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Space as a Warfighting Domain: Issues for Congress

Introduction

The United States is in the midst of making significant changes to policy on protecting national security pertaining to outer space. Military strategists increasingly consider space to be a warfighting domain—a location where offensive and defensive military operations take place—similar to air, land, and sea. During the Cold War, both the U.S. and the Soviet Union approached space as a sanctuary and a non-warfighting domain. However, many states and international entities, including the Department of Defense and the North Atlantic Treaty Organization (NATO), now declare space a warfighting domain.

Many countries rely on the capabilities that civilian and military space systems provide. Many governments have agreed in principle that space should remain a domain used for peaceful purposes and for the benefit of all humankind. Various treaties and agreements are the mechanisms in place to promote the principle of space as a peaceful domain, but these do not prevent nations from having or conducting counterspace operations.

Space Threats

Militaries around the world are preparing for future wars with assets located in space and developing counterspace technologies. According to the 2020 U.S. Defense Space Strategy, China and Russia have weaponized space as a means to reduce U.S. and allied partners' freedom of operation in space. Likewise, that document claims that China has tested and proven counterspace capabilities that threaten U.S. and allied partners' satellites and national security. The militarization of space as an issue dates back to the late 1950s, when the Soviet Union launched Sputnik 1, the first manmade object placed into the Earth's orbit. In 1958, the United States launched its first satellite, Explorer 1. This was the beginning of a new competition and space arms race between two great powers. Through the evolution of technological advancements, the accessibility to reach and use space has increased for a growing number of governments and nonstate actors.

Many U.S. defense experts describe space as the ultimate military high ground, with particular importance to communications, intelligence, and missile-warning surveillance operations. Adversaries such as China and Russia have studied warfighting concepts and focused on space systems as a particular U.S. vulnerability. China and Russia are reported to be pursuing nondestructive and destructive counterspace weapon capabilities, such as jammers, lasers, kinetic-kill or anti-satellite (ASAT) systems, and cyber-attack capabilities. U.S. military officials have stated that U.S. satellites no longer enjoy sanctuary in space, and that U.S. military space superiority can no longer be taken for granted.

China and Russia are developing and testing multiple counterspace technologies that potentially threaten U.S. and allied partners' space assets. Counterspace systems include kinetic physical, nonkinetic physical, electronic, and cyber. *Kinetic physical* includes direct ascent weapons (i.e. missiles) that attempt to strike a satellite and co-orbital which is first placed into orbit (i.e. satellites), then once commanded it maneuvers and strikes its target. *Nonkinetic physical* can include lasers, high-powered microwave weapons, and nuclear weapons detonated in space that create an electromagnetic pulse. *Electronic* targets the means through which space systems transmit and receive data by jamming or spoofing radio frequency (RF) signals. *Cyber* targets the data itself.

Part of the U.S. military response in defending against these capabilities is the National Space Defense Center (NSDC) at Schriever AFB, Colorado. The NSDC is a joint and interagency effort between the Department of Defense, the Intelligence Community, and commercial industry to research U.S. space vulnerabilities and develop tactics and doctrine to deal with potential attacks on space systems.

