

TERRESTRIAL RESPONSES TO SPACE AGGRESSION

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Deterring aggression in the space domain by targeting space-based assets or space-related ground assets may be ineffective or have adverse consequences, such as the increase of space debris. The United States should instead consider other terrestrial targets, but the main challenge is identifying such retaliatory targets outside of space. Without an obvious relationship between space and the target, retaliation would send the wrong message and could be escalatory. One way to solve this problem is for the United States to create a symbolic relationship between space aggression and terrestrial targets. This article explores how a shift in terms and shared perceptions concerning space assets may help in deterring adversarial actions and what challenges such a shift might produce. Rather than offer specific recommendations, this article highlights the importance of symbolism in deterrence.

In June 1993, the United States responded to a foiled Iraqi assassination attempt against former President George H. W. Bush with missile strikes against the Iraqi Intelligence Service headquarters in downtown Baghdad. Evidence pointed to a group of individuals allegedly hired by the Iraqi Intelligence Directorate, or Mukhabarat, in the plot to kill Bush. When asked why the Mukhabarat building was chosen as the target, Chairman of the Joint Chiefs of Staff Colin Powell explained it was the “closest thing to the provocation” and the “nexus to the provocation.”¹ He did not explain what linked the building to the provocation, but the target was not selected to accomplish the typical military goal of reducing the enemy’s strength or capabilities. Although the target was the home of the agency that carried out the operation, the missile strike probably did little to degrade Iraq’s capacity for future operations.

Instead, the relationship between the provocation and the retaliation is best described as symbolic. The United States decided, in the words of theorist Thomas Schelling, “to respond in the same language, to make the punishment fit the character

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1. Michael Knights, *Cradle of Conflict: Iraq and the Birth of the Modern U.S. Military* (Annapolis, MD: US Naval Institute Press, 2005), 143.

of the crime, to impose a coherent pattern on relations.² There is no hard-and-fast rule about what constitutes responding in the same language, but it was obvious the target was connected to the assassination attempt.³ Other targets could have imposed the same level of punishment on the Iraqi government, but they would not have seemed as appropriate or have held the same meaning.⁴

The same instinct for retaliation to be directed at the nexus to the provocation is apparent in discussions about responding to attacks against satellites. Studies on space defense usually begin by mentioning retaliation in the space domain, only to reject this option later.⁵ As an alternative, some have proposed striking the enemy's space-supporting ground stations.⁶ In both cases, the proposed target is either in space or has some relationship to space. This is not a carefully reasoned thing, but the intuition is not wrong. Any identified target probably does require some relationship to the initial attack to be considered appropriate for retaliation.⁷

The default to either space-based or space-related targets is problematic for several reasons. The main concern is that enemies are likely to attach more value to destroying American satellites than preserving their own. Thus the threat to deny an enemy the use of their satellites may not be enough to deter. This leaves strategists at an impasse. There does not seem to be a response to space aggression that not only targets the nexus to the provocation but also delivers sufficient pain to deter attacks. The United States may not want to respond in space for other reasons: to avoid normalizing attacks in space, creating fields of orbiting debris that endanger other satellites, or being misinterpreted by states with poor space surveillance capabilities.

One solution for deterrence in space is the creation of a symbolic relationship between space aggression and a specific retaliatory action. In the absence of an obvious response that is the nexus to the provocation, the United States has to define the nexus for other nations. This requires convincing other countries that there is a relationship between satellites and a terrestrial target, or between a space action and a terrestrial action, that was not previously considered space-related. The symbolic relationship could be based on any number of factors, as long as it is widely understood and accepted.

Symbolism is an important consideration in retaliation. Although political and military leaders may not use the language of symbolism, they are using symbolic logic

2. Thomas C. Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 2020), 149.

3. Knights, *Cradle of Conflict*, 141–43.

4. Schelling, *Arms and Influence*, 145.

5. Roger G. Harrison, Deron R. Jackson, and Collins G. Shackelford, "Space Deterrence: The Delicate Balance of Risk," *Space and Defense* 3, no. 1 (Summer 2009), 22–25; James P. Finch and Shawn Steene, "Finding Space in Deterrence," *Strategic Studies Quarterly* 5, no. 4 (2011): 14; and Forrest E. Morgan, *Deterrence and First-Strike Stability in Space* (Santa Monica, CA: RAND Corporation, 2010), 28.

