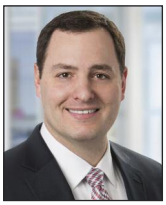
National security, export controls, and the space economy


With entrepreneurial eyes focused skyward and beyond, balancing commercial opportunity with national security is very much on the US government's agenda. Donald Vieira, Nicholas Klein and Jennifer Ho review the regulations and the challenges they face.

Ushering in a new era of commercial space activity, last month, SpaceX launched into space the most powerful rocket in the world, with the ability to lift into orbit a mass greater than a fully loaded 737 jetliner.[1] The company, headed by business magnate Elon Musk, already has launched two test satellites for what is intended to be a massive constellation of nearly 12,000 satellites that will provide wireless internet coverage worldwide.[2] SpaceX is not alone in its endeavours; US-based companies Rocket Lab and Virgin Orbit also are testing rockets designed to send small satellites into orbit and preparing for commercial space travel.[3]

The recent, astounding growth in the space economy also is evident in the sheer size of the industry. In 2016, the global space economy was nearly $350 billion and the satellite industry accounted for more than 75% of that total, with global revenues of $260.5 billion, more than double what it was 10 years earlier.[4] As of 31 December 2016, there were approximately 1,500 operational satellites providing services ranging from national security, global positioning and earth observation to supporting the agriculture, science and telecommunications industries. These developments highlight both our increasing dependence on space-based services and the challenges that government regulators face to maintain adequate oversight over what is often sensitive technology.

While a number of US agencies have a hand in regulating space activity, the Department of Commerce's Bureau of Industry and Security ('BIS') and the Department of State's Directorate of Defense Trade Controls ('DDTC') share responsibility in administering and enforcing export controls as they pertain to spacecraft and, in particular, satellites. As commercialisation of the satellite industry increases, so too will the importance of the US export controls regime as it seeks to strike the delicate balance between advancing economic growth and protecting US national security.

This article provides a brief history of US export controls and a more detailed description of current regulations pertaining to satellites and spacecraft, including rules for hardware, technical data and services. It also addresses the tension between the economic and national security implications of export controls on the US commercial space industry.

Satellite export control reform

For more than 20 years, the regulation of spacecraft and satellites has fluctuated between the ITAR and the EAR based on industry demand and national security concerns. In the early-to-mid 1990s, two satellites built by US manufacturers, Hughes Space and Communications International, Inc. ('Hughes') and Space Systems/Loral ('Loral'), exploded shortly after they were launched aboard Chinese rockets.[5] Although Hughes and Loral obtained export licences to launch the satellites as required at the time, they did not obtain licences for their assistance to Chinese authorities during the investigation of the accidents.[6] The US government's subsequent investigation of the companies' assistance to the Chinese concluded that they released 'potentially sensitive technological information regarding rocketry to China's government in the process.'[7] In response to the national security concerns surrounding these incidents, Congress passed the Strom Thurmond National Defense Authorization Act in 1998, which transferred export control responsibility for all commercial and non-commercial satellites from the EAR to the more restrictive ITAR.[8]

In 2013, the National Defense Authorization Act ('NDAA') returned authority to the US president to determine whether satellites and related items should be controlled by the ITAR or the EAR. New regulations promulgated under the NDAA in 2014 transferred a wide range of items from the United States Munitions List ('USML') under the ITAR to the Commerce Control List ('CCL') under

the EAR, including certain commercial communications satellites and remote sensing satellites, probes and rovers for planetary and interplanetary science and exploration.[9] Only items with various space-related military functions, sophisticated sensors, certain satellite integration and launch services, and manned spacecraft remained subject to the ITAR. A key change in the 2014 satellite export control reform was the elimination of the ITAR 'see-through rule' for satellites.[10] Before this change, the 'see-through rule' provided that if any part or component of a satellite was controlled under the ITAR, the entire satellite was as well.[11]

In 2017, BIS and DDTC published concurrent revisions to the EAR and ITAR to clarify ambiguities and address industry concerns regarding the technical scope of the regulations. The changes included:

