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# CYBER, ROBOTIC, AND SPACE WEAPONS IN INTERNATIONAL CONFLICT

by Vince Vitkowsky

A Review of:  
Striking Power: How Cyber, Robots, and Space Weapons Change the Rules for War, by Jeremy Rabkin & John Yoo (Encounter Books 2017)

<https://www.amazon.com/Striking-Power-Robots-Weapons-Change/dp/1594038872>

## Note from the Editor:

The author favorably reviews a new book about cutting edge issues in international law and the law of war.

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- Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), of 8 June 1977, *available at* <https://ihl-databases.icrc.org/ihl/INTRO/470>.
- Philip Alston, *Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions*, UN GENERAL ASSEMBLY HUMAN RIGHTS COUNCIL (May 28, 2010), <http://www2.ohchr.org/english/bodies/hrcouncil/docs/14session/A.HRC.14.24.Add6.pdf>.
- *EU proposal for an international Space Code of Conduct, Draft*, EUROPEAN UNION EXTERNAL ACTION (March 31, 2014), [https://eeas.europa.eu/headquarters/headquarters-homepage\\_en/14715/EU%20proposal%20for%20an%20international%20Space%20Code%20of%20Conduct.%20Draft](https://eeas.europa.eu/headquarters/headquarters-homepage_en/14715/EU%20proposal%20for%20an%20international%20Space%20Code%20of%20Conduct.%20Draft).

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## About the Author:

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In this compelling and provocative book, Professors Jeremy Rabkin and John Yoo explain how developments in cyber, robotic, and space weapons can make the world a safer place. But they further explain that, to fulfill this potential, the rules for war will need to accept the legality of attacks directed at civilian objects.

Conflicts are an inevitable feature of international relations. To Rabkin and Yoo, the ultimate policy objective should be to end conflicts as quickly as possible, with as little destruction as possible. They argue that new weapons can support this objective, but only if policymakers have a full range of options. To that end, they write that “we should prefer an attack on civilian infrastructure instead of an attack on military facilities, if the former required less force and presented less chance of serious death and destruction.”

Rabkin and Yoo believe the most important use of new weapons may be maintaining the international order. These weapons will “allow nations to communicate their intentions more clearly,” and communicate their seriousness (i.e., coerce each other) without inflicting the same levels of casualties and destruction as conventional warfare. They are more precise, can be calibrated to particular circumstances, and can be only temporarily disruptive. Thus, they increase the possibility of a negotiated resolution, and are to be preferred over “more destructive signaling” or “full great power hostilities.”

## I. HISTORICAL OVERVIEW

The authors provide a *tour d’horizon* of the history of weapons, the conduct of war, and the rules of warfare. These rules are referred to variously as “War Law,” the “Law of Armed Conflict,” or “International Humanitarian Law,” often depending on one’s foundational perspective.

They observe that in the Twelfth Century, the invention of the crossbow, which could penetrate armor, weakened the strategic dominance of knights in Europe. This led to attempts to prohibit its use, including a call for a formal ban by the Second Lateran Council in 1139 and a decree by Holy Roman Emperor Conrad III that its use was a capital crime. The attempts failed because the weapon was simply too effective to give up. Attempts to ban improvements in the design and tactical use of the longbow also failed. And so it has continued, through the pattern of new weapons, calls for bans, and ultimate acceptance, with the arquebus (forerunner of the musket), aviation warfare, and other weapons through World War II and beyond. The only exceptions have been relatively successful bans on chemical weapons and agreed limitations on nuclear weapons.