6. Todd Harrison et al., *Escalation & Deterrence in the Second Space Age*, Center for Strategic and International Studies (CSIS) Aerospace Security Project (Lanham, MD: Rowman & Littlefield Publishing, October 2017), 31.

7. See Vincent Manzo, "Deterrence and Escalation in Cross-Domain Operations: Where Do Space and Cyberspace Fit?," *INSS Strategic Forum* 272 (December 2011).

whenever they select a target because it will “send a message.” Acknowledging this and incorporating it into strategic thinking can help strategists develop creative solutions for deterrence. New symbolic associations can be identified or even constructed or changed intentionally. This article shows how using such a framework can generate solutions for space security.

Symbolism and Retaliation

Governments frequently communicate with actions rather than words. President Joseph Biden did not need to travel to Ukraine in February 2023 to talk with President Volodymyr Zelensky, but his visit to an active war zone symbolized America’s support.⁸ Without the need to explain its meaning, his presence in Ukraine conveyed a message. Military action can also be used to communicate symbolic messages. The United States has repeatedly flown nuclear-capable bombers on patrols in response to North Korean nuclear and missile tests.⁹ These flights rarely demonstrate capabilities that are not already known, nor do they incur high costs or carry a serious risk of war. They simply resemble actions that could be taken in war and are best understood as symbolic responses to nuclear threats.

Indeed, it is common practice to base military strategy and national security policy on something as ambiguous as symbolism. Military planners might calculate their operations with precision to achieve specific military objectives, but national leaders make decisions based on much more intuitive considerations.¹⁰ They want their military action to send a message to the enemy, knowing that verbal explanation may not be possible and that the action will speak for itself regardless of what is said.

What makes an action symbolic? A symbol typically refers to an object or action that represents some other object, action, or abstract idea, or some class of these things. By communicating through symbolism, the sender can embed a message in their action, enabling the receiver to make a mental association between the action and what it represents. This mental association could be based on any number of sources—appearance, functionality, precedent, or some other abstraction or flight of imagination. What matters is that the association between the action and meaning is perceived by the receiver and understood as a message from the sender.

Symbolism has typically been an important element of retaliation. One reason is that the purpose of the military action has to be communicated. States want their adversaries to know that the action is meant as punishment for a specific provocation. They also want adversaries to know that the action is limited, and that it is conditional on the adversary’s behavior—it will stop if the provocations also stop. Sending that message is necessary to deter future transgressions without escalating into a broader

8. Peter Baker and Michael D. Shear, “Long Risky Night for Biden on Way to a Besieged Kyiv,” *New York Times*, February 21, 2023, A1.

9. For example, see Choe Sang-Hun, “In Show of Alliance, American Forces Fly B-52 Bomber over South Korea,” *New York Times*, January 11, 2016, A4.

10. Barry O’Neill, *Honor, Symbols and War* (Ann Arbor: University of Michigan Press, 1999).

conflict. If an adversary instead views the military action as unrelated, gratuitous, or opportunistic, it may not deter future provocations, and the opponent may feel compelled to counter-retaliate or take further military actions in self-defense.

Methods of Retaliation

There are many ways a military action in response to a provocation can symbolically communicate a state's intent. In addition to a response in kind, the target, the timing, the weapon used, the duration and intensity of attack, or the location can all send the desired message. In these ways, the military action may call to mind the act it is punishing and easily be recognized as retaliatory.

The most obvious way to send the message is for the response to be, in as many ways as possible, identical to the initial provocation. After North Korea launched eight missiles into the ocean east of the Korean peninsula last year, South Korea and the United States responded by launching the same number into the same waters. South Korea also conducted a "tit-for-tat" response to North Korea flying drones over the border between the two countries with cross-border drone flights of its own.¹¹ The resemblance between violation and response made clear that the response was chosen to punish the initial violation, and that it was intentionally chosen rather than coincidence.

