Simple Scenarios Analysis

Space Weaponization: An Inevitable Future

Diana Hajali

Key Judgments

While space militarization has continued and expanded since the Cold War, space weaponization is now becoming a global concern. Russian president Vladimir Putin, for instance, fears the North Atlantic Treaty Organization's (NATO) potential role in space, especially after NATO declared space its fifth operational domain.[1] Meanwhile, Russia and China have developed anti-satellite weaponry designed to hurt the U.S.'s military communications and GPS networks in a crisis.[2] Though the 1967 Outer Space Treaty bans the stationing and deployment of weapons of mass destruction (WMDs) in or from space, the future of space weaponization remains unclear. Using Simple Scenarios Analysis, six key drivers were identified and used to determine whether the best-case, worst-case, mainline, or wild card scenario is most likely to occur.

- The most likely scenario is the worst-case scenario, in which space weaponization leads to a space arms race or space warfare between one or more nation-states.

- The six key drivers are: international opposition, the building of advanced space weapons by nation-states, the pursuit of national security objectives, available counter-measures to space weapons, a shift in the balance of power, and the advancement of technology.

[1] Ellyatt, Holly. "Putin fears the US and NATO are militarizing space and Russia is right to worry." *CNBC*, 2019.
[2] Kamocsai, Peter. "Why the U.S. Should Be a Leader in Space Weaponization." *Space News*, 2015.

Background

Space weaponization should be distinguished from space militarization. Space militarization describes the reality that space systems are used as a means to achieve military objectives, such as through intelligence gained from reconnaissance, surveillance, and telecommunication satellites. Space weaponization, however, refers to a more aggressive and offensive use of space systems for military purposes, and it includes space-based weapons used to destroy targets either in space or on the ground.[3] The Outer Space Treaty bans the stationing of WMDs in outer space, prohibits military activities on celestial bodies, and details legally binding rules governing the peaceful exploration and use of space. WMDs are commonly understood to include nuclear, chemical, and biological weapons.

The treaty does not, therefore, ban all space weapons. It also allows for amendments proposed by member countries, of which there are currently one hundred and five, including the U.S.[4] However, the U.S. decided to create its own Space Force, which was signed into law on December 20, 2019 and is now the sixth branch of the military. Its precursor, the U.S. Space Command was activated in August 2019 by the Pentagon and continues to serve alongside the Space Force.[5] According to the Department of Defense and the U.S. Space Force itself, the intention of the new military branch is to ensure U.S. superiority in space and to protect against adversarial threats from other nations in space.[6]

Analysis

The future of space weaponization remains unclear, but several scenarios can be outlined in order to better understand possible outcomes. The following scenarios were found using Simple Scenarios Analysis and are based on six different drivers.

Out of the four scenarios – best-case, worst-case, mainline, and wildcard – the most likely scenario is the worst-case scenario, in which space weaponization will lead to a space arms race or space warfare between nation-states.

Best Case Scenario: International Legislation

The best-case scenario is one in which international legislation, such as a treaty, limits or bans space weaponization in totality. Currently, international law only bans the stationing or deployment of WMDs from space. This leaves the stationing and deployment of other weapons open. The vagueness of the Outer Space Treaty has also hindered its own ability to prevent nation-states from maneuvering around the legislation and building other space weapons systems. This scenario would likely include the amendment of the Outer Space Treaty by the

[3] Wakimoto, Takuya. "Weaponization of space will harm the United States more than it gains." *The Space Review*, 2019.
[4] Kimball, Daryl. "The Outer Space Treaty at a Glance." *Arms Control Association*, 2017.
[5] Myers, Meghann. "The Space Force is officially the sixth military branch. Here's what that means." *Air Force Times,* 2019.
[6] Pope, Charles. "Officials provide details on building the Space Force, its structure and operating imperatives." *United States Space Force*, 2020.

United Nations, as well as any supportive nation-states, to ban all space weapons rather than solely WMDs. Another possibility is that an entirely new treaty is created which better defines space exploration and warfare and clearly outlines the limits on space weaponization. This is the best-case scenario because it avoids a potential space arms race or space warfare and protects all current and future non-militarized space assets.

Worst Case Scenario: Space Arms Race

The worst-case scenario entails the start of a space arms race between two or more nation-states. In this scenario, a nation-state uses the ambiguity of the Outer Space Treaty in order to create and station advanced space weapons or ignores international legislation altogether. In the case that other nation-states also have interests and capabilities in space, multiple nation-states may begin rapidly developing and stationing space weapons, leading to a space arms race similar to the arms race during the Cold War. This arms race will include expending economic and military resources to develop new weapons and could potentially lead to space warfare if a nation-state decides to deploy or test out a space weapon. This is the worst-case scenario because it necessitates heavy economic and military expenditures and could lead to space war between two or more nation-states in which the deployment of space weapons has the potential to harm assets and the environment.

