Additionally, the U.S. Government, under the authority of the Department of Commerce’s Deputy Assistant Secretary for Export Administration in 15 CFR 744.6(c), “Additional prohibitions on ‘U.S. persons’ informed by BIS,” may require an export license through a Bureau of Industry and Security (BIS) “is informed” process.

Recommendation 3: Apply existing regulatory and licensing authorities to establish alternative controls to protect areas of true critical military or intelligence advantage (i.e., the use of signals and systems designed to avoid detection and location), and to protect against the output of commercial RF remote sensing satellite capabilities being used by adversaries and other countries not aligned with the United States:

- The USG should implement end-use and end-user controls utilizing the EAR to protect loss of critical military or intelligence advantages instead of imposing ITAR controls universally on clearly non-military and non-intelligence radio frequency information.
- To address any policy concerns about the export of RF remote sensing satellite data and information products not subject to the above condition, including for military or intelligence end-use by any country other than NATO member states and Major Non-NATO Allies, the Department of Commerce should apply EAR controls and require export licenses through the “is informed” process (under 15 CFR 744.6(c)). This process would require U.S. companies to notify the Department of Commerce and to receive interagency clearance to export such products to foreign persons from countries of concern.