

United States Space Law: Historical Evolution and Legislative Framework

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In this article, the evolution of the United States' national legal framework governing space activities is examined, highlighting its development under the influence of technological innovations and market transformations. It should be noted that in 2020 the U.S. National Space Policy formally designated space as a distinct theater of operations and initiated the establishment of the Space Forces, underscoring the expansion of the military dimension. Special attention is devoted to the integration of civil and defense interests, the dual-use nature of space technologies, and the role of commercial remote sensing within non-proliferation regimes. In conclusion, it is worth noting that the contemporary regulatory model is characterized by a combination of public-private partnerships, the unification of normative instruments, and the harmonization of military and civilian objectives in pursuit of technological advantage and responsible international cooperation.

Keywords: space law, international treaties, space launches, remote sensing, ITAR, USML, U.S. Space Force, dual-use technologies.

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Introduction

The United States has traditionally been regarded as the state possessing the most advanced national space legislation in the world.

In accordance with the principal international instruments of space law, the United States has become a party to four of the five key international treaties: the Outer Space Treaty (1967), the Rescue Agreement (1968), the Liability Convention (1972), and the Registration Convention (1976). At the same time, it refrained from acceding to the Moon Agreement (1984), reflecting its ambivalent approach to regulating activities on the Earth's natural satellite.

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It should be emphasized that U.S. space legislation has consistently responded to the practical needs and technological achievements of the nation. As the geopolitical or economic environment evolved, Congress systematically supplemented the legal framework with new statutes and regulatory measures. In particular, provisions governing private space launches, remote sensing, and commercial crewed flights were refined.

U.S. space law milestones

In response to the technical challenges at the dawn of the space era, the United States Congress enacted the Communications Act of 1934 long before the first human ventured into orbit. This statute has since been amended repeatedly to facilitate effective licensing of commercial satellite operations. Specifically, amendments have clarified requirements for coordinating use of the radio-frequency spectrum and for insuring space vehicles.

In light of the growing need for civilian coordination of space research, the National Aeronautics and Space Administration (NASA) was established in 1958. President Dwight D. Eisenhower signed the National Aeronautics and Space Act, which defined NASA's objectives as: expanding knowledge of the universe; developing and improving space systems; evaluating the benefits of space activities; affirming U.S. leadership in space; and sharing results with defense agencies.

With the advent of the private space era, Congress adopted the Commercial Space Launch Act in 1984. This law created a clear licensing regime – overseen by the Federal Aviation Administration – for private launches and re-entries of spacecraft. It also prescribed insurance requirements and third-party liability provisions in the event of incidents.

Also in 1984, the Land Remote-Sensing Commercialization Act was passed to promote the development and operation of Earth-observation systems. Its principal aim was to transfer management of the government-operated Landsat program to the private sector, thereby enabling companies to operate and expand remote-sensing capabilities.

Following practical difficulties in privatizing Landsat, the 1992 Land Remote-Sensing Policy Act repealed its predecessor and delegated authority for licensing and regulating commercial remote-sensing operators to the Department of Commerce. Concurrently, responsibility for developing new components of the satellite system was assigned to private industry (Space Foundation, 2023).

In 2015, the Commercial Space Launch Competitiveness Act was enacted. This statute deferred a portion of regulatory oversight until 2023, extended the period of third-party liability indemnification, and granted private entities property rights over resources obtained in space, including materials extracted from asteroids.

To ensure stability in long-term space policy, Congress passed the NASA Transition Authorization Act in 2017. That legislation emphasizes continuity of NASA's fundamental missions regardless of changes in administration, encourages investment in scientific and technological projects, and includes provisions for medical care of astronauts injured during missions.

Finally, the National Defense Authorization Act for Fiscal Year 2020 established the United States Space Force under the Department of the Air Force. Designated as the sixth branch of the U.S. Armed Forces, the Space Force was assigned a defined mission set, task structure, and chain of command for conducting military operations in the space domain (Space Foundation, 2023).

From state monopoly to hybrid space regulation

Considering the historical dynamics of space activity development, its execution during the first decades of the space age remained entirely within state structures. Only sovereign governments held the requisite technical and financial resources to conduct scientific research and practical exploration of outer space, while private entities were effectively excluded from the process.

On one hand, strategic and political considerations led governments to hesitate in involving third parties in space programs beyond their own military and civil agencies. On the other hand, the immense financial commitments inherent to any space operation deterred potential private investors. Moreover, the legal framework governing non-state actors in the space domain proved to be markedly inadequate and fragmented.

However, during the 1980s and 1990s a significant shift occurred: private operators began to integrate gradually into the space market. This development was driven primarily by states' need to identify alternative funding sources to sustain ambitious space projects amid late 1970s budgetary contractions. Simultaneously, technological innovations and cost reductions spurred private-sector interest in the industry.