1. increasing the aperture thresholds for control of remote sensing satellites and components;
2. eliminating controls based on whether a spacecraft supports human habitation;
3. redefining several controls based on technical capabilities rather than the end use of the spacecraft;
4. removing certain criteria concerning propulsion and altitude control; and
5. adding thresholds for the controls on electric propulsion systems.[12]

This recent initiative was intended to 'boost both national security and the competitiveness of the US industry by streamlining complicated export requirements and removing redundant rules.'[13]

Pending legislation in Congress may have an additional impact on export controls on satellites and spacecraft. In February 2018, Congress introduced the Export Control Reform Act ('ECRA'), a bipartisan effort to replace the Export Administration Act and modernise US export control regulations under the EAR.[14] Although the proposed legislation generally would codify the existing US export control regime, it also would establish new mechanisms designed to preserve US technological advantage in emerging technologies, science, engineering, manufacturing and other industries critical to US national security and foreign policy. As currently drafted, the ECRA would redefine a 'US person' to include 'corporations organized under the laws of the United States if natural US persons own more than 50% of the outstanding capital stock of the entity.' This shift could restrict access to certain satellite technologies by US subsidiaries of foreign companies and subject them to additional licensing requirements. The ECRA also would broaden the scope of the EAR to cover developmental activities not previously regulated and institute a formal interagency process to regularly review and identify key emerging technologies. These changes may lead to the continued evolution of the satellite export control regime, affecting not just the types of hardware and technical data covered, but also the licences required.

US export controls and Space-related products and services: the background

US export controls are designed to prevent the spread of sensitive technologies to foreign actors that could threaten US interests and, at the same time, allow US companies to engage in legitimate commercial activity. The primary regulations of the US export control system are the Export Administration Regulations ('EAR'), administered by BIS, and the International Traffic in Arms Regulations ('ITAR'), administered by DDTC. Both the EAR and the ITAR regulate the export, re-export and transfer of products, software and technology/technical data. An 'export' is (1) an actual shipment or transmission out of the United States; (2) releasing technical data to a foreign person; (3) transferring registration, control or ownership of any aircraft, vessel or satellite to a foreign person; or (4) performing a defence service on behalf of, or for the benefit of, a foreign person.[16] A re-export is the shipment or transmission of exported items from one foreign country to another, and a 'transfer' is the movement of exported items within a foreign country.

BIS regulates the export, re-export and transfer of dual-use goods, software and technology (collectively, items) subject to the EAR. Generally, items subject to the EAR include all US-origin items, any item located in the United States and foreign-made items that incorporate above de minimis levels of controlled US-origin content. The EAR impose licensing requirements based on the destination, end-user, intended end use and classification of the item on the Commerce Control List ('CCL'). The CCL groups items into nine broad categories and five product groups and identifies the licensing requirements for each. An item that falls into a specific category and product group is given an export control classification number ('ECCN'). Items subject to the EAR that are not listed on the CCL or the USML are designated 'EAR99' and generally can be exported without a licence. As discussed in more detail below, satellites, related parts and components, and technical data primarily are regulated in CCL Category 9 'Aerospace and Propulsion'.

The ITAR impose controls on defence articles, including technical data, and the provision of defence services. The US Munitions List ('USML') identifies defence articles and defence services that are subject to the ITAR. The USML is divided into 21 categories, though in general terms, any items specifically designed for military use will fall under ITAR jurisdiction. Certain satellite hardware, technical data and related support equipment are subject to the ITAR under USML categories XV 'Spacecraft and Related Articles' and XII 'Fire Control, Laser, Imaging, and Guidance Equipment.' US persons that manufacture or export defence articles or provide defence services to foreign persons are required to register with DDTC on an annual basis. Both US and foreign persons providing brokering services to support the export of defense articles or defense services also must register with DDTC. In addition, the ITAR impose licensing requirements for the export, re-export, release or transfer of defence articles or defence services.