In a chapter entitled “A Few Things Regarded as Barbarous and Cruel: The Law of War before the 1970s,” Rabkin and Yoo review the common historic acceptance of attacks against civilians and their property. To underscore the effectiveness of such attacks, they quote Civil War General Philip Sheridan, who wrote in his memoirs that “reduction to poverty brings prayers for peace more surely and more quickly than does the destruction of human life.” The authors could be misinterpreted as callous, but in context they are not. They are descriptive, identifying the absence of prohibitions of a broad range of attacks on civilian infrastructure and property. They note that “editorials in *The New York Times* defended the fire-bombings of Hamburg and Dresden

when they occurred. Even the use of atomic bombs against Japan won broad support in American opinion at the time.” Rabkin and Yoo urge that “we should hesitate to conclude that advocates for humanitarian constraint in our era have better principles than the greatest western war leaders of earlier times.”

## II. THE LAW OF ARMED CONFLICT

History teaches that appeals to international law have not stopped the development and use of increasingly effective weapons. Yet attempting to limit the development and use of robotic, cyber, and space weapons by law constitutes the prevailing approach of mainstream public international law professors and practitioners (“specialists”).

Rabkin and Yoo are strong skeptics of the Law of Armed Conflict as understood by most specialists. That Law is comprised of the United Nations Charter, the Geneva Conventions and some of the Additional Protocols, and the statements and actual practice of states (referred to as “customary international law”). Most specialists believe that the U.N. Charter only allows nations to use force in response to an armed attack or in self-defense to preempt an imminent threat. Rabkin and Yoo demonstrate that this interpretation does not reflect the reality of great power practice. They provide examples such as the U.S. blockade during the Cuban Missile Crisis, NATO’s intervention in the former Yugoslavia, and the Israeli destruction of Iraq’s Osirak reactor.

The authors’ main objections are directed to the 1977 Additional Protocol I to the Geneva Conventions (“AP I”), which elevated non-state actors such as independence movements and guerrillas to the level of nations and expanded the definition of civilian targets that were not to be attacked. They describe AP I—which the U.S. has not ratified—as instituting a significant break with the history and practice of the Law of Armed Conflict.

A chapter entitled “How the Law of War Was Hijacked” describes the authors’ view of the politics behind AP I and subsequent interpretations of the Law of Armed Conflict by the International Committee of the Red Cross and advocacy organizations, and occasionally by international tribunals. Their thesis is that the law “has become an arena for ideological struggle between advanced and developing nations.” They describe the hypocrisy of the specialists and the lack of great power acceptance of many prevailing precepts. Although they make their argument in a thorough and reasoned fashion, many serious and distinguished people will thoroughly reject their thesis, reasoning, and conclusions. Those disagreements will not be settled here. For present purposes, it is sufficient to note that, apart from fundamental matters such as genocide, the Law of Armed Conflict rarely has precise and unalterable content. Rather, it is living, evolving, and subject to debate.

Rabkin and Yoo argue that recent efforts to impose restraints on the use of new weapons through purported “codifications” are misguided and do not reflect state practice. As they put it, “the rules of war must evolve to keep pace with technology.” Attempts at “rules” must be deferred until new weapons are used and a better understanding of their effects emerges. This is effectively the position of the U.S. Government. For example, Rabkin and Yoo note that the 2015 Department of Defense Law of War Manual states that the existing laws of war *should* apply to cyber

operations, but that those rules are “not well settled” and are “likely to continue to develop,” and that the Manual does not “preclude the [Defense] Department “from subsequently changing its interpretation of the law.”

The authors argue that by limiting the circumstances in which the use of force could have a basis for unequivocal international support, the prevailing interpretation of the U.N. Charter reduces the range of options for coercing other nations. Yet, at times, coercion through limited, targeted force is exactly what is required. The challenges of this century—including terrorism, rogue nations, asymmetric warfare, and regional challengers—demand more frequent use of force, but low-intensity force, delivered with great precision and at lower cost.

Rabkin and Yoo would loosen the purported international law restriction on the use of force in anticipatory self-defense by removing the requirement of “temporal imminence.” They say the need to do this is especially acute when the potential danger is greatest, as in attempts to preempt the use or development of weapons of mass destruction. As an example, they cite the Stuxnet cyber exploit, which slowed down the Iranian nuclear program for years, with no direct injury to human beings.