If an identical response is not available, the choice of target can determine the message. In August 1964, the United States responded to reported attacks by North Vietnamese torpedo boats in the Gulf of Tonkin against two US Seventh Fleet destroyers with airstrikes against North Vietnamese naval vessels and facilities along the coast, though it must be noted that the second alleged attack against the destroyers almost certainly did not occur.¹²

There were other targets that could have imposed the same punishment, but they would not have communicated the same purpose. Though the method of strike differed, the target was sufficiently related to the original attacks to make its purpose clear. Later revelations suggest that President Lyndon B. Johnson was less interested in sending a message to North Vietnam than in putting on a performance for his domestic audience, but the response still contained the elements that created the appearance of a typical retaliation. Notably, the response was disproportionate in several ways—such as the number of casualties and targets destroyed.¹³ Its appropriateness appeared to come from the relationship between the original attack and the targets struck.

Targets are frequently related to the provocation, as in the US airstrikes on terrorist training camps in Libya in 1986 after a Libya-sponsored terrorist attack in West Berlin, or US airstrikes against Iraq's nuclear facilities in 1993 after weapons inspectors

11. William Gallo, "South Korea Embraces 'Tit-for-Tat' Approach to North's Provocations," *Voice of America*, January 6, 2023, <https://www.voanews.com/>.

12. See Edwin E. Moise, *Tonkin Gulf and the Escalation of the Vietnam War* (Chapel Hill: University of North Carolina Press, 1996).

13. Moise, 221.

were denied access.¹⁴ The airstrikes targeted the Iraqi Intelligence Directorate because that particular agency was responsible for the initial provocation. Other features of a retaliation such as the choice of weapon or its location can also send the appropriate message. It is even possible to send a message of retaliation if none of these are related to the attack. In Operation Desert Strike, the United States responded to a 1996 Iraqi attack against Kurdish forces with air strikes in another part of the country. The Kurdish areas were physically inaccessible because Allies refused to allow the United States to use their military bases, so attacks were concentrated against air defenses in the south.

US Army Major General Kurt Anderson, the commander of the operation, emphasized that a timely response was the most important part of that operation, presumably because it highlighted the connection between act and response: “Weapons effects were less important than the political goal of responding in a timely fashion.”¹⁵ As the previous examples also show, timing is usually an important part of retaliation. It surely helped that the United States had already established a pattern of using limited air strikes as punishment. It is also worth noting that the French government objected to the attacks because the targets were unrelated to the provocation, suggesting that the United States was pushing the limits of what was considered appropriate.¹⁶

There are, of course, many other considerations when designing a retaliation, and symbolism is not the only reason a response may resemble the initial provocation or include striking targets associated with it. Self-defense often requires military action against the source of the provocation. Military advisers may recommend responses within their areas of responsibility. Proportionality is easiest to achieve when the response is identical. Nevertheless, as the above examples show, symbolism often guides decision-making even when these are not considerations.

Responses to Space Aggression

China’s and Russia’s efforts to develop antisatellite weapons (ASATs) have alarmed American officials and forced them to think about how to respond to ASAT attacks.¹⁷ Options for defending space systems can include maneuvering or hardening satellites, intercepting or destroying physical threats, or relying on redundancy and reconstitution to ensure continued operations.¹⁸ Yet defending satellites is difficult. Satellites are fragile, visible, predictable, and limited in power and fuel. There are many potential

14. Judy G. Endicott, “Raid on Libya: Operation Eldorado Canyon,” in *Short of War: Major USAF Contingency Operations 1947–1997*, ed. A. Timothy Warnock (Maxwell AFB, AL: Air University Press, 2000), 149; and Knights, *Cradle of Conflict*, 138, 143.

15. Knights, 163.

16. Frederic Bozo, *A History of the Iraq Crisis: France, the United States, and Iraq, 1991–2003* (New York: Columbia University Press, 2006), 42.