Current satellite export controls

Satellites present a unique challenge for US export controls. Not only is satellite hardware and technology subject to export controls as it moves on Earth, it also is subject to export controls as it conducts its mission in space. Although BIS and DDTC have made the alterations to the export control regulations described below to address many potential export situations, increasing dependence on satellites for communication and data transfer may necessitate additional updates.

Hardware

Currently, under both the EAR and the ITAR, launching a spacecraft, launch vehicle or payload into space is not considered an export of that item.[15] However, the movement of these items that are subject to US export control jurisdiction on Earth remains regulated by either the EAR or the ITAR, depending on the technical specifications of the item.

Category XV(a) of the USML controls satellites and spacecraft that have certain technical capabilities regardless of their intended use or function. Thus, even purely commercial satellites and spacecraft with the following technical capabilities are subject to the ITAR:

- Are specially designed to mitigate the effects of or for detection of a nuclear detonation;
- Autonomously detect and track moving ground, airborne, missile or space objects other than celestial bodies, in real time using imaging, infrared, radar or laser;
- Conduct signals intelligence or measurement and signatures intelligence;
- Are anti-satellite or anti-spacecraft;
- Have space-to-ground weapons systems;
- Have certain electro-optical remote sensing capabilities or characteristics;
- Have radar remote sensing capabilities or characteristics;
- Provide positioning navigation and timing ('PNT') signals;
- Autonomously perform collision avoidance;
- Are suborbital, incorporate ITAR-controlled propulsion systems, and are specially designed for atmospheric entry or re-entry;
- Are specially designed to provide inspection or surveillance of another spacecraft, or service another spacecraft via grappling or docking;
- Are classified, contain classified software data or were developed using classified information; or
- Are specially designed to be used in a constellation that when operated together form a virtual satellite with the functions above.

Category XV extends to ground systems and training simulators that are specially designed for telemetry, tracking and control of satellites and spacecraft, and certain enumerated spacecraft parts and components.[17] Classified parts, components, attachments and systems that are associated with satellites or spacecraft also are subject to the ITAR.[18]

Certain global positioning systems ('GPS') and global navigation satellite systems ('GNSS') receiving equipment are controlled under Category XII(d) of the USML. Specifically, receiving equipment that is designed for military applications; encryption or decryption; use with USML-covered antenna; or use with rockets, missiles, satellite launch vehicles, drones or unmanned air vehicle systems capable of delivering at least a 500 kg payload to a range of at least 300 km are subject to the ITAR.[19] However, the vast majority of civil and commercial GPS and GNSS equipment does not meet the Category XII(d) criteria and is therefore subject to CCL Category 7 of the EAR and not the ITAR.[20]

Satellites and spacecraft subject to US jurisdiction that are not subject to the ITAR are controlled under CCL Category 9 of the EAR.

Satellites and spacecraft subject to US jurisdiction that are not subject to the ITAR are controlled under CCL Category 9 of the EAR. CCL Category 9 includes unclassified commercial communications satellites, remote sensing satellites, and their parts and components with performance parameters below the ITAR threshold. The CCL imposes licensing requirements and restrictions depending on the specific ECCN for the satellite hardware and technology.

Technical data

USML Category XV(f) controls technical data pertaining directly to ITAR-controlled satellites, ground control and training systems simulators, and specified parts and components. Technical data related to satellites and parts and components that are subject to the EAR remains subject to the ITAR if the technical data is classified.

Under the EAR, technology related to satellites is classified under Product Group E within Category 9 of the CCL. This section of the CCL controls the technology required for the development, production, operation, installation, repair, overhaul or refurbishing of spacecraft and satellites, and related commodities.[21]

Neither the ITAR nor the EAR control the data transmitted to or from a satellite or spacecraft 'when limited to information about the health, operational status, or measurements or function of, or raw sensor output from, the spacecraft, spacecraft payload(s), or its associated subsystems or components.'[22] Examples of such 'housekeeping data' include system configuration; operation status information; payload raw mission or science output, such as images and particle measurements; command responses; and timing information. Moreover, the act of processing such telemetry data or encrypting it does not cause the telemetry data to be subject to export control laws.[23]