Their more controversial argument is that the Law of Armed Conflict should be understood to permit the use of force through new weapons against civilian targets, as long as the force applied is non-lethal. This is anathema to international law specialists, who believe that the Law of Armed Conflict prohibits attacks on civilian facilities which are not also used for military purposes. Rabkin and Yoo point to examples in which nations have used direct and indirect coercion against civilians, such as trade embargoes and economic sanctions. They note that U.N. Charter authorizes the Security Council to impose such restrictions.

They would go further: political leaders should consider the use of new weapons in a broad range of attacks. They give the example of disabling the electrical supply in a city, which would cause “inconvenience” to a large number of civilians. But they do not address the likelihood that the consequences may be far more than “inconvenient.” Rabkin and Yoo state that they are not arguing against *all* limits. Instead, their “purpose is to reclaim space for debate and deliberation, rather than allow restrictive views about the law of war to foreclose opportunities offered by new technologies.” They argue that “the most important characteristic of new technologies . . . is the capacity for remarkable degrees of precision.” Even if the weapons lower the barriers for the use of force, the “earlier, more precise use of force could prevent threats from metastasizing into far worse dangers.” Thus these weapons “may lead to less destructive wars by giving nations more options to resolve their disputes, or, better yet, more information that prevents conflicts from occurring in the first place.”

## III. ROBOTIC WEAPONS

Robotic weapons, especially drones, have assumed a prominent role in recent conflicts. The Obama administration’s heavy reliance on drone warfare has been met with much criticism. Philip Alston, the U.N. special rapporteur on drones, concluded that U.S. drone practice may violate international law in several respects, including the prohibition against arbitrary deprivation of life. Others argue that these drone attacks are illegal because they

do not take place within the context of an international armed conflict. To Rabkin and Yoo, these criticisms confuse the legality of an armed conflict—its *jus ad bellum*—with how it is waged—its *jus in bello*. They argue that once a nation has decided to use force, it may choose which weapons to use—whether drones, ballistic missiles, commando teams, or anything else—subject only to the traditional considerations of distinction, proportionality, and military necessity. The authors favor drones because they are more precise and produce less collateral damage than other weapons. Although totally avoiding collateral damage is “a level of perfection unattainable in war,” drones can more closely approach this goal. As the authors put it, “destroying the Fuhrer’s bunker no longer requires leveling central Berlin.”

Applying the test of ending conflict as quickly as possible, with as little destruction as possible, the authors would accept attacks on civilian infrastructure or property if they were the most efficient and least destructive course of action. They note that nations have engaged in such attacks for various reasons, including humanitarian intervention. Most prominent are the NATO strikes on power stations, highway bridges, and broadcasting towers in Kosovo and Serbia. Rabkin and Yoo observe that “military lawyers have turned somersaults to justify these attacks.” Rather than engage in questionable reasoning, “nations should honestly admit that their militaries are employing force against civilian targets to pressure their enemies.” As to the element of proportionality, the authors argue that the standard should simply be whether the costs to civilians of an attack significantly outweigh the benefits of bringing a faster, less destructive end to the conflict.

Looking forward, Rabkin and Yoo argue that concerns about the development of *autonomous* robotic weapons are misplaced. Autonomous weapons are merely another technological advance. Targeting decisions may be made by algorithms, but humans make the decision to deploy, so “command responsibility” would apply, just as it does in other circumstances.

#### IV. CYBER WEAPONS

The authors believe dire warnings of a “cyber Pearl Harbor” are vastly overstated. They write that “fervid imagination seems to have outrun physical possibility.” They note that the developments of exploits such as Stuxnet are time consuming and expensive; that virus is reported to have taken four or five years to develop and to cost billions of dollars.