17. Department of Defense (DoD), *Defense Space Strategy Summary* (Washington, DC: DoD, June 2020), 1–3.

18. Todd Harrison, Kaitlyn Johnson, and Makena Young, *Defense against the Dark Arts in Space*, CSIS (Lanham, MD: Rowman & Littlefield Publishing, February 2021).

ways to disrupt their operations or their links to the ground, including missiles and other projectiles, lasers and microwaves, cyberattacks, signal jamming, and even grappling or ramming by other satellites.¹⁹

The vulnerability of satellites is why some have turned to the threat of retaliation to deter attacks. Retaliation could be nonmilitary and could include economic sanctions or the revocation of diplomatic privileges. Retaliation could also come in the form of military attacks meant to disrupt or destroy enemy targets. Perhaps the most important part of such a strategy is deciding what the response would be, or at least what response should be threatened. While the obvious response is retaliation in space, the general consensus among space experts is that this may be both ineffective and needlessly destructive.²⁰

The United States, more than any other country, relies on satellites, so enemies may be willing to sacrifice their satellites to degrade or destroy American systems.²¹ Further, retaliation in space could add to the debris problem and could be escalatory if an adversary does not have the capabilities to distinguish between a limited and an unlimited attack. It may also normalize attacks in space.

Studies of space deterrence usually conclude the solution is a terrestrial or “cross-domain” retaliation.²² Yet this solution usually lacks specifics on the methods and nature of a response. A recent RAND report typifies this issue: it advocates for “establishing the credibility of [cross-domain] threats” but provides no instruction how to do so.²³ Even the vague wording of official US policy to respond “at a time, place, manner, and domain of our choosing” suggests the government may not have decided what a response would be.²⁴ Of course many studies recognize terrestrial responses also face significant challenges.²⁵ They may be perceived as disproportionate and escalatory, particularly if they cause casualties.

Apart from a few exceptions discussed later, the only specific suggestion in the literature is that terrestrial targets should be space-supporting or space-related ground

19. National Air and Space Intelligence Center (NASIC), *Competing in Space* (Wright Patterson AFB, OH: NASIC Public Affairs, December 2018).

20. Harrison et al., *Escalation*.

21. Forrest E. Morgan, *Deterrence and First-Strike Stability in Space* (Santa Monica, CA: RAND Corporation, 2010), 26–27.

22. Harrison et al., *Escalation*.

23. Krista Langeland and Derek Grossman, *Tailoring Deterrence for China in Space* (Santa Monica, CA: RAND Corporation, 2021), 16.

24. Donald J. Trump, *National Security Strategy of the United States of America* (Washington, DC: White House, December 2017), 31, <https://trumpwhitehouse.archives.gov/>; and Donald J. Trump, *National Space Policy of the United States of America* (Washington, DC: White House, December 9, 2020), 4, <https://trumpwhitehouse.archives.gov/>.

25. Manzo, “Deterrence”; and Forrest Morgan, “Deterring Chinese Attacks,” in *Cross-Domain Deterrence in US-China Strategy*, ed. James Scouras, Edward Smyth, and Thomas Mahnken (Laurel, MD: Johns Hopkins Applied Physics Lab, 2014), 41, <https://apps.dtic.mil/>.

stations or terminals.²⁶ There are military reasons why these targets might be selected to defend American satellites or disable those of the enemy.

Yet there is also clearly a symbolic reason why these kinds of targets could be selected. If the target for retaliation is space-related, the adversary would hopefully understand the attack as a response to a space-based provocation, which would make escalation less likely. While scholars do not explain target selection in these terms, they seem to recognize space-related retaliations are more appropriate and nonescalatory than nonspace-related ones. Without explicitly identifying the issue of symbolism, they are being constrained by it.

The problem is that for deterrence purposes, destroying ground stations or terminals suffers from the same challenge as retaliating in space: threatening to destroy space-related targets may not deter attacks if the enemy does not attach enough value to its space systems. While terrestrial attacks do not create space debris—except insofar as a satellite that the enemy has lost control of is debris—they do involve striking sovereign territory or causing casualties. Striking territory or causing casualties would likely be taken as crossing an important threshold and escalating the conflict. Nonlethal sabotage with cyberattacks or special operations could solve that problem but may be unavailable or not timely enough to send the right message.

Despite these shortcomings, the intuition to look to space-supporting ground stations is understandable. In fact, this is probably the best terrestrial response right now, as it is the most obvious solution. Enemies will perceive those targets were intentionally chosen as a direct response to the provocation.