Defence services

USML Category XV(f) controls defence services pertaining directly to ITAR-controlled satellites, ground control and training systems simulators, and specified parts and components. Defence services that use classified technical data also are subject to the ITAR. Defence services related to satellites and spacecraft that are subject to the ITAR include the furnishing of assistance or training on the (1) integration of a satellite or spacecraft to a launch vehicle or (2) launch failure analysis of a satellite or spacecraft, regardless of the jurisdiction, ownership, or origin of the satellite or spacecraft, or whether technical data is used.[24]

Challenges going forward

Economic recovery of the US satellite industry

The US satellite industry suffered greatly after the passage of the Strom Thurmond National Defense Authorization Act in 1998. After the legislation was enacted, the United States became the only space-faring country that 'control[led] all commercial satellites and related items,

Links and notes

[1] *Falcon Heavy Test Launch*, SpaceX (Feb. 7, 2018), http://www.spacex.com/news/2018/02/07/falcon-heavy-test-launch.
[2] Loren Grush, *SpaceX just launched two of its space internet satellites – the first of nearly 12,000*, The Verge (Feb. 22, 2018, 11:00 AM), https://www.theverge.com/2018/2/15/17016208/spacex-falcon-9-launch-starlink-microsat-2a-2b-paz-watch-live.
[3] Loren Grush, *The biggest rocket launches and space missions we're looking forward to in 2018*, The Verge (Dec. 29, 2017, 9:00 AM), https://www.theverge.com/2017/12/29/16821862/2018-space-missions-rocket-launches-nasa-space-x-elon-musk.
[4] Bryce Space and Technology, *2017 State of the Satellite Industry Report,* Satellite Indus. Ass'n (Oct. 2017), https://www.sia.org/wp-content/uploads/2017/10/SIA-SSIR-2017-full-2017-10-05-update.pdf.
[5] Eric Schmitt, *A Secret U.S. Device Missing After '96 China Rocket Crash*, The New York Times (June 24, 1998), http://www.nytimes.com/1998/06/24/us/a-secret-us-device-missing-after-96-china-rocket-crash.html.
[6] Kurtis J. Zinger, *An Overreaction That Destroyed an Industry: The Past, Present, and Future and U.S. Satellite Export Controls*, 86 U. Colo. L. Rev. 351, 353-4 (2015).
[7] *Id.*
[8] *Id*. at 354.
[9] Jeffrey Gerrish, *US Government Announces Reforms to Space and Satellite Systems Export Controls*, Skadden (May 13, 2014), https://www.skadden.com/insights/publications/2014/05/us-government-announces-reforms-to-space-and-satel.
[10] Dep't of Com. & Fed. Aviation Admin., U.S. Export Controls for the Commercial Space Industry 4 (Nov. 2017), http://www.space.commerce.gov/wp-content/uploads/2017-export-controls-guidebook.pdf.
[11] *Id*.
[12] Office of Space Com., New Rules Refine Satellite Export Controls (Jan. 10, 2017), http://www.space.commerce.gov/new-rules-refine-satellite-export-controls/.
[13] Daniel Wilson, *Feds Revise Export Controls on Spacecraft*, Law360 (Jan. 9, 2017, 6:26 PM), https://www.law360.com/articles/878835/feds-revise-export-controls-on-spacecraft.
[14] Press Release, Foreign Aff. Committee, Royce Introduces Bipartisan Export Control Reform Bill (Feb. 15, 2018), available at https://foreignaffairs.house.gov/press-release/royce-introduces-bipartisan-export-control-reform-bill/.
[15] 22 C.F.R. § 120.17;15 C.F.R. § 734.18(a)(1).
[16] 22 C.F.R. § 120.17; 15 C.F.R. § 734.13
[17] USML, 22 C.F.R. 121.1(XV)(e).
[18] USML, 22 C.F.R. 121.1(XV)(e)(21).
[19] USML, 22 C.F.R. 121.1(XII)(d)(2).
[20] Office of Space Com., ITAR Controls on GPS/GNSS Receivers Updated (Oct. 12, 2016), http://www.space.commerce.gov/itar-controls-on-gps-gnss-receivers-updated/.
[21] Com. Control List, Aerospace & Propulsion, 15 C.F.R. App. Supp. No. 1 to Part 774 (Dec. 27, 2017).
[22] USML, 22 C.F.R. 121.1(XV)(f), n. 3; CCL, 15 C.F.R. pt. 774, supp. no. 1, product group E note 2; *see also* EAR, 15 C.F.R. § 734(b)(3).
[23] USML, 22 C.F.R. 121.1(XV)(f), n. 3.
[24] USML, 22 C.F.R. 121.1(XV)(f).
[25] Zinger, *supra* note 7 at 378.
[26] *Id*. at 359.
[27] *Id*.
[28] Bryce Space and Technology, *supra* note 4; Zinger, *supra* note 7 at 375.
[29] White House, Nat'l Security Strategy of the U.S. 31 (Dec. 2017), https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf.
[30] Sean Kelly, *The new national security strategy prioritizes space*, The Hill (Jan. 3, 2018, 2:40 PM), http://thehill.com/opinion/national-security/367240-the-new-national-security-strategy-prioritizes-space.
[31] White House, *supra* note 29.