The rules of cyber warfare have not been set. There are no specifically applicable treaties. There has never been a declared cyber war, so there is no actual state practice from which states can even begin to set rules of customary international law. The great powers have agreed to no norms. The only point of consensus seems to be that a cyber attack that would have widespread kinetic effects on civilians, similar to the effects of “bullets and bombs,” would violate the Law of Armed Conflict.

But the absence of actual law has not dissuaded specialists from proclaiming its precepts. The most prominent effort has been the Tallinn Manual, which contains a set of “rules” composed by academics meeting in Estonia under the aegis of NATO. Now in its second edition, it is advisory in nature; it is not binding on anyone, including NATO members. According to the Manual, “the law of armed conflict applies to cyber operations undertaken

in the context of armed conflict.” There have also been other efforts at codification that assume that the rules of AP I provide relevant standards. AP I prohibits reprisals against all “civilian objects” and “civilians” in general, and notwithstanding formal reservations by some of the signatories, the Tallinn Manual proclaims that this is now customary international law, binding on all states. Yet this proclamation is based on almost no state practice or public announcements of position. Thus as Rabkin and Yoo observe, “they assume away the most important questions in a field that has just opened.” But the specialists do acknowledge that some key questions are unanswered. For example, the Tallinn Manual experts could not reach agreement on how to treat an attack on a major international stock exchange that causes the market to crash, because, as the Manual states, “they were not satisfied that mere financial loss constitutes damage” sufficient to constitute an armed attack.

The key point here is that the most fundamental questions concerning cyber attacks, such as what constitutes an armed attack, what circumstances permit such attacks, and what objects may be attacked, remain open. What *is* known is that states have indeed interfered with civilian websites, computer controls, and access to the internet, even if they have not acknowledged it. Rabkin and Yoo suggest that in some instances “a precisely targeted cyber attack might provide a tactically superior response” to the use of conventional weapons. Exploits can be individually tailored, ratcheted up or dialed down, and limited in duration, to meet particular circumstances. They can be a “more precisely tuned means of coercion between nations,” and “might serve the ultimate aims of humanitarian law” by reducing destructive kinetic conflict.

Here, the authors place too much confidence in a state’s ability to control and limit the effects of cyber exploits. Once a computer virus is launched “into the wild,” it is not uncommon for it to migrate to other computers in the region and around the world. There are several known instances in which this has occurred, including Stuxnet, the 2012 attack on Saudi Aramco, and the WannaCry, Petya, and NotPetya exploits earlier this year. Thus, cyber initiatives and responses implicitly carry a strong risk of unanticipated collateral damage. Rabkin and Yoo would likely respond that the damage would merely be economic or financial, or would only affect property, so in many cases the risks would be acceptable. To which the counter-response is: “that depends.”

#### V. SPACE WEAPONS

Space weapons present special challenges. Businesses and people rely on satellites in their day-to-day activities to a remarkable degree. The GPS system is one of the most obvious examples. Furthermore, space weapons have the potential to be especially destructive. For example, the authors describe proposals for space weapons, including “Hypervelocity Rod Bundles,” which are tungsten rods about twenty feet long and one foot in diameter that would be dropped from satellites. Accelerating to a speed of 36,000 feet per second, the sheer kinetic energy would give the impact on penetration of nuclear weapons.

For these reasons and others, there have been calls for a ban on the “militarization of space.” Rabkin and Yoo, to the contrary, argue against adopting any broad prohibition on the use of force

in space. The current legal structure is set by the 1967 Outer Space Treaty, signed and ratified by the U.S., the U.S.S.R., and other major powers. The treaty created a set of restrictions, the most relevant of which are prohibitions against the “establishment of military bases, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies,” and it prohibited placing weapons of mass destruction in orbit. It declared that space, the moon, and celestial bodies be used “exclusively for peaceful purposes,” but this provision has been construed by the U.S. to permit the use of space for self-defense.