This article identifies only two other possibilities in the literature: Vincent Manzo's thought experiment about striking air defenses, and King Mallory's suggestion for striking nonspace intelligence, surveillance, and reconnaissance, and command, control, and communications. Their justifications for these targets are addressed later, but the very fact these researchers have to provide detailed explanations why these targets are appropriate suggests that they are not obvious or intuitive choices and may not be understood by an enemy. Manzo acknowledges the dilemma, and in fact uses his example to illuminate it.²⁷

Symbolic communication is often a search for the simple and intuitive, upon which shared meanings can be easily established. Space-related responses to space attacks make sense symbolically and are probably the least escalatory response; however, they are problematic for other reasons. The question, then, is what symbolically appropriate response would also achieve the goal of deterrence?

Why Words Are Not Enough

One might think presidential explanation could successfully convey the retaliatory purpose of an attack. The United States could strike an opponent's naval base and ex-

26. Harrison et al., *Escalation*, 31, 43–44; Morgan, 41; and Jim Cooper, "Updating Space Doctrine: How to Avoid World War III," *War on the Rocks*, July 23, 2021, <https://warontherocks.com/>.

27. Manzo, "Deterrence," 4–5; and King Mallory, *New Challenges in Cross-Domain Deterrence* (Santa Monica, CA: RAND Corporation, 2018), 10–11.

plain that it was a retaliation for an attack in space. The government could try to avoid escalation by including a message outright, as Johnson did in announcing “We still seek no wider war” following the US retaliation to the Gulf of Tonkin incident. Yet it is worth remembering that the American reprisal in that operation was not just against any target—it was against “gunboats and certain supporting facilities . . . which have been used in these hostile operations.”²⁸

The action itself has to carry the intended message. That is because the action will carry some message no matter what is said. An example of this phenomenon comes from space itself. In February 2008, just over a year after China tested an ASAT on one of its defunct satellites, the United States similarly shot down one of its own satellites. The American government claimed that Operation Burnt Frost was not a response to China’s test but was a safety measure against an out-of-control satellite.²⁹

Yet this explanation drew a great deal of skepticism from Russia, China, and space security experts who interpreted it as a response to China’s ASAT test.³⁰ Regardless of the official explanation, the nature and timing of the military operation sent a different message. The action spoke louder than the words.

Operation Burnt Frost shows that the symbolic content of the action will outweigh a verbal explanation. The United States may have been counting on it to send a message to China. In this case, the appearance of retaliation eclipsed the claims that the operation was unrelated. Conversely, the appearance that cross-domain attacks are unrelated may outweigh verbal claims that they are retaliatory. That is why a terrestrial response to space aggression requires some symbolic relation to the aggression itself.

A retaliatory strike against, say, a naval base or a railroad bridge in response to a satellite attack would not be viewed as an appropriate or even explicable reaction. Instead, it would likely be viewed as opportunistic, meant to prepare for further military action, achieve some other unrelated tactical objective, or gratuitously harm the opponent. Any attempt to explain it would seem post hoc and would be dismissed as disingenuous.

Explaining a retaliation after the fact is insufficient. Instead, the response has to carry a message of retaliation without the need for explanation. It has to be obvious that it was chosen to convey the message. That is why many authors default to space-based or space-related targets. Yet, since space-based or space-related targets are insufficient, the default choice does not work. The only option left is to imbue some other target with the same symbolic meaning. Once that is done, explanations will not be necessary.

28. Ezra Y. Siff, *Why the Senate Slept: The Gulf of Tonkin Resolution and the Beginning of America's Vietnam War* (Westport, CT: Praeger Publishers, 1999), 113–14.

29. Nicholas L. Johnson, “Operation Burnt Frost: A View from the Inside,” *Space Policy* 56 (May 2021); and James Oberg, “Assessing the Hazards of Space Hydrazine, and the Media Reportage of It,” *Space Review*, August 25, 2008, <https://www.thespacereview.com/>.

30. Noah Shachtman, “Experts Scoff at Sat Shoot-Down Rationale,” *Wired*, February 15, 2008, <https://www.wired.com/>; and Alexis A. Blanc et al., *Chinese and Russian Perceptions of and Responses to U.S. Military Activities in the Space Domain* (Santa Monica, CA: RAND Corporation, 2022), 30–31, <https://doi.org/>.