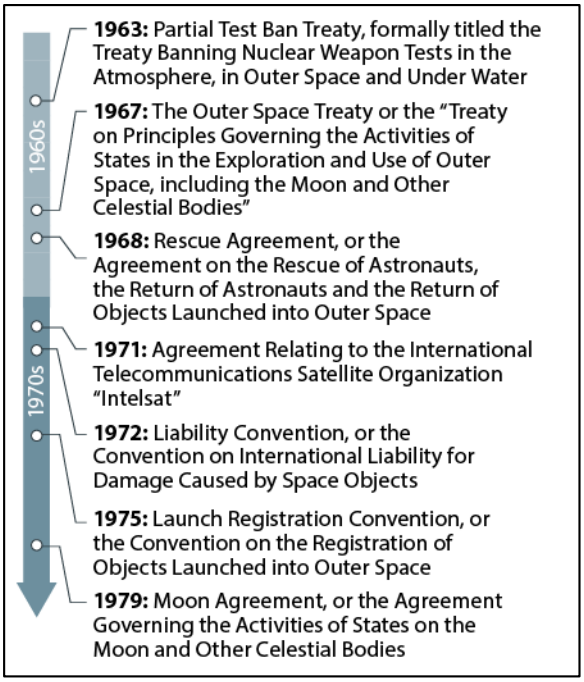
Space Command vs. Space Force

Which military organization commands during a space conflict if a U.S. or allied partner's satellite is attacked? According to the Department of Defense, the U.S. Space Command is responsible for conducting operations in, from, and to space in order to deter conflict and, if necessary, defeat aggression, and defend U.S. vital interests. Conversely, the U.S. Space Force is responsible for organizing, training, and equipping troops (space guardians) during peacetime in order to present them to the combatant commands (i.e., U.S. Space Command) during a time of space conflict or war.

Treaties Aimed at Preventing Conflict in Space

Several agreements were introduced in the 1960s and 1970s that attempted to prevent nations from placing weapons in space. The United Nations (U.N.) General Assembly adopted a treaty in 1967 that formed the basis of international space law. The Outer Space Treaty, or the "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," was originally considered under the Legal Subcommittee in 1966, and agreed upon later that year by the General Assembly. The original signatories were the Russian Federation, the United Kingdom, and the United States of America. The treaty went into force in October 1967, and 110 countries have become parties to it. Other treaties and agreements that focus on other aspects of outer space are depicted in **Figure 1**.

Figure 1. Treaties and Agreements



Source: CRS figure based on data from the United Nations Office for Outer Space Affairs.

The United Nations' Committee on the Peaceful Uses of Outer Space (COPUOS) continues to administer international cooperation in peaceful uses of outer space—61st session of the COPUOS, the committee stated that "the non-militarization of outer space, which should never be used for the placement and/or deployment of weapons of any kind, and, as the province of humankind, should be used strictly for the improvement of living conditions and the pursuit of peace among peoples that inhabit the Earth." However, none of the treaties, including the Outer Space Treaty, ban the placement of weapons, other than weapons of mass destruction, into outer space.

Currently there is no agreement or treaty that bans placing conventional weapons into outer space, but multilateral discussions regarding the peaceful uses of outer space are a recurring theme at the UN Conference on Disarmament in Geneva. For example, in 2008, Russia and China attempted to define a space weapon in their proposed treaty, "Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects," (PPWT) "in order to prevent an arms race in outer space" and "held in accordance with the spirit of the [Outer Space Treaty]." However according to some analysts, the draft treaty lacked language that would prevent the development, testing, or deployment of ground-based ASAT weapons, which China currently has in its counter-space arsenal. Conversely, other observers argue that the PPWT outlines pertinent issues, from the legal protection of satellites to nuclear powered systems in outer space. U.S. officials have argued that the treaty text is insufficient to the challenges, calling it "a diplomatic ploy by the two nations to gain a military advantage." The United States continues to promote establishing international norms of responsible behavior in outer space that can more easily adapt to future technological changes.

Implications for Space Operations

Many observers contend that space is weaponized. From the onset of the space arms race between the United States and Russia in the 1950s, militaries have leveraged satellites for communications, intelligence, and navigation to enable combat operations. Now these observers portray space as increasingly contested and no longer a sanctuary used only for peaceful purposes. Space-faring nations, including Russia, China, Iran, and North Korea, will likely continue to develop, acquire, and test their counterspace ground-based weapons and other technologies that could potentially disrupt and prevent U.S. access and use of outer space. The imminent space threats could have implications that affect not only U.S. security but also that of the world. Congress could examine whether the current international norms will be enough to restrain U.S. adversaries and protect U.S. space assets, including both military and civilian systems in outer space.

Potential Questions for Congress

- What are the potential and new space-related treaties and international agreements the U.S. could consider to ensure that nations use outer space for peaceful purposes only?
- Are the current international norms for outer space enough to protect U.S. military, civil, and commercial space systems?
- What is the current U.S. policy and response if an adversary attacked a U.S. or allied partner's satellite?
- Who is in charge of "policing" outer space?

CRS Products

CRS In Focus IF10337, *Challenges to the United States in Space*, by Stephen M. McCall.

Other Resources

Center for Strategic & International Studies, *Space Threat Assessments 2021*, March, 2021.

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