To Rabkin and Yoo, the Treaty is significant for what it does *not* prohibit. It does not prohibit sending ballistic missiles *through* space, nor stationing reconnaissance satellites, nor basing conventional weapons in space. It does not prohibit any military operations not involving WMD in orbit or outer space. And it does not address the use of orbital weapons against terrestrial targets, or vice versa. The authors argue the ban on WMD makes it clear that all other weapons remain unregulated. Other specialists and the U.N. General Assembly reject these interpretations. These disputes, too, will not be resolved here. It is sufficient to note that there are viable arguments that existing international law permits a broad range of military activities in space. Importantly, in its 2006 National Space Policy, the U.S. Government stated that it “will oppose the development of a new legal regime or other restrictions that seek to prohibit or limit U.S. access to space.”

Rabkin and Yoo argue that the U.S. should use space weapons the same way as robotic and cyber weapons: “as a strategic mechanism to coerce other nations, which will lead to more peaceful resolutions of crises.” They add important caveats. They argue that nations should voluntarily limit employment of anti-satellite weapons, because satellites are critical to early-detection systems, and fear of their total destruction would undermine the strategy of deterrence. Similarly, nations should manage first-strike capabilities in a manner which would not destabilize the strategic balance of power. They recognize that the risks of triggering a nuclear exchange far outweigh any coercive benefits.

To Rabkin and Yoo, even though deployment of anti-satellite systems should be limited, nations should be able to target or disable *individual* satellites used for military purposes. Even dual-use satellites could be legitimate targets, “if they present a comparatively less destructive means of coercion.” And the authors note that “the absence of human beings in space makes space an even better arena for the use of force than the Earth, as the likelihood of the collateral death of civilians is virtually zero.” So again, use of space weapons could promote the “central goal of the laws of war—protecting innocent civilian life.”

Finally, the authors endorse another voluntary restriction, arguing that the U.S. should limit development and propose a narrow international ban of space weapons designed to strike ground targets, again because they would destabilize the balance of power.

Rabkin and Yoo acknowledge that most specialists in the field would go much further in arguing for international cooperation, including the prohibition of space-based weapons. But the authors believe any such comprehensive arms control regime simply would not succeed, because no country could have

confidence that the agreement would survive. Instead, they argue, limitations will have to be based on deterrence.

## VI. A STARTING POINT FOR LEADERS AND ADVISERS

The authors write with a deft and artful touch, with engaging and persuasive prose. Their key arguments are stated simply and directly. This makes it possible to be swept along by their arguments, sometimes at the expense of critical engagement.

But there are some key points that the authors could have addressed more thoroughly. Most importantly, they could have addressed the consequences that would befall civilians if the attacks they argue for take place, even the “limited” cyber attacks they describe as causing “inconvenience.” For example, an attack disabling a power system almost inevitably will lead to injury and death. Dark traffic lights will cause accidents. Hampered EMTs will fail to save lives. Hospital patients will be at risk. (Coincidentally, as this sentence is being written, infants in hospital intensive care units in Texas are being evacuated in anticipation of Hurricane Harvey, for fear that power outages will cause their respirators to fail.) Shortages of essential supplies could lead to physical altercations and riots. Attributing responsibility for any injury and death to the original attack is not a stretch. In short, as leaders weigh options, the human costs of an exploit often will defy accurate prediction. Similarly, the authors give short shrift to the effects of “mere” economic, financial, or property loss. An attack bringing down a stock exchange would cause utter chaos, with consequences impossible to foretell. They could be as widespread and disruptive as the bombing of a city by conventional means.

These observations do not detract from the importance of the book. *Striking Power* will be regarded by some as controversial, and by others as blasphemous. But it surely is groundbreaking and timely. As nations continue to develop and use new weapons, new concepts in international law *must* emerge. Rabkin and Yoo have provided a useful starting point for deliberations by political leaders and legal advisers charged with making life and death decisions in the real world.