As noted earlier, attacking a space-supporting ground station can send the right message even though the target is not in space. This suggests that convincing the adversary some other terrestrial target is space- or satellite-related—or part of some category of objects that includes satellites—could make it possible to send the same message. Different from simply communicating the relationship verbally, this requires creating the mental association in the mind of the adversary so that the action makes sense without an accompanying verbal explanation.

Symbolism and Shared Perception

Symbolism relies on shared perception. Symbolism is about the associations made collectively as a society, not just the associations an individual makes in their own mind. The need for shared perception is why symbolic objects are often similar in appearance to the thing they represent. It is also why symbolic actions frequently mimic widespread cultural practices, as when two national leaders shake hands to represent friendship between their countries. All actors are aware of the relationship between the symbol and what it represents. It is only through this shared perception—not just the knowledge of an association, but the knowledge that others make the association, that others know you make the association, and so on—that the message is understood to be intentional.

This is why diplomacy often invokes explanations that “the United States would view” an action in some manner, or that “the United States makes no distinction” between different aggressive acts. In the Cuban Missile Crisis, for instance, the Kennedy administration declared that it would consider any attack “against any nation in the Western Hemisphere as an attack by the Soviet Union on the United States.”³¹ The government did not simply make a threat, but communicated how it perceived or categorized certain actions.³² The goal is for the adversary to understand this perception—the meaning an attack would convey—and for the United States to know that it understands it.

Shared perceptions can be shaped through explanation. But a single declaration may not be enough to create that new shared perception. New perceptions have to be socialized, an issue addressed later in the article. Moreover, not just any explanation will do. If explanations are unreasonable or appear ad hoc, one side will not accept that the other perceives or categorizes an action in the way they claim, and a shared perception will not be formed.

The Cuban Missile Crisis example suggests the starting point for credible cross-domain deterrence should be identifying options for the United States to declare it “makes no distinction” or sees a relationship between a space-based and terrestrial attack. Then it can adopt strategies for creating that new perception. The goal is to

31. James Hershberg, “The Cuban Missile Crisis,” in *The Cambridge History of the Cold War*, ed. Melvyn P. Leffer and Odd Arne Westad (Cambridge, UK: Cambridge University Press, 2010), 75.

32. Asma Khalid, “How Biden Is Trying to Clean Up His Comments about Russia and Ukraine,” NPR, January 20, 2022, <https://www.npr.org/>.

identify a simple and intuitive category that could include space systems and other terrestrial targets, one that would form the basis of reasonable shared understanding. If it is too complicated or far-fetched, it will be dismissed as opportunistic. It would have to be defensible and justifiable, even compelling. It would be most effective if it were based on principles that were already widely accepted, which would lower the barrier to shared understanding and acceptance.

If space-supporting ground sites are seen as appropriate targets, even though these targets are technically cross-domain, other cross-domain attacks might be acceptable if the targets are functionally related to space. If the United States could successfully argue it makes no distinction between satellites and some other type of asset based on their function, then perhaps it could recategorize that asset as a legitimate target for retaliation.

For example, debate is underway whether the US government should designate space systems as critical national infrastructure, alongside nuclear reactors, the electrical grid, and other key civilian assets.³³ Indeed, space assets have become essential parts of the national economy, something US Space Force and US Space Command leaders have repeatedly emphasized. This redesignation could create a recognized association between satellites and other civilian infrastructure, such that retaliation against other kinds of infrastructure would make sense. If satellites are widely viewed as civilian or homeland targets, then civilian or homeland responses might seem appropriate.

Yet attacking civilian infrastructure is generally frowned upon—and for good reason—and it violates international law. Such an obscure redesignation by the government would not convince many people anyway without a concerted effort to publicize the new categorization.

Mallory and Manzo have both made suggestions based on military function. Mallory suggests directly targeting terrestrial communication and intelligence, surveillance, and reconnaissance (ISR), since these are satellite functions. Manzo suggests targeting air defenses because air-based ISR would have to replace space-based ISR, though he acknowledges that the logic may not be understood by an adversary. These attacks may be understood by some in the military, but they may be too obscure for a wider audience. They could, however, be a starting place if the United States were to intentionally educate the world on these categories.