Mainline Scenario: Status Quo

The mainline scenario is the extension of the status quo, meaning that nation-states continue to militarize space while exploring space weaponization as allowed by current international legislation. This would allow for continued space militarization in the interest of pursuing national security objectives or exploration interests. Space weaponization has not yet led to a massive and rapid build-up of space weapons or their deployment, but does include nation-states' attempts at designing and testing space weapons as allowed by international law. For instance, both Russia and China are developing weapons capabilities, such as laser weapons and ground-based ant-satellite missiles. Indeed, images of a modified Russian MiG-31, a supersonic near-space interceptor, surfaced in mid-September 2019.[7] This is the mainline scenario because it supports the status quo of increasing space militarization and exploring space weaponization without necessarily leading to a space arms race or war.

Wildcard Scenario: Global Defense

In the wildcard scenario, the appearance of a hostile extra-terrestrial species forces humanity to enhance and utilize space weaponization as a global defense. Rather than a space arms race or warfare between nation-states, this scenario would require that nation-states on Earth join forces in order to fight against a hostile extra-terrestrial species in defense of the globe. In this scenario, another species in our galaxy will appear and want to take control of Earth. International limits and nation-state competitions will be set aside in order to defend Earth using the deployment of space weapons, including WMDs.

[7] Sheetz, Michael and Amanda Macias. "China and Russia are militarizing space with 'energy weapons' and anti-satellite missiles: Pentagon." *CNBC,* 2019.

Figure 1. Simple Scenarios Matrix

Drivers	International Legislation	Space Arms Race	Status Quo	Global Defense
United Nations and majority nation-state opposition	+ +	-	+	- -
Building of advanced space weapons by nation-states	-	+ +	-	.
Pursuit of national security objectives	-	+	+	+ +
Available and potential counter-measures to space weapons	-	+	+	+
A shift in the current balance of power	.	+	-	.
The advancement of technology	.	+	-	+

Context

Space militarization has facilitated the military activities of nation-states since the Cold War, but the actual use of weapons in or from outer space remains controversial.[8] The Outer Space Treaty, signed in 1967, bans the testing and deployment of WMDs from space, but does not ban weapons in general. While there have been proposals to ban space weapons by nation-states and the international community, the U.S. has rejected such proposals. Indeed, any attempt to amend the Outer Space Treaty currently seems unlikely, especially due to the U.S.'s creation of the Space Force, now the sixth branch of the military.[9] A point of concern in weaponizing space includes the risk that increased debris could have on U.S. space assets, such

[8] Peoples, Columba. "Assuming the Inevitable? Overcoming the Inevitability of Outer Space Weaponization and Conflict." *Contemporary Security Policy*, 2008.

[9] Johnson-Freese, Joan. "The Outer Space Treaty and the weaponization of space." *Bulletin of the Atomic Scientists*, 2019.

as satellites.[10] Others, however, believe that a space arms race is inevitable and that the U.S. should lead the charge in space weaponization. Proponents of this argue that space weapons do not have to be deployed in space, but can attack targets on Earth. They also point out that other nations, such as Russia and China, have already tested anti-satellite weaponry and are building systems to neutralize space weapons.[11]

Figure 2. Scenario Indicators

International Legislation	Space Arms Race	Status Quo	Global Defense
• United Nations (UN) convenes a conference on space weaponization legislation • Many nation-states support an international treaty to limit or ban space weapons • The Outer Space Treaty is revisited for amendments banning space weapons • A new treaty to ban or limit space weapons is proposed by the UN • The U.S., China, and Russia support limiting or banning space weapons	• China or Russia develop a new and advanced space weapon • A nation-state tests or deploys a new space weapon • Countries with space capabilities begin spending more money on space defense • The UN does not oppose the testing or deployment of space weapons by nation-states • Nation-states create military branches specifically dedicated to space defense •	• The U.S., China and Russia continue to develop space systems • China and Russia continue to build defenses in space, including anti-satellite missiles • Nation-states find ways to bypass the vagueness of the Outer Space Treaty to create but not deploy new weapons • Space militarization continues to be focused on reaching ground objectives rather than objectives in space	• The U.S., China, and Russia work together rather than against each other • Technology advances to the point where we learn more about and are closer to the rest of the galaxy • Nation-states on earth do something in space that attracts the attention of another species

[10] Wakimoto, Takuya. "Weaponization of space will harm the United States more than it gains." *The Space Review*, 2019.

[11] Kamocsai, Peter. "Why the U.S. Should Be a Leader in Space Weaponization." *Space News*, 2015.

Conclusion

As the current balance of power shifts and new technologies continue to be developed, it is likely that space weaponization will increase and could potentially lead to a space arms race in the future. Using a Simple Scenarios Analysis, four scenarios were generated and tested for likelihood by means of six key drivers. Out of the four scenarios, the worst-case scenario, in which space weaponization leads to a space arms race or warfare, is the most likely. It is important that policymakers prepare for this possibility and use space weaponization as an opportunity to bolster national security and defense while exploring capabilities in space.