including technology, as munitions items.'[25] As a result of the significant regulatory burden associated with ITAR compliance, the US satellite industry lost approximately $2.35 billion in sales to foreign companies.[26] Seizing upon the licensing difficulties faced by their US counterparts, foreign companies began advertising 'ITAR-free' satellite components and hardware to attract customers interested in avoiding the US regulatory burden.[27]

Since the 2014 satellite export control reform effort, the US space industry, and satellite companies in particular, have recovered much of their lost market share. Today, the US satellite industry accounts for approximately 42% of global satellite industry revenues, a significant increase from its 27% market share in 2000.[28] Nevertheless, the effects of the ITAR satellite export regime remain. European companies continue to market hardware as 'ITAR-free,' partially to entice Chinese buyers that are prohibited from purchasing ITAR items. Although export controls have been loosened for a limited set of US allies, for China and other embargoed nations, nothing has changed. As a result, products made by the US satellite industry continue to present a liability to customers and end-users in certain parts of the world, impeding the growth of the US satellite industry.

National security concerns

Inextricably linked to concerns over the economic viability of the US satellite industry is the need to protect US national security. Not only do satellites provide the US government with vital geospatial, signals, measurements and signature intelligence, but they often incorporate incredibly sensitive dual-use technologies, the protection of which is necessary to maintaining American military and industrial leadership. As export controls are loosened to allow for greater trade efficiencies, it may seem that national security protections are proportionally weakened. However, this is not necessarily the case. Satellites continue to be covered by US export regulations and licensing requirements. Particularly sensitive hardware and technology remain subject to the ITAR, to include classified technology and technical data, and technical data that could be used to increase the military capabilities of foreign countries.

Moreover, the current National Security Strategy of the United States emphasises that economic security and US leadership in space are key components of US national security.[29] 'As space evolves into a more globally competitive industry, the economic vitality of the US space sector will support key national security goals to 'promote American prosperity' and 'advance American influence.'[30] Indeed, the current US National Security Strategy specifically identifies advancing space as a priority domain, promoting space commerce and maintaining the American lead in space exploration as top priorities.[31] However, a key challenge for US export control regulators is striking the appropriate balance between liberalising regulations to support industry expansion and preventing bad actors from acquiring sensitive US satellite and space technology.

Conclusion

Recent technological developments once again have captured the popular imagination and placed the space industry at the forefront of American discourse. Satellites have become ubiquitous as industries ranging from science and agriculture to telecommunications are increasingly reliant on the services they provide. Nevertheless, the booming commercialisation of the space industry must be tempered by considerations of US national security and the protection of key technologies. The US export controls regime mediates the gap between these two often conflicting ambitions through continued advancements in satellite export control reform and reflects the importance of satellites and spacecraft in advancing US interests around the world.

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