Failing that, the United States could invent new categories. The term weapons of mass destruction, for example, has created a widely recognized association between nuclear, chemical, and biological weapons despite the differences in their physical attributes, military uses, and potential for so-called mass destruction. This term enabled the Bush administration to conflate the threats from Iraq's chemical and nuclear weapons programs when justifying the Iraq War. The association may have also made possible the Ameri-

33. Frank J. Cilluffo and Mark Montgomery, "Time to Designate Space Systems as Critical Infrastructure," *SpaceNews*, April 14, 2023.

can threat of “the strongest possible response”—widely viewed as a reference to nuclear weapons—if Iraq used chemical or biological weapons in the Gulf War.³⁴

Perhaps the United States could begin to socialize new terms such as “critical military infrastructure” or “war-supporting digital systems” when describing satellites. These phrases can encompass the military functions Mallory and Manzo discuss that are shared between satellites and terrestrial targets. Adversaries may then understand retaliation against those other military targets as logical responses to space aggression. This would have the added benefit of not crossing the threshold to civilian targets. Responses would also be more justifiable in international law if they served a self-defense purpose.

Another possibility suggested by the example of US airstrikes on the Iraqi Intelligence Directorate is to target assets controlled by the government agency or private entity that operates the satellite. That could be particularly effective if that entity has assets other than space systems. Surely, as the space domain develops and its contours become more well-known in the public consciousness, other possibilities not identified here will present themselves.

Constructing Symbols in International Relations

Creating new symbolic meanings is difficult, and there is no guarantee that the approach suggested here would work. Introducing a new association, or changing the meaning of an object or action, requires establishing a new collective understanding. It is almost like redefining the meaning of a word. As discussed above, all relevant actors must understand the new definition—and recognize that others do, too—for it to be used for communicative purposes. Relevant actors may even have an incentive to pretend not to understand or to offer a competing conception if they do not want to accept a redefined category or symbolic understanding.

Precedent

If the United States decides to redefine or recategorize satellites or space systems, how can it ensure the definition becomes universal? Establishing precedent over time is one method. For example, through repeated use, the United States has made it clear it views sanctions and airstrikes as its default methods for punishment against a range of transgressions.³⁵ Adversaries and observers can understand the United States’ intent when these tools are used.

Though the targets usually have a relationship to the transgression, the United States could try to establish a default set of targets that it attacks after space aggression, or any provocation for that matter. In that way, an adversary would understand the

34. Micah Sifry and Christopher Cerf, *The Gulf War Reader: History, Documents, Opinions* (New York: Random House, 1991), 178–79.

35. Daniel Byman and Matthew Waxman, *The Dynamics of Coercion: American Foreign Policy and the Limits of Military Might* (Cambridge, UK: Cambridge University Press, 2002), 88, 107.

retaliation and the message it sends, even if the target is not directly related to an attack against satellites.

Negotiated Agreement

Negotiated agreements are another way. States can codify shared definitions and principles. Perhaps satellites could be legally categorized as a specific type of protected asset along with other similar assets. Lawyers frequently create new categories or distinguish between different types of assets to apply different legal standards. Reprisal is not usually allowed by international law, but recategorizing satellites could also redefine what kind of responses are recognized as tit-for-tat or in-kind.

Yet neither of these avenues—precedent or negotiated agreements—are very realistic. The former would be escalatory and the latter would be a nonstarter.

Information Campaign

Instead, redefinition requires something like an information campaign—an intentional, long-term, public effort to convince other countries that the United States views space aggression as falling into a certain category of attack. It would not be the usual information campaign. The goal of the campaign would not simply be to convey a message but to shape shared perceptions and collective understandings about the nature of satellites. The campaign would also require more than just messages; it would include more extensive efforts at socializing new definitions. Those efforts themselves may be symbolic or ritualistic.

Repeated declarations would, of course, be part of this process. Domestic legal redefinitions could also be involved, as well as proposals at the United Nations or within treaties, though these would be insufficient on their own. Various diplomatic rituals as well as military exercises could be used to make the recategorization official. Many diplomatic activities are meant to change public perceptions, including, for example, holding defense agreement-signing ceremonies to convince observers that aggression against one is aggression against all. Such rituals could be developed for space.