In the initial phase of private participation, public-private partnerships emerged as the principal mode of cooperation, notably through long-term agreements between government agencies and commercial firms to execute projects previously undertaken exclusively by state entities. Subsequently, wholly private space enterprises also began to develop, although their number and scale remained relatively limited.

Concurrently, U.S. national space legislation evolved toward the unification and systematization of regulatory instruments. In this context, in 2010 the House of Representatives introduced a bill to consolidate all existing space-related provisions under a single Title 51 "National and Commercial Space Programs" of the United States Code (U.S. Code, 2010), without substantive alterations to the underlying norms.

Thus, the U.S. national legal framework for space activities demonstrates a gradual transformation from exclusively state regulation to a hybrid partnership model with the private sector, founded on the unification and transparency of the legislative regime (Tronchetti, 2013).

Dual-Use dilemma of US space export controls

States generally seek to protect their investments and objects of intellectual property in order to maximize the economic return on allocated resources. At the same time, this objective does not preclude the transfer of technologies among stakeholders, including those classified as sensitive exports. Such transfers give rise to a series of political and strategic challenges, especially when technologies are intended for military applications. In these cases, government agencies implement two complementary control mechanisms:

- Protective measures aimed at preserving the confidentiality of specific knowledge and technological developments;
- Export prohibitions that restrict the transfer of certain technologies or technical data to designated jurisdictions.

Given the complexity of the technological process, it is most appropriately viewed as a system of industrial know-how, formed through the combination of knowledge, skilled human resources, and technical management. This confluence of factors enables the development of new devices and methodologies for addressing specialized tasks. Inventions and pioneering

solutions receive legal protection through patents, licensing agreements, and trademarks, which together comprise the framework of intellectual property rights.

In this context, the principal instrument regulating the export of defense technologies in the United States is the International Traffic in Arms Regulations (hereinafter – ITAR) (22 CFR Chapter I, 2013). ITAR establishes controls over the export, re-export, and import of defense-related articles and services included on the United States Munitions List (hereinafter – USML) (22 CFR Part 121, 2013). Specifically:

- a) All manufacturers, exporters, and brokers in the defense industry must register with the U.S. Department of State;
- b) Any transfer of relevant technologies to foreign persons or entities requires an official license.

Notably, since 1999 all satellites, launch vehicles, and associated components have been placed on the USML (Introduction to U.S., 2008). As a result, commercial communications satellites – despite representing a significant revenue source for the U.S. space industry – became subject to stringent export controls, which substantially complicated the supply of critical parts and complete spacecraft to foreign customers. Between 1999 and 2006, production volumes of launch vehicles, satellite systems, and ground equipment declined significantly under the influence of ITAR restrictions (Foust, 2014).

In response to these challenges, the satellite-communications sector began to advocate actively for the liberalization of ITAR as it applies to commercial spacecraft. In 2011, the House of Representatives approved H.R. 3288, which grants the President authority to remove commercial satellites and their components from the USML under specified conditions (H.R. 3288, 2011). Thus, although ITAR remains a cornerstone of the national security regime, its impact on the competitiveness of the U.S. space industry continues to be subject to critique.

Future legislative initiatives concerning ITAR will determine the optimal balance between national security imperatives and opportunities for American space companies to expand on the global market (Tronchetti, 2013).

It is also well documented that commercial satellites, despite their civilian orientation, increasingly perform functions characteristic of military information systems (Military, 2018). They furnish high-resolution intelligence data that enable the identification of military installations, monitoring of movements, and detection of terrain alterations. This capability, in turn, supports rapid response to emerging threats and enhances the effectiveness of strategic analysis.

Moreover, compliance with international treaties is monitored through the use of commercial satellites. Their orbital observation capabilities facilitate verification of adherence to nuclear test ban agreements and other non-proliferation regimes. Such practice promotes transparency among states and contributes to the preservation of international peace and stability.

Navigation and communication services provided by commercial satellites are critical to military operations. Global positioning systems yield precise coordinates for ground units, enable route planning, and ensure uninterrupted data transmission. Concurrently, satellite communication in remote regions underpins real-time command and control of defense forces.

In recognition of these factors, the United States formally designated space as a distinct warfighting domain in its 2020 National Space Policy (National Space Policy, 2020). This document delineates priorities for the integration of space technologies into overarching defense strategies, the development of orbital infrastructure, support for industry competitiveness, and the reinforcement of international cooperation. Pursuant to a Presidential directive (Text of

Space Policy, 2019), the Space Force was established as a separate branch of the Armed Forces, with defined responsibilities for the control and protection of critical orbital assets.

Accordingly, the central objective of this policy is to preserve the United States' technological and operational advantage in space and to deter adversarial exploitation of the orbital domain in ways that threaten national security. To this end, the Department of Defense invests in advanced threat-detection systems, precision weaponry, and autonomous orbital platforms (Toliver, 2025). Consequently, the U.S. is enhancing its capacity for effective deterrence of potential aggressors across the multidomain battlespace.

Furthermore, the integration of the Space Force into national and multinational operations is designed to ensure continuous support for ground, naval, and air units (Saltzman details, 2025). This multifaceted coordination optimizes operational capabilities and allows military strategies to adapt to the complexities of the modern battlefield. Interoperability with allied forces – achieved through standardized data-exchange protocols and joint exercises – firming resilience against inadvertent incidents in space (Saltzman details, 2025).

Finally, the expansion of international cooperation is an indispensable component of U.S. space strategy. The Artemis Accords, for example, establish a framework for the peaceful exploration of the Moon, Mars, and other celestial bodies, designate “safety zones” around critical sites, and set mechanisms for safeguarding essential infrastructure. The inclusion of Ukraine and other partners in these agreements fosters the harmonization of standards and technologies, thereby enhancing global security and deterring aggressive actions in outer space.

U.S. space warfighting paradigm shift

It is also important to note that on 17 April the United States Space Force published the document “Space Warfighting: A Framework for Planners” (U.S. Space Force, 2025), marking a fundamental shift in the Pentagon's approach to conducting combat operations beyond Earth's atmosphere. The strategy combines defensive and offensive concepts to ensure comprehensive protection of American satellite systems under conflict conditions.

According to the framework's key provisions, space is no longer considered a neutral environment but has become an active theater of military operations supporting virtually all modern defense systems – from missile-launch early-warning networks to high-precision navigation and positioning services. The framework warns that disabling critical satellites would seriously jeopardize the United States' defensive capability.

The primary objective of the document is to prepare Space Force personnel to secure freedom of maneuver in space for the United States and to deny adversaries access to orbital resources. It emphasizes the development of both protective and proactive operational capabilities for deterrence and, if necessary, for countering hostile actions (U.S. Space Force, 2025).

Reflecting the evolution of the Space Force since its establishment in 2019, “Space Warfighting: A Framework for Planners” illustrates the transition from a traditionally passive posture to active combat readiness and offensive operations (U.S. Space Force, 2025). The service's rhetoric has shifted from classic formulations of “defense and deterrence” (Hitchens, 2025) to a public emphasis on the capacity to conduct offensive missions in space.

Key concepts for potential offensive actions in the space domain include:

- orbital strikes to disable adversary satellites providing reconnaissance or navigation;
- disruption of data transmission through cyber operations or electromagnetic interference;

- terrestrial strikes against enemy infrastructure targets, from launch complexes to orbital program command centers (Space Warfighting, 2025).

The framework also underscores the necessity of minimizing the generation of space debris so as not to introduce additional hazards for civilian and allied spacecraft (Erwin, 2025).

In light of escalating geopolitical competition from China and Russia (Hitchens, Theresa, 2025), the publication of this strategy formalizes the U.S. approach to space conflict and embeds space capabilities within the joint force interoperability framework for large-scale conflicts.

Thus, “Space Warfighting: A Framework for Planners” lays the groundwork for the combat use of space by integrating defensive measures with offensive readiness. It signals a new paradigm in which the space domain is treated as a distinct yet integral component of contemporary military strategy.

Conclusion

Legislative transformation of U.S. Space Policy represents a gradual shift from a centralized model of state regulation to a more flexible normative architecture. This new framework is characterized by the integration of public-private partnership mechanisms, openness to technological innovation, and strategic adaptability to changes in the global security environment. Such an approach promotes the emergence of a competitive and institutionally resilient space sector.

Institutional innovations – most notably the establishment of the United States Space Force as a separate branch of the Armed Forces – underscore a reappraisal of space’s role within national defense doctrine. Space is increasingly perceived as a potential theater of military operations, necessitating multidomain integration and the formulation of novel conceptual models for safeguarding national security.

The legal and regulatory regime, including export-control measures governing dual-use technologies (particularly under the International Traffic in Arms Regulations – ITAR), reflects the United States’ determination to preserve strategic advantage amid intensifying international competition. At the same time, it attempts to balance national security imperatives with the developmental needs of private space enterprises.

The expanding contribution of commercial satellite systems to intelligence, navigation, and monitoring functions highlights the deepening interdependence between governmental and non-governmental actors in the field of space security. This interdependence, in turn, underscores the necessity of revisiting regulatory approaches to dual-use technologies.

The issuance of national and strategic documents, such as “Space Warfighting: A Framework for Planners”, cements a new paradigm of space activity grounded in proactive planning, multidomain integration, and the enhancement of defensive capabilities in outer space.

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