Meanings are not infinitely malleable and there is no guarantee that new categories will take hold. Space is physically, scientifically, legally, and semantically distinct from other domains, and that distinction has been constructed since before the start of the Space Age. An opponent would have every incentive to reject American attempts to reframe satellites as being part of some terrestrial infrastructure. They would almost certainly dismiss any attempt at such a redefinition as opportunistic, illogical, or dangerous. The distinction between space and Earth may have even served us well: The notion of space as a sanctuary from military conflict may have helped keep the domain peaceful all these years.

Moreover, certain thresholds will likely retain their resonance regardless of efforts to remove them or define new associations that cross them. Probably the most important threshold—and the main distinction between space attack and terrestrial attack—are fatalities. Attacks against satellites do not directly kill people, whereas terrestrial attacks often do. It will be very difficult to convince people that crossing the

line into lethal force is justified by an attack on an unmanned vehicle in space. Military space professionals are fond of reminding audiences that “satellites don’t have mothers.”³⁶ The problem of lethal force has led space strategists to focus on unmanned targets and nonlethal means such as cyberattacks and sanctions. Cyberattacks may have an added symbolic advantage in that, like attacks in space, they are new, secretive, and high-tech, so they could be associated with space in people’s minds.

It will be nearly impossible to minimize or eliminate the delineation between lethal and nonlethal attacks—nor is it a good idea to try, as the distinction serves humanity well. It is such an important, natural, and long-standing distinction that crossing it will surely be seen as escalatory. Perhaps redefining satellites as critical civilian infrastructure or critical military infrastructure could convince observers that attacks in space also put lives at risk, but that may be too sophisticated an argument to have wide appeal. Sanctions are still often viewed as nonlethal policy responses despite their potential to create fatalities. Ultimately, terrestrial responses to space aggression may have to remain nonlethal.

Another major distinction is one of territory. An attack in space is against a vehicle controlled by a sovereign state, but states cannot claim sovereignty over any part of space. Retaliation against a state’s sovereign territory would likely be seen as crossing an important and escalatory threshold. Yet this is probably more permeable than the lethality threshold. States frequently take aggressive actions against each other’s territory. Just as the United States attacked naval targets in North Vietnam in response to an attack on its naval vessels in international waters, it may be able to attack relevant targets on another’s territory in responses to an apparent attack.

Conclusion

Some may believe that a search for terrestrial responses is unnecessary. Perhaps international condemnation, economic sanctions, or retaliation in space would be enough to deter military aggression in space. Conversely, space aggression might end up being covert enough that retaliation is unnecessary. There are clearly those who believe that deterring aggression in space is inseparable from the problem of deterring war on Earth, making specific responses to space aggression irrelevant.

While there is some validity to these views, the United States does need to be prepared to retaliate to limited military actions in space. Attacks are possible in both crises and limited wars. Russia’s war in Ukraine, for instance, does not involve direct conflict between the United States and Russia, but there may exist a temptation to attempt to disable the other’s space systems. Even direct conflicts between major powers are likely to have limits. During the Korean War, the United States did not use nuclear weapons, strike Chinese territory, or launch attacks at sea. These limits were, to some

36. General John E. Hyten, “Mitchell Institute Breakfast Series,” speech, June 20, 2017, US Strategic Command (website), <https://www.stratcom.mil/>.

degree, sustained by the fear of reciprocal attack. In a direct conflict between powerful states, the fear of retaliation may lead them to respect limits against space attacks.

For now, the reframing of military actions in space is moving less toward legitimizing cross-domain responses and more toward making finer distinctions about what is and is not allowed in space itself. The United States has attempted to establish norms against acts that create debris and dangerous rendezvous and proximity operations.³⁷ Still, this also does not invalidate the search for terrestrial responses in support of deterrence. Perhaps terrestrial responses would only be reasonable following certain types of attacks in space, such as those that cause debris. The new distinctions make the deterrence problem more complicated, but not impossible. They simply demand more creative solutions to identifying or imagining cross-domain retaliations. **Æ**

37. Sandra Erwin, "DOD Updates Space Policy, Formally Adopts 'Tenets of Responsible Behavior,'" *SpaceNews*, September 6, 2